Umatilla Indian Reservation

Hazard Mitigation Plan

2016

TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

Executive Summary
Umatilla Indian Reservation Hazard Mitigation Plan

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) Board of Trustees adopted the first Umatilla Indian Reservation (UIR) Hazard Mitigation Plan on November 10, 2008. This action completed the initial efforts of several dedicated tribal members and employees to develop a plan to make the UIR more resistant to hazards both natural and man-made. The information about possible impacts and damage from hazards on the Reservation led to the identification of several mitigation actions that, if implemented, will reduce the effects of various hazards and help prevent the loss of life and personal injury and help reduce damage to property and the Reservation economy.

The effort to protect tribal members, employees, the visiting public, the economy, First Foods, cultural and natural resources of the Umatilla Indian Reservation is ongoing and core to the CTUIR Vision:

> ***"The Confederated Tribes of the Umatilla Indian reservation government serves our community through responsible leadership and accountability. We respect ourselves, citizens, neighbors, environment, culture, religion and a healthy lifestyle. We will uphold and exercise our sovereignty and Treaty. We strive to, once again, be a sustainable, empowered and prosperous nation.[i]"***

The efforts that follow, which include the implementation of mitigation actions, further refinement and periodic evaluation of this Plan and an update every five years are steps to ensure the success of this effort.

Although the types of natural and man-made hazards have not changed significantly since the first Plan was prepared, the CTUIR government and Reservation community has grown considerably since 2008. This Plan, prepared predominantly in 2015, reflects these changes in the community, reassesses the risks of hazards to existing and future structures as a means to comprehensively plan for the sustainability of the UIR culture and community.

The following is a summary of what is contained in the Umatilla Indian Reservation Hazard Mitigation Plan:

Section 1 includes a description of: the federal acts which shape the hazard mitigation planning process; the CTUIR governmental authority; the scope of the plan; and, a discussion of the planning process used to develop this plan.

Section 2 provides a profile of the Umatilla Indian Reservation including information about its government, economy, population, and a list of assets important to the community.

Section 3 provides an assessment of 12 natural hazards and three man-made hazards that were evaluated by the Hazard Mitigation Steering Committee to determine their level of risk to the UIR. This assessment includes the following for each natural and man-made hazard: a profile of the hazard, history of occurrence, impacts to UIR, extent and probable intensity and vulnerability.

Section 4 identifies the projected impacts from hazardous events on assets and resources located on the Reservation including critical facilities, infrastructure and CTUIR enterprises.

Section 5 sets goals and organizes proposed mitigation strategies under six mitigation categories: public information and education, preventive activities, structural projects, property protection, emergency services and natural resource protection. Section 5 also describes the process used to prioritize the mitigation measures for the UIR Hazard Mitigation Plan and lists mitigation measures/action items for implementation during this five-year plan.

Section 6 identifies existing policies and procedures that support mitigation efforts, outlines an action plan for the implementation of priority mitigation items, including a description of the project, the responsible party for initiating the action, possible funding sources, and whether the implementation of the measure is a short-term or long-term venture. This section also describes the CTUIR's grant and program management capacity.

Section 7 describes the possible grant funding resources available to the CTUIR to implement the mitigation measures/action items contained as listed in Section 5.

Section 8 provides a description of the plan maintenance process which includes monitoring, evaluating, and updating the plan and a program for continued public involvement in the hazard mitigation planning process.

A number of appendices accompany the UIR Hazard Mitigation Plan. These appendices provide a great deal of information supporting the CTUIR's hazard mitigation planning effort.

Acknowledgements

Patricia T. Perry, AICP is the Tribal Planning Office Senior Planner and principle preparer of this Plan. Ray Denny is the Public Safety Director and acting emergency management coordinator. Nicole Novak, GIS Specialist in the Office of Information Technology, produced the maps for use in the plan.

Members of the Hazard Mitigation Steering Committee (HMSC) served as technical advisors and included representatives from various entities; CTUIR staff, local, state and federal agencies and volunteer CTUIR committee/commission members including:

CTUIR Board of Trustees
Yellowhawk Tribal Health Clinic
CTUIR Public Works Department
CTUIR Department of Natural Resources
CTUIR Natural Resources Commission member, Gerald Reed
CTUIR Tribal Water Commission member, Mitch Pond
USDA Natural Resources Conservation Service
US Army Corps of Engineers
Umatilla County Emergency Management
CTUIR Law and Order Committee member, Michael Reed
National Weather Service, Pendleton, Oregon
Oregon Department of Forestry, Pendleton, Oregon
Bureau of Indian Affairs, Umatilla Agency
Wildhorse Resort and Casino
City of Pendleton

[i] CTUIR Comprehensive Plan, 2010

Page intentionally left blank

Section 1 - Introduction

The Umatilla Indian Reservation Hazard Mitigation Plan (the Plan) is a document intended to make the Umatilla Indian Reservation (UIR) more resistant to natural and man-made hazards and more resilient in recovering from the effects of natural or man-made disasters. A hazard is any situation that has the potential of causing damage to people, property, or the environment. Hazard mitigation is any action that is taken to reduce or eliminate long-term risk to human life and property.

In 2008, the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) completed an extensive evaluation of hazards that could impact the wellbeing of the Umatilla Indian Reservation and its residents and governmental facilities. The result of that evaluation was the CTUIR's first Hazard Mitigation Plan; developed with the assistance of consultants hired under a Federal Emergency Management Agency (FEMA) Pre-Disaster Mitigation Grant.

Federally approved Hazard Mitigation Plans are effective for five years and must be maintained and kept current within the five year intervals. The 2008 CTUIR Hazard Mitigation Plan that was approved by FEMA February 27, 2009 is expired. This Plan will serve as CTUIR's new Hazard Mitigation Plan meeting all current Federal requirements.

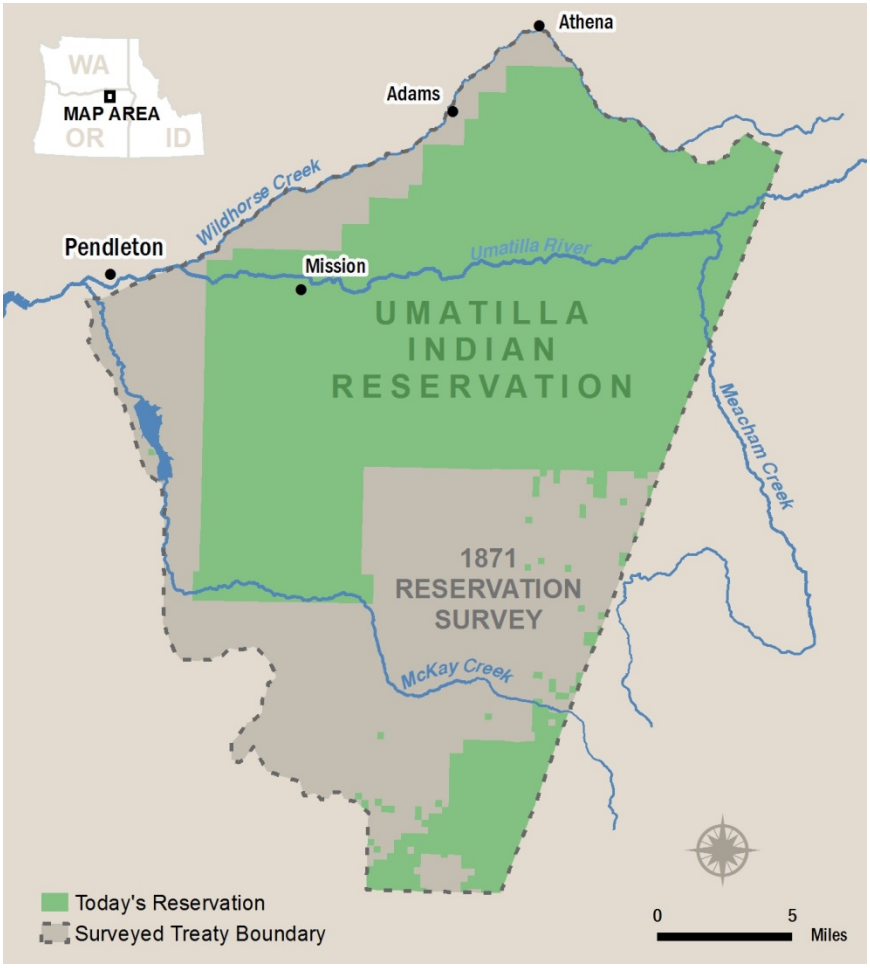


Figure 1-1
Umatilla Indian Reservation (UIR)

1. Why Prepare A Plan?

To assess the vulnerability of the UIR to hazards (risk assessment) and to identify projects or efforts that the CTUIR can take to minimize or eliminate the risk of having a disaster (mitigation).

Post disaster costs for repair and clean-up of homes, businesses and governmental structures as well as community infrastructure has been steadily rising. Generally, these cost increases are expected to continue to rise due to many factors. As the community continues to grow, the costs of responding to a disaster and the process of recovering from a disaster will continue to rise even faster.

To reduce or slow the costs of responding to disasters, the concept of mitigating or taking action to reduce damages from hazards before they occur was added to the process of receiving federal grant dollars in response to a disaster. The United States Office of Management and Budget has found for every dollar spent on mitigating a disaster, four dollars are saved during the response and recovery phase after a disaster. In other words, it pays to implement measures that help lessen the effects of hazards that threaten an area. FEMA now requires that jurisdictions prepare hazard mitigation plans in order to be eligible for certain grant funds for this reason.

2. Robert T. Stafford Act and Disaster Mitigation Act of 2000

Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law (PL) 100-707, was signed into law November 23, 1988. This act amended the Disaster Relief Act of 1974. The Stafford Act constitutes the statutory authority for most Federal disaster response activities especially as they pertain to FEMA and FEMA programs[1].

The Disaster Mitigation Act of 2000 (DMA 2000) amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act (the Act) by repealing the previous mitigation planning provisions (Section 409) and replacing them with a new set of mitigation plan requirements (Section 322). The current Robert T. Stafford Disaster Relief and Emergency Assistance Act was recently amended in 2013 as PL 93-288, 42 U.S.C. 5121 and emphasizes the need for state, Tribal, and local entities to closely coordinate mitigation planning and implementation efforts. This act also establishes minimum requirements for "mitigation plans" which are necessary if jurisdictions wish to be eligible for certain federal mitigation grant programs.

3. What Does It Mean to Be Disaster Resistant and Resilient?

Being disaster resistant means identifying which hazards present the greatest risks to people and assets and mitigating their effects as much as possible. Is it possible to be completely resistant to hazardous events? No. Certain hazards will continue to occur and cause power outages, traffic

problems, disruption of daily activities and other complications. The key to being disaster resistant is keeping hazardous events from becoming disasters.

Resiliency i**s** the ability to return to normal performance levels following a high impact/low probability disruption. Applying this notion of resiliency involves two things: mobilizing the means to reduce vulnerabilities and increasing the capacity to swiftly bounce back from major man-made or natural disasters.

4. The Purpose of this Plan

The purpose of the UIR Hazard Mitigation Plan is to:

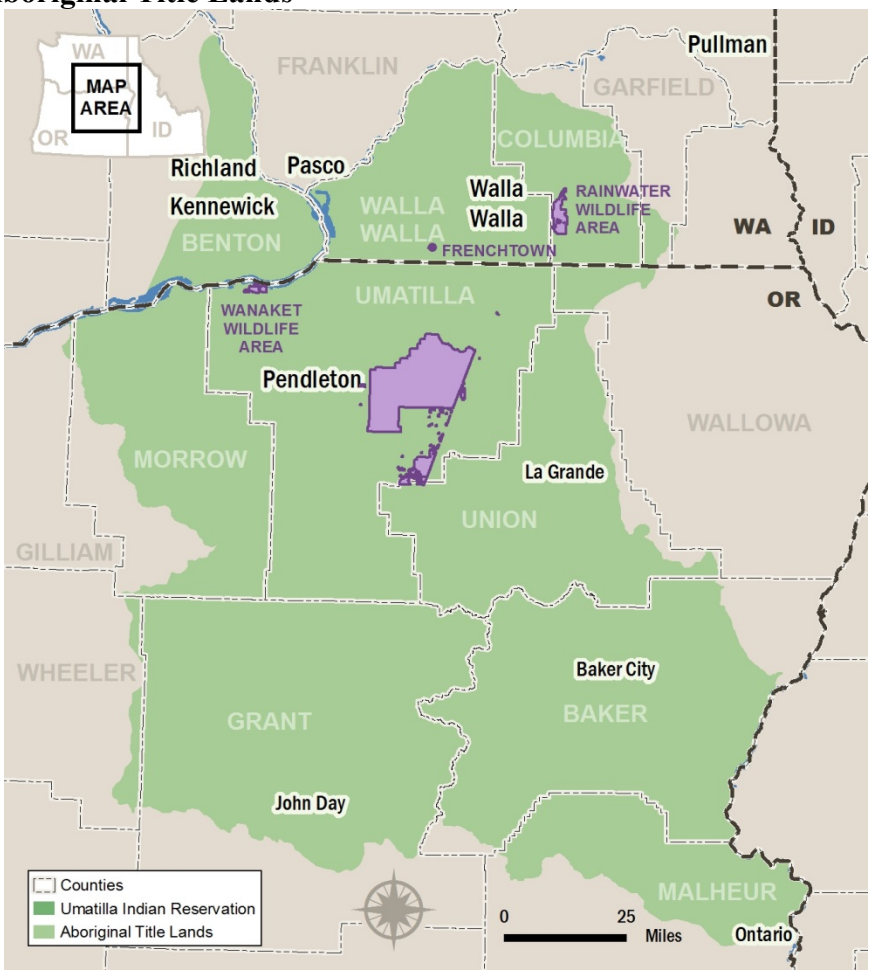
- Analyze the natural and man-made hazards that have the potential to cause death, injury and inflict damage to property within the current boundary of the Umatilla Indian Reservation and determine the type and level of risks associated with each hazard analyzed;
- Provide measures that, if implemented, will prevent or minimize the effects of various hazards and help protect the people and assets within the boundaries of the Reservation;
- Satisfy the federal requirements for tribal hazard mitigation plans as stated in the 44 Code of Federal Regulations(CFR), Section 201.7 Tribal Mitigation Plans thus enabling the CTUIR to become eligible for all hazard mitigation grant programs and disaster assistance funding administered by the Federal Emergency Management Agency (FEMA); and
- Provide a guide for all people living and working on the Reservation to help them make the Umatilla Indian Reservation more disaster resistant and resilient and able to withstand the detrimental effects from all of the natural and man-made hazardous events identified in this plan.
- Serve as a functional plan to implement the CTUIR Comprehensive Plan Goal and Objectives of the Public Safety Element.
- Serve as the CTUIR Flood Mitigation Plan pursuant to 44 CFR

5. Scope

This single jurisdiction Hazard Mitigation Plan applies to the approximately 172,000 acres of land within the "diminished boundary" of the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) and to trust lands, held for the CTUIR by the U.S. Department of Interior, that lie within the "aboriginal title" area. At the time of this writing only the trust lands identified as Wanaket Wildlife Area, Wanapa and French Town on the following map are included in this Plan. There are several small parcels of individual allotted and other trust lands within the aboriginal title area in Umatilla County that were not evaluated under this plan but are covered under the Umatilla County Natural Hazard Mitigation Plan.

The CTUIR also owns substantial acreage in Columbia County, Washington known as the Rainwater Wildlife Area which is not in trust status at this time. In the future, when the Rainwater Wildlife Area is converted to trust status, this Plan will be amended to include those lands.

Figure 1-2: Aboriginal Title Lands



Goals and mitigation measures of this plan may apply to Indian Trust lands outside the aboriginal title area as they pertain to CTUIR interests including but not limited to Tribal rights to hunt, fish, and to gather food and medicines. Historically and traditionally, members of the Cayuse, Umatilla and Walla Walla Tribes traveled beyond the aboriginal title area as described on Figure 1-2 to hunt, fish, gather and trade. These traditional and culturally important locations have great significance today as the Tribes strive to pass on skills, stories and knowledge generation after generation. These locations; trust, public and fee lands, outside the aboriginal title area fall under various other jurisdictions and their hazard mitigation plans which should be coordinated with the CTUIR to ensure protection of Treaty reserved rights. Today, these culturally significant places and "First Foods" are subject to hazards both natural and man-made. The "First Foods" are also sensitive to environmental conditions including climate change.

Lands under the jurisdiction of Umatilla County surround the UIR. Umatilla County has a separate Natural Hazard Mitigation Plan, recently updated April 17, 2014, that does not address CTUIR-owned Trust lands within that jurisdiction. Therefore, these lands are included within the scope of the CTUIR Hazard Mitigation Plan to insure that any pre-hazard mitigation measures or post-hazard assistance can be obtained for those lands.

6. Authority

The CTUIR, is comprised of the Cayuse, Walla Walla, and Umatilla Tribes, having retained the authority to self-government established in the Treaty of 1855. Through this authority, the Tribes have exercised the right to determine and plan for their future. The CTUIR was formally established with the adoption of a Constitution and By-laws in 1949. The CTUIR governmental structure consists of a nine member Board of Trustees elected by the Confederated Tribes enrolled membership (General Council).

In 1990, the Board of Trustees entered into a Memorandum of Understanding with Umatilla County that formally recognizes "that all land use planning and regulation of lands situated inside the boundaries of the UIR located within Umatilla County shall be administered by the CTUIR…" The Tribal Planning Office administers land use through the adopted CTUIR Comprehensive Plan, Mission Community Plan and Land Development Code.

The CTUIR also retains certain reserved Treaty Rights regarding hunting, fishing and gathering within a large area of aboriginal title lands surrounding the UIR. The CTUIR does not have land use jurisdiction on those aboriginal title lands that it does not own but does coordinate with surrounding jurisdictions regarding impacts to these reserved Treaty Rights. This coordination also includes natural hazards. The CTUIR has land use jurisdiction on lands being held in trust by the U. S. Department of Interior for the CTUIR that are located outside the diminished Reservation boundaries.

7. Funding

This plan was prepared by CTUIR staff with the support and direction of a voluntary Hazard Mitigation Plan Steering Committee utilizing no additional outside funding sources.

8. The Planning Process

The CTUIR Tribal Planning Department coordinated and developed this Hazard Mitigation Plan with the CTUIR Public Safety Department and a volunteer Steering Committee. The Oregon State Hazard Mitigation Plan, CTUIR 2008 Hazard Mitigation Plan, the Umatilla County 2014 Natural Hazard Mitigation Plan, the Walla Walla County Multi-Jurisdictional Hazard Mitigation Plan and all current FEMA requirements for Tribal Hazard Mitigation Plans pursuant to 44 CFR Part 201 §201.7 were reviewed along with all applicable CTUIR-adopted Comprehensive Plan, statutes, functional plans and policies. The Profile of the Umatilla Indian Reservation (UIR) and an inventory of all applicable plans and policies adopted by the CTUIR provide basic information about the Reservation community and Tribal government structure. Based on a review of documented hazardous events that have occurred on the Reservation, a community

Disaster Prevention Survey and existing Mitigation Plans listed above, Section 3- Hazard Identification/Risk Assessment Summary was developed.

CTUIR has a number of commissions and committees that act in an advisory capacity to the Board of Trustees to assist in conducting governmental affairs. These Commission and Committee members are enrolled CTUIR Tribal members appointed by the Board of Trustees and are governed by adopted Bylaws or the CTUIR Advisory Committee Code. The Law and Order Committee, advisory to the Public Safety Department and Board of Trustees, provided the formal review and recommendations to the Board.

Volunteers from several Commission and Committees served on the Mitigation Plan Steering Committee as well as CTUIR staff and representatives from local, state and federal agencies. The Steering Committee met multiple times to provide input during the preparation of this Plan. Documentation of meetings and public involvement is included in Appendix B.

The Steering Committee is comprised of representatives from:

CTUIR Board of Trustees
CTUIR Public Safety Director
Yellowhawk Tribal Health Clinic
CTUIR Public Works Director
CTUIR Tribal Planning Office
CTUIR Dept. of Natural Resources
CTUIR Natural Resources Commission member
CTUIR Tribal Water Commission member
USDA Natural Resources Conservation Service
US Army Corps of Engineers
Umatilla County Emergency Management
CTUIR Law and Order Committee member
Bureau of Indian Affairs, Umatilla Agency
Oregon Dept. of Transportation, Region 5
City of Pendleton
Wildhorse Resort and Casino
Oregon Dept. of Forestry
National Weather Service

This Steering Committee reviewed each stage of the Plan's development providing technical consultation. Updates on the Plan's development were provided to the Law and Order Committee at their regular bi-monthly meetings. Following the adoption of this Plan, the Law and Order Committee will continue its advisory role by reviewing the CTUIR Hazard Mitigation Plan annually and monitoring implementation of the migration measures within the Plan. A detailed description of the Plan's monitoring, review and evaluation is located in Section 8.

Following review by the Law and Order Committee and presentation to the CTUIR General Council, the CTUIR Board of Trustees has reviewed and adopted this Plan by Resolution, see Appendix A.

Citizen Involvement Strategy

To obtain input from Tribal members and the general public (all persons living or working on the Reservation and others living near the Reservation), a number of methods of communication were devised. The six elements of the strategy are as follows:

1. Newspaper articles - Confederated Umatilla Journal publishes a monthly newspaper that is sent to 1200 CTUIR Tribal households and mailed to 500 subscribers. Approximately 8,000 copies are distributed throughout the region.[2]

2. Survey – A survey was utilized to obtain additional input about critical assets on the Reservation and perceptions from citizens about which hazardous events present the greatest threat.

3. Provide updates about the status of the Tribe's hazard mitigation planning effort on the Tribe's internet website: http://ctuir.org/tribal-services/public-safety/emergency-management

4. Introduce the draft Plan to the CTUIR General Council and at the Community Forums for public comment.

5. CTUIR Hazard Mitigation Plan Outreach – Coordination with other agencies already involved in monitoring, preparing for and the recovery from hazardous events by inviting representatives to serve on the Steering Committee. Some of the agencies contacted include: USDA Natural Resources Conservation Service, USDOI Bureau of Indian Affairs, US Forest Service, US Army Corps of Engineers, Oregon Department of Transportation, Oregon Department of Forestry, Umatilla County, the City of Pendleton as well as other state and federal agencies.

6. Open House – As the planning process progresses, one or more "open house" meetings open to the public will be scheduled to inform citizens about hazard mitigation and to receive their input for the hazard mitigation plan.

All six elements of this strategy were implemented to inform Reservation citizens and public agencies about the UIR Hazard Mitigation Plan. Documentation of the citizen involvement effort is contained in Appendix B – Citizen Involvement.

Preparation of the UIR Profile

A profile of the Umatilla Indian Reservation was prepared to address topics such as the organizational structure of the CTUIR Tribal Government, the Reservation's population and economy, natural resources, and "special needs" population. The information contained in the profile presents facts useful in determining the level of risk presented by various hazardous events (Section 2). The Oregon State Hazard Mitigation Plan, the CTUIR Hazard Mitigation Plan (2008), the Umatilla County Natural Hazard Mitigation Plan (2014), the CTUIR Coordinated Human Services Public Transportation Plan and the US Census were used along with other information sources in the preparation of the Umatilla Indian Reservation profile.

Identification of UIR Assets

The next step in the development of this plan involved the identification of assets on the UIR. A prepared list of assets important to the Reservation community was reviewed by the public in the form of a survey and at public meetings. The prepared list of assets was amended to incorporate comments received from the public and finalized by the Steering committee. The assets are described in more detail in Section 4.

Hazard Identification and Risk Assessment

A review of survey results, plans, studies, reports, internet sites and newspapers was conducted to obtain information about various hazards that impact the Umatilla Indian Reservation (UIR). This information was used to determine which natural and man-made hazards have caused damage or have the potential to harm assets or disrupt activities on the Reservation in the future. Most information about hazards focused on Umatilla County and was not specific to the Umatilla Indian Reservation. For those hazards that generally affect all of Umatilla County (e.g., severe winter storms, drought, etc.), it was presumed that such hazards also affect the UIR in a similar manner. Hazards such as flooding, landslides and wildfire affect the Reservation directly and their specific affects were evaluated and considered by the Steering Committee.

The analysis of hazards was reviewed by the Steering Committee to identify which hazards present the greatest threats and which hazards present little or no actual threat to the Reservation. The analysis, contained in Section 3, categorizes all of the natural and man-made hazards reviewed as high, medium, and low threats to the Reservation.

A number of existing studies, plans and reports were used in the development of the hazard identification and risk assessment for this plan. Some of the studies, reports, plans and information sources used to produce Section 3 included the "Report of Flood Fight Potential Sites" by Jerry Gardenhire, the Umatilla County Community Wildfire Protection Plan, the Umatilla Agency and Confederated Tribes of the Umatilla Indian Reservation Wildland Fire Prevention Plan, the 2014 Umatilla County Natural Hazard Mitigation Plan, the 2008 CTUIR Hazard Mitigation Plan as well as the Oregon State Hazard Mitigation Plan.

Assessing the Threat from Various Hazards on Assets Located Within the UIR Boundaries

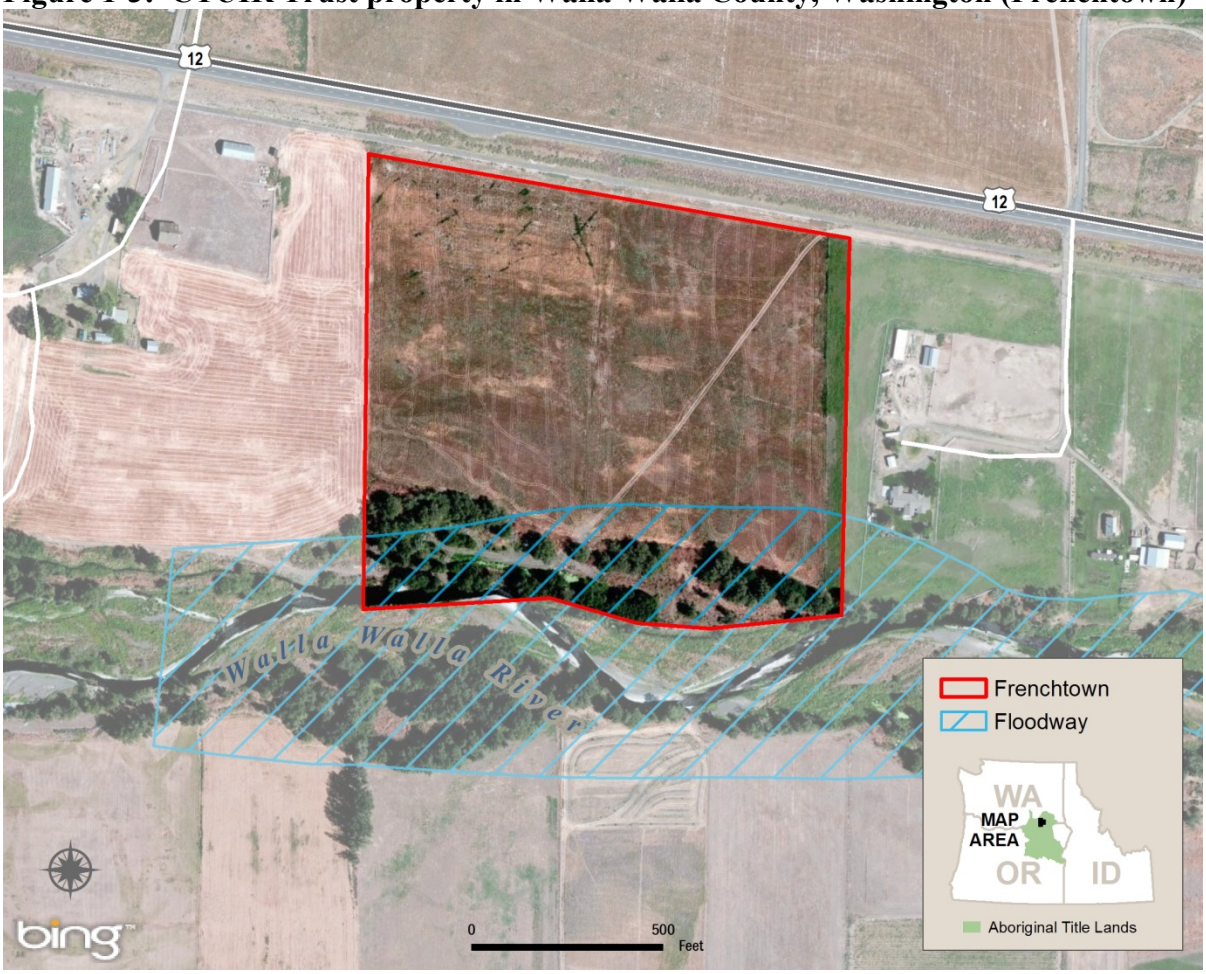
The Steering Committee then assessed the likely impacts from various hazards on each of the previously identified assets and concluded that not every asset would be impacted by each hazard the same way. Some hazards may not damage structures at all, but could interfere with the Tribal economy, damage natural resources, affect infrastructure and delay or prevent the delivery of services to Tribal members, non-tribal members, and the visiting public.

Assessing the Threat from Various Hazards on CTUIR-owned Trust Lands Within the Aboriginal Titled Areas

The Steering Committee reviewed the location of these lands and evaluated/assessed the hazards that could be associated with them by the same methodology used for lands and assets within the Reservation. These Aboriginal Title Area trust lands were generally included in their corresponding county jurisdictional plans although not specifically identified.

The Frenchtown property contains approximately 30 acres and is located in Walla Walla County, Washington. This Tribal trust property is undeveloped and has cultural and historical significance to the CTUIR. The property is located adjacent to the Walla Walla River which flows east to west along its southern property line. An agricultural water diversion in the Walla Walla River and associated irrigation water system easement is located on this property and serves adjacent farmland. The principle natural hazard associated with this property would be flooding and no man-made hazards have been locally identified except as described in the Walla Walla County Hazard Mitigation Plan Risk Assessment[3].

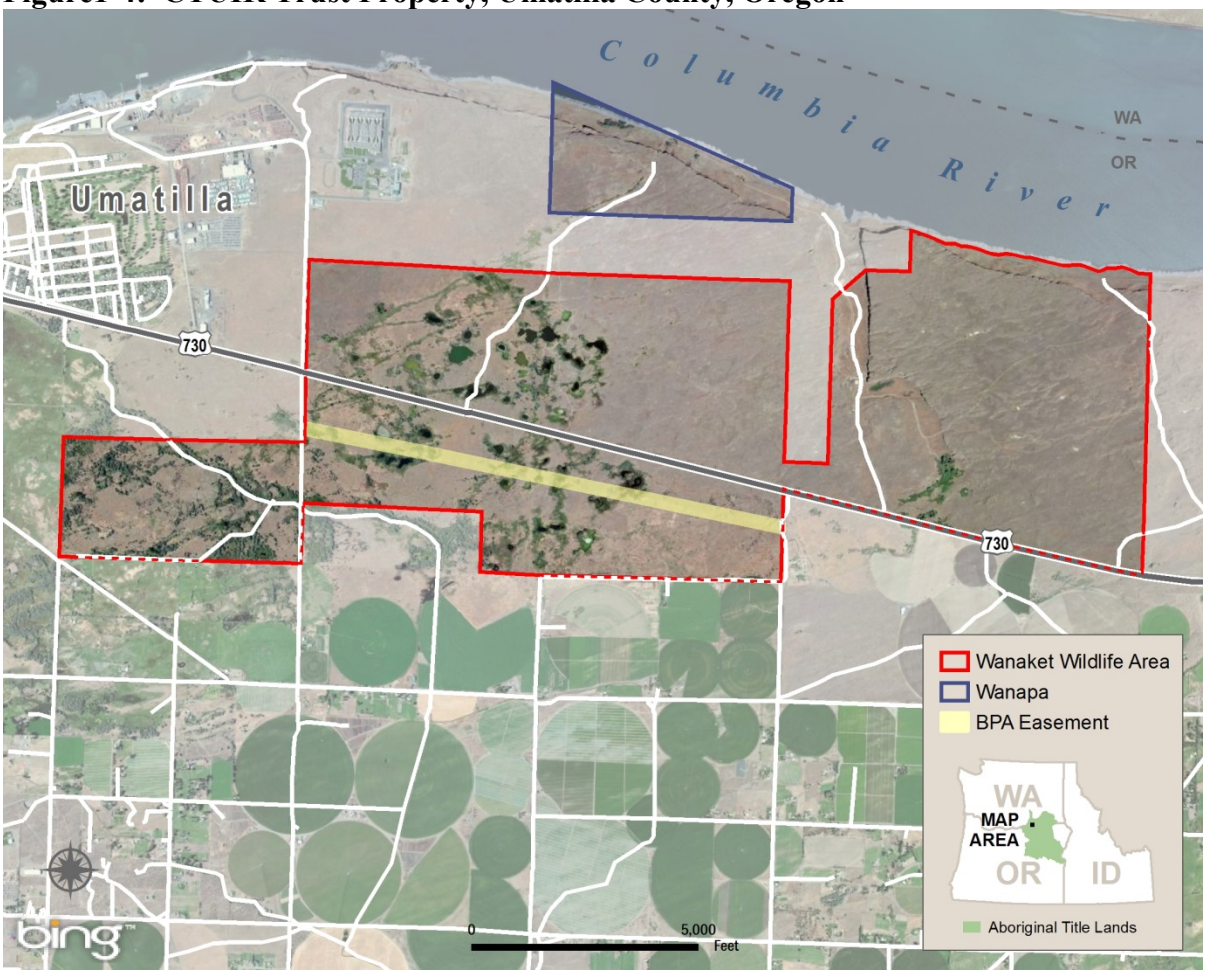
Figure 1-3: CTUIR Trust property in Walla Walla County, Washington (Frenchtown)



The Wanaket and Wanapa Tribal trust properties are located along the Columbia River in northwestern Umatilla County. Wanaket is a dedicated wildlife management area of approximately 2,768 acres. This property is undeveloped, containing many wetland areas and several ponds, with the exception of a 165-foot Bonneville Power Association transmission line easement, which crosses Wanaket in an east-west direction parallel to and south of Oregon State Highway 730. In July 2015, a proposed new transmission line easement adjacent and parallel to the BPA easement is under consideration by the CTUIR.

The Wanapa property is north of the Wanaket Wildlife Area and contains approximately 195 acres. Although currently undeveloped, the Wanapa property land use designation is industrial and will most likely be developed in the near future. Potential hazards that may be associated with the Wanaket and Wanapa properties are described and evaluated in the Umatilla County Hazard Mitigation Plan 2014.

Figure1-4: CTUIR Trust Property, Umatilla County, Oregon[4]



Development of Goals and Mitigation Measures

The Steering Committee was presented with draft goals and a number of possible mitigation measures designed to reduce the impacts from natural and man-made hazards that present risks to the Reservation, its residents and assets. The mission statement, goals, and mitigation measures from the previous CTUIR Hazard Mitigation Plan 2009 were considered, discussed, reviewed and refined. Completed mitigation measures were removed, new measures added and all mitigation measures were reprioritized utilizing the same scoring methodology for consistency.

Mitigation Measure Implementation

Each mitigation measure was assigned an identifier and corresponding Action Items which are listed in Table 5-1. Mitigation measures/Action Items were evaluated based on the six categories of mitigation of mitigation measures that can be used to reduce the impacts of identified hazards as recommended by FEMA. By coordinating the CTUIR measures with corresponding FEMA categories, the relationship of action items with FEMA funding programs is clearer. For each of

the Action Items, the principle internal department or program (CTUIR governmental) and the collateral internal and external agencies were identified.

Coordination with Federal and State Agencies, Umatilla County, and Neighboring Cities

The CTUIR invited representatives of federal and state agencies, Umatilla County, and the City of Pendleton to be on the Steering Committee to guide the development of the draft CTUIR Hazard Mitigation Plan and to identify coordination efforts on measures and action items. All stakeholders, the general public and agencies were also invited to a public meeting where the final Plan was presented.

Monitoring, Review and Plan Evaluation Process

Section 10 of the plan was prepared to describe the process used to monitor, review and evaluate this Plan. It establishes the roles and responsibilities of the Public Safety Director and Steering Committee in the monitoring, review and evaluation process as well as a schedule for the next review and Plan update.

Mitigation Measure Prioritization Process

A mitigation measure prioritization process was employed to satisfy the FEMA requirement to establish a process for prioritizing the plan's mitigation measures. This process had Steering Committee members evaluate each mitigation measure using criteria that emphasizes the benefit and costs of projects while satisfying mitigation and disaster resilient objectives. After individual Committee members finished prioritizing each mitigation measure, the total scores were combined and then averaged to establish a single score to be used to prioritize measures for the Umatilla Indian Reservation.

Sections of the Plan

Other sections of the plan and numerous appendices are provided to support the hazard analysis and risk assessment and to establish the governmental capacity of the CTUIR to support the hazard mitigation measures and programs discussed herein. Numerous resource documents are also provided to be used by the Public Safety Department and others that will monitor, review, evaluate and update this plan in the future.

9. Compliance with Federal Laws

Pursuant to 44 CFR 13.11(c), the CTUIR will continue to comply with all applicable Federal statutes and regulations during the periods for grant funds are received.

Pursuant to 44 CFR 13.11(d), the CTUIR agrees to amend the UIR Hazard Mitigation Plan when necessary to reflect changes in Tribal or Federal laws or statutes.

10. Person to Contact

Ray Denny, Director
CTUIR Public Safety Department
Telephone: (541) 429-7606

[1] http://www.fema.gov/about/stafact.shtm
[2] 2014 Confederated Umatilla Journal editorial staff
[3] Walla Walla County Multi-Jurisdictional Hazard Mitigation Plan (2010)
[4] Map created by CTUIR Geographic Information Systems Program

Section 2 - Profile of the Umatilla Indian Reservation (UIR)

1. - Brief History

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) is comprised of members of the Cayuse, Umatilla and Walla Walla Indian Tribes. These three tribes have intermingled economically, socially, and in language, to the point that tribal distinctions are less pronounced. The Walla Walla Treaty of 1855 was negotiated at Fort Walla Walla between the government and the three tribes. The Treaty contained 11 articles and established the Umatilla Indian Reservation.

Rather than accept the provisions of the Indian Reorganization Act of 1934, the tribes adopted a written Constitution and By -Laws which were approved by the Secretary of the Interior on December 7, 1949. This Constitution established the present tribal government known as the CTUIR. The day-to-day work of the Tribal government is carried out by a staff of 715 employees and includes departments such as Administration, Health and Human Services, Natural Resources, Economic and Community Development, Public Works, Education, Housing, Science and Engineering, and Public Safety. 1,705 employees are also employed at CTUIR-owned enterprises: Yellowhawk Tribal Health Clinic, Wildhorse Resort and Casino, Cayuse Technologies, Arrowhead Travel Plaza, Mission Market and Farming Enterprise. The combined total of 2,420 employees distinguishes the Reservation as being the largest employer in Umatilla County.[1]

2. - Location

The Umatilla Indian Reservation (UIR) is located within Umatilla County in northeast Oregon. The UIR borders the jurisdictions of Umatilla County, the city of Pendleton and federal lands managed by the Umatilla National Forest. Other cities in close proximity to the UIR are Adams, Athena, Weston, and Pilot Rock. The Reservation is situated primarily within the Umatilla River Basin and the Blue Mountains. The Tribal Governance Center is located in the unincorporated community of Mission. The Umatilla River, Interstate 84, Union Pacific Railroad and Oregon State Highway 331 are predominant corridors that transect the Reservation. Three much smaller unincorporated communities located on the Reservation include Cayuse, Thornhollow and Gibbon. These rural residential communities are located along the Umatilla River upriver from Mission.

3. - Climate and Geography[2]

Umatilla County has a semi-arid climate and is located in Climate Division 6, as established by the National Climatic Data Center. Air masses from the Pacific Ocean move across the Cascades which serve as an effective moisture barrier leaving areas to the east, including the Reservation, in a “rain shadow.” This region is Oregon’s major wheat producing area.

This climate supports shrub-steppe plant communities in the undisturbed areas. The topography of the UIR is gently rolling hills and valleys with elevations ranging from 1120 feet above sea level at the western boundary to 4000 at the eastern boundary in the Blue Mountains. Due to the elevation differences, the soil types vary from sandy loam well suited to growing alfalfa, and winter wheat to silt loam suitable for timber production.

Precipitation in the geographical area is seasonal. Approximately 10 percent of the annual precipitation comes in the months of July–September. Most precipitation comes from intense Pacific storms occurring from October through April. This weather pattern supplies sufficient moisture for productive crops such as wheat, vegetables, and livestock and develops a snow pack in higher elevation areas.

When years with higher precipitation levels occur during the winter months resulting in a thicker snow pack at the higher elevation, sudden warming events have the potential to cause rapid melting of the snow pack and flooding in lower elevations. The free-flowing Umatilla River, whose headwaters are located east of the Reservation in the Blue Mountains, flows east to west through the Reservation. This river has several tributaries that are also subject to occasional flooding.

With anticipation and concern about the impacts of climate change to the Reservation, the CTUIR is conducting a Vulnerability and Resiliency Assessment. This assessment would identify impacts to elements of homeland security, at-risk elements identified in this Plan and Tamanwit (natural law). The resultant Assessment will support the development of a future Climate Adaptation Plan which will assist the CTUIR's efforts to protect and preserve its First Foods, water supply, citizens as well as its economic viability.

Table 2-1: Climate Summary

Period of Record Climate Summary,
The City of Pendleton, OR, Radio KUMA

Month	Mean Maximum Temperature (deg F)	Mean Minimum Temperature (deg F)	Mean Temperature (deg F)	Mean Precipitation (inches)	Average Snowfall (inches)
January	44.5	27.8	36.2	1.6	4
February	49.3	28.9	39.1	1.2	3.1
March	58.5	33.8	46.2	1.4	0.8
April	65	38.5	51.7	1.5	0
May	73.1	45.4	59.2	1.7	0
June	80	51.4	65.7	1.2	0
July	89.9	55.9	72.9	0.4	0
August	89.3	54.4	71.8	0.5	0
September	80.3	46.1	63.2	0.7	0
October	66.6	37	51.8	1.1	0
November	52.2	32.4	42.3	1.9	0.9
December	42.4	26.8	34.6	1.5	2.9
Annual	**62**	**39.9**	**53**	**14.8**	**11.7**

Source: Western Regional Climate Center, Western US Climate Historical Summaries, http://www.wrcc.dri.edu/CLIMATEDATA.html – Temperature and precipitation data (1981-2010), snowfall data (1893-2011)

4. - Soils

Soil types of the UIR vary greatly ranging from wet Xerofluvents along river and stream floodplains to the rocky outcrops of the Blue Mountains. Between these soil extremes are large expanses of silt loam soils, in the lower elevations of the Blue Mountain foothills, which are conducive to the production of grain crops and hay. The higher elevations of the Blue Mountains contain various soil associations which are conducive to Douglas Fir, ponderosa pine and grand fir forest stands. Soils on the UIR were surveyed by the US Department of Agriculture Soil Conservation Service in 1988. This survey, *Soil Survey of Umatilla County Area, Oregon*, includes the UIR and continues to serve as the main source of information for soil identification; crop, rangeland and woodland productivity; building suitability and sanitary facility (septic) evaluation. The data and soil maps from this survey have been digitized into a Geographic Information System format for modern day use.

Due to the many specific types of soils occurring on the UIR, too many to list here, a general description is provided. Refer to the survey document for more detail.

The lower elevations of the Reservation, located in the western half, contain two core soil types that formed in loess, lacustrine sediment, and alluvium on hills, terraces and piedmonts. Pilot Rock and McKay are the predominant soil types. Pilot Rock soils are moderately deep, well drained soils that formed in loess overlying cemented alluvium; on fan terraces. Mckay soils are deep and well drained that formed in loess overlying alluvium; on fan piedmonts. These soils occur at elevations of 1,100 feet to 2,000 feet and are suitable for growing grain crops and hay.

The mid elevations also contain two core soil types that formed in loess, residuum and colluvium on the foothills of the Blue Mountains; Gwin-Gurdane-Rockly and Gurdane-Gwiny. Both soil types are shallow to moderately deep, well-drained soils that formed on ridges and hill slopes at elevations of 2,000 feet to 4,500 feet. These soils are suitable for hay and pasture.

The higher elevation soils, located on the eastern edge of the reservation, include the Umatilla-Kahler-Gwin and Tolo-Klicker associations. These soil types are moderately deep soils that formed in loess, volcanic ash and residuum on plateaus and hills of the Blue Mountains at elevations of 3,000 feet to 5,000 feet. These forest soils are suitable for growing grand fir Douglas fir, ponderosa pine and western larch.

5. - Population and Demographics

Based on the 2010 US Census, the total population of the Reservation was 3,027, a 3.4 percent change from the 2000 US Census. The change in population between 1990 and 2000 was 17 percent which was less than Umatilla County's 19 percent change. Umatilla County's 19 percent change in population between 1990 and 2000 was consistent with the growth rate for the Mid-Columbia Region which includes Wasco, Sherman, Morrow and Umatilla Counties. The percentage of population change occurring between 2000 and 2010 was significantly less than the previous decade for both Umatilla County and the Reservation at 7.6% and 3.4% respectively. Population growth for this region is projected to continue at a moderate rate over the next 20 years.

Table 2-2: Population Growth

	1990 Pop.	2000 Pop.	2010 Pop.	Change 1990-2000		Change 2000-2010	
UIR	2,502	2,927	3,027	17%	425	3.4%	100
Umatilla Co.	59,249	70,548	75,889	19%	11,299	7.6%	5,341
Oregon	2,842,321	3,421,399	3,831,074	20%	579,078	12.0%	409,675

Residential Population on the Umatilla Indian Reservation

The CTUIR Tribal membership enrollment as of January 2014 is 2,965. Nearly half of these Tribal members live on or near the UIR. The Reservation is also home to another 300 Indians who are members of other tribes. The total population of the Reservation, both Indian and non-Indian, was 3,027 in 2010. The total Reservation population grew by 17 percent during the decade of the 90s after a decline during the decade before; yet the total Native American population on the Reservation grew by 43 percent during the decade of the 80's. The development of Indian gaming enterprises on the Reservation drew more Indians back to their homeland due to the availability of more jobs. The Native American population grew even faster off-Reservation than on-Reservation, due in part to the lack of housing and employment opportunities on the Reservation.[3]

According to U.S. Census Bureau, 2010 Census data 1,458 Indian residents were living on the Reservation in 469 households. The non-Indian population on the Reservation was 1,569.

The projected population in Table 2 was obtained by analyzing previously developed population projections for the Reservation located in various CTUIR planning documents: *Study of the Population of the Umatilla Reservation, June 1997 Walker Research Group, Ltd.*; CTUIR Comprehensive Plan 2010; CTUIR Renewable Energy Feasibility Study, October 2005. Utilizing previous projections and 2010 US Census data with consideration given to Reservation housing availability, the percentage of population change from 2010 forward was reduced to 7.5% in Table 2-2.

Table 2-3: Population Projection

	1980	1990	2000	2010	2020	2030
Umatilla Indian Reservation Population*	**2619**	**2502**	**2927**	**3027**	**3254**	**3498**
Umatilla County Population**	**58,861**	**59,249**	**70,548**	**75,889**	**81,656**	**87,862**
Indian	**908**	**1,029**	**1,469**	**1,458**	**1567**	**1684**
Non-Indian	**1,711**	**1,473**	**1,458**	**1,569**	**1687**	**1814**
	2619	**2502**	**2927**	**3027**	**3254**	**3498**

* Based on 17% increase for 1980-2000 and 7.5% increase for 2010-2030 with US Census actual for 2010. The same percentages were utilized for both the Indian and non-Indian populations.

** No official updated projections for Umatilla County were available for the preparation of this Plan; 17% increase was used for 1980-2000, US Census actual for 2010 and 7.6% for 2010-2030.

Population with Special Needs

The ability to respond and recover from a disaster will vary among jurisdictions. One important factor for consideration before a hazardous event occurs is having information about the number of people living within a jurisdiction with "special needs." Three segments of the population that have special needs are older citizens, citizens with disabilities, and citizens living below the poverty level. Generally, the "special needs" population of a jurisdiction has a much harder time safely avoiding injury or damage from a hazardous event and recovering from a disaster than the general population. Tables 2, 3 and 4 provide information about UIR's "special needs" population along with comparisons of two of those population segments with Umatilla County's and the state of Oregon's.

Older Population Comparisons[4]

Depending on the type, intensity and the amount of warning before a hazardous event occurs, older citizens may have a greater degree of difficulty relocating before a disaster or keeping safe during a disaster. The time it takes to recover from a disaster may also take much longer as older citizens on fixed incomes do not have the necessary funds or are not physically able to make needed repairs.

Table 2-4 reveals that the percentage of people living on the Reservation in 2010 that were older than 65 is fairly consistent with the Umatilla County and state of Oregon percentages. This information reaffirms the trend that the older population segment will continue to increase.

Table 2-4: Population Comparisons

	Total Population	0-19	% of Total	20-64	% of Total	65 and over	% of Total
Oregon	3,831,074	972,183	25.4%	2,325,358	60.8%	533,533	13.8%
Umatilla County	75,889	22,398	29.5%	43,834	57.7%	9,657	12.8%
Umatilla Reservation	3,027	858	28.3%	1,711	56,6%	458	15.1%

CTUIR Population with Disabilities[5]

In some cases, citizens with disabilities can be even more vulnerable to hazardous events than older citizens. The 2010 Census defines people with disabilities as anyone "with long-lasting physical, mental, or emotional conditions or limitations that affect the ability to perform major life activities."

Table 2-5 below shows the disabled population on the Reservation as compared to Umatilla County and the State of Oregon, based on the American Community Survey estimates. Disabled status is determined using only those people 5 years of age and over.

Table 2-5: Disability Population Comparisons

Area	Population 5 years and over	Number with Disability Status	Percent with Disability Status
USA	**262,246,108**	**49,746,248**	**19.0%**
Oregon	**3,831,074**	**523,018**	**13.6%**
Umatilla County	**75,889**	**11,184**	**15.2%**
Umatilla Reservation	**3,027**	**529**	**20.0%**

Poverty Comparisons[6]

Table 2-6 reveals that the percentage of individuals living on the Reservation in 2010 that were below the federal poverty level (15.8%) is fairly consistent with the Umatilla County and state of Oregon percentages. This segment of the population may also have greater difficulty relocating before a disaster or keeping safe during a disaster. Like the older population, the time it takes people with less disposable income to recover from a disaster is usually much longer as they may not have the necessary funds or be able to repay disaster assistance loans often available under a Presidential disaster declaration. Therefore, mitigation measures that help prevent damage or reduce damage from a hazardous event will provide the greatest benefit to this segment of the population.

Table 2-6: Poverty Comparisons

Area	Number of Families Below Poverty Level	Percent of Families Below Poverty Level	Number of Individuals Below Poverty Level	Percent of Individuals Below Poverty Level
USA	**6,620,945**	**9.2%**	**33,899,812**	**12.4%**
Oregon	**70,032**	**7.9%**	**388,740**	**14.0%**
Umatilla County	**1,756**	**9.8%**	**8,524**	**15.8%**
Umatilla Reservation	**92**	**12%**	**458**	**15.8%**

Another measure of economic status is income. The Decennial Census determines the Median Household Income (everyone living in a residence), the Median Family Income (all related people in a residence) and the Per Capita Income.

Table 2-7:[7] Income Comparisons

Area	Median Household Income	Median Family Income	Per Capita Income
USA	**$41,994**	**$50,046**	**$21,587**
Oregon	**$49,260**	**$48,680**	**$20,940**
Umatilla County	**$45,861**	**$46,680**	**$16,410**
Umatilla Reservation	**$50,052**	**$55,256**	**$15,158**

6. - Land Use and Land Ownership[8]

Lands lying within the diminished boundary of the UIR total approximately 173,578 acres. Land ownership on the UIR is a checkerboard of non-Indian and Indian ownerships. Approximately 50.4%, 87,456 acres, is land held in trust by the US Bureau of Indian Affairs. Included in this trust acreage are 65,020 acres held in trust under individual Indian allottee ownership and 22,436 acres held in trust under CTUIR ownership.

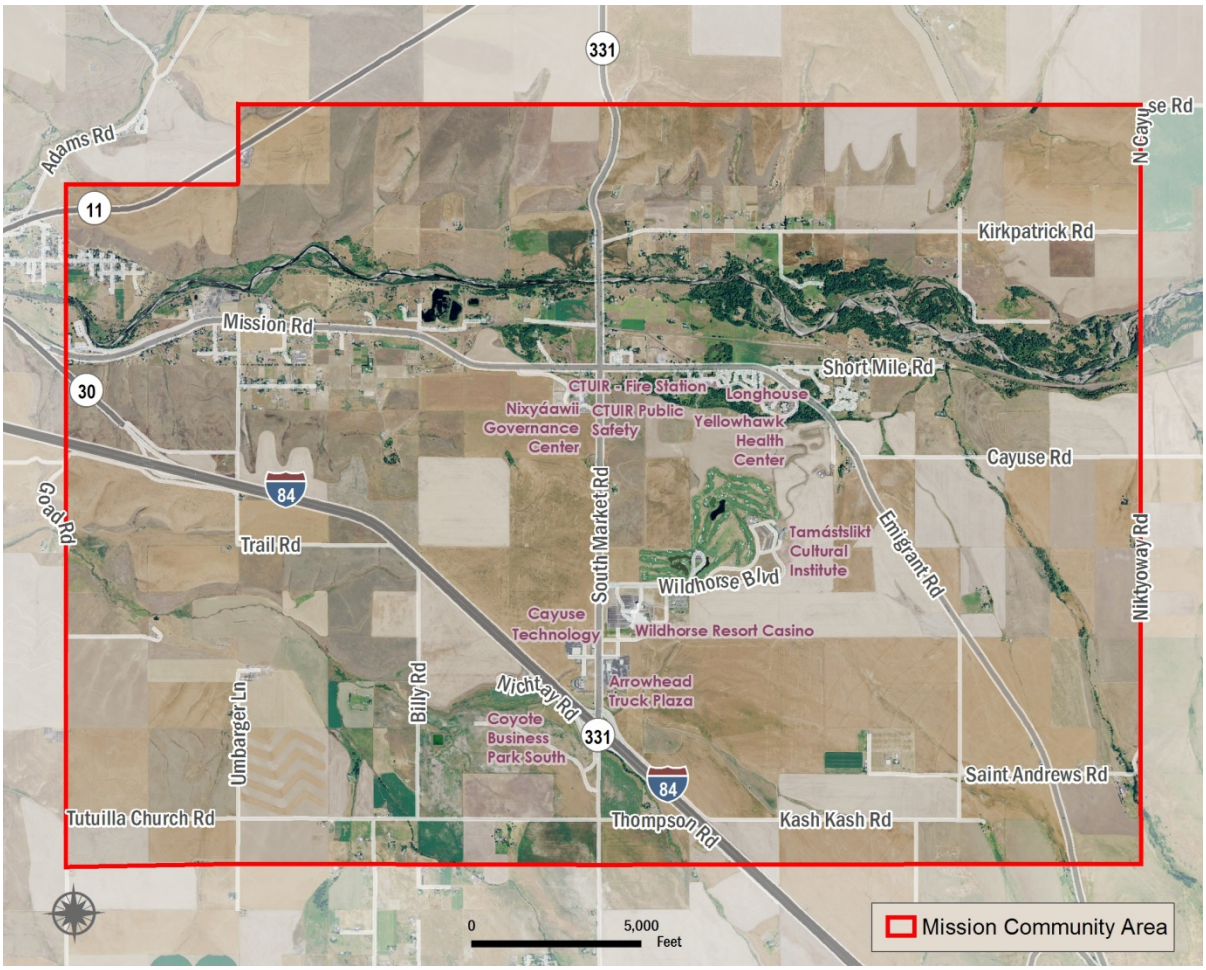
Approximately 49.6%, 86,122 acres, within the diminished boundary is owned as "fee" land. Included in this "fee" land acreage are 64,401 acres under non-Indian ownership and 21,721 acres owned by the CTUIR.

Existing Land Use

The general characteristic of the UIR for land use could be described as rural. Most of the lands on the UIR are used for agriculture on lower elevation lands with forestry and grazing in the upland, mountainous area. The most urban and developed area is located near the Reservation's western boundary, bordering the city of Pendleton. This area is identified as the Mission Community Planning Area, the most urban area of the Reservation. This Mission Community Area contains residential, commercial and light industrial development. The Mission Community Area (See map below) contains most of the Reservation's housing, schools, and Tribal and Bureau of Indian Affairs administrative office buildings. This area contains the Yellowhawk Tribal Health Clinic, CTUIR Government complex, CTUIR Fire and Emergency Services, both considered to be critical facilities.

A number of public facilities can be found in Mission such as community wells that serve the CTUIR's public water system, two steel water reservoirs located on hills above the community, and an electrical substation. The Mission Market and grain silos are also located in this area. Portions of the Mission Community area were developed prior to flood studies and portions of the developed area are located within the 500-year floodplain. The CTUIR operates and maintains a community sewer system within the Mission Community Planning Area which is connected with the system that serves and is operated by the City of Pendleton.

Figure 2-1: Mission Community Planning Area



New and Future Development Trends

Over the past decade, the CTUIR has completed several large capital improvement projects and established commercial and industrial shovel-ready development sites that have been partially developed (Coyote Industrial Park South and Coyote Business Park North and East). This new development is located in the vicinity of the Interstate 84 and State Highway 331 interchange near the Wildhorse Casino and Resort and the Arrowhead Travel Plaza within the Mission Community Plan area. The Nixyáawii Governance Center and Public Safety buildings were completed in 2009 and 2007, respectively, north of the commercial and industrial areas. All of this development is located outside of designated flood hazard areas.

By 2011, the CTUIR completed expansion of the Wildhorse Resort and Casino, the Resort Hotel (added 10-story with 200-rooms) Cineplex and Arrowhead Travel Plaza. New development in the Coyote Business Park North included the US Forest Service building and a three-business retail center added to the existing Cayuse Technologies and Davita Dialysis Center. Future development plans identified in the CTUIR Capital Improvements Program include additional

Tribal housing projects, new Yellowhawk Tribal Health Center, community water system expansion and continued development of the industrial and commercial business parks.

Future development trends will include focusing development within the Mission Community Plan area where community water and sewer services are available and exposures to natural hazards are minimized.

The map on the preceding page identifies where existing, new and future development in the community of Mission and the Interstate 84 - Highway 331 commercial – industrial area is likely to occur. The remainder of the Reservation is primarily and will continue to be farm and forest lands devoted to the sustainability of the First Foods and natural resources.

7. - Housing

Where development is located and the type of materials used in building construction are important factors in determining the risks facing a jurisdiction. The housing-type and date of construction are also important factors in assessing the risk from certain hazard. Certain housing types tend to be less disaster resistant and warrant special attention. For example, manufactured homes are generally more prone to wind and water damage than standard stick-built homes. Generally, older homes are more at greater risk from earthquakes than new homes where building codes have incorporated earthquake safety into standard building design. For these reasons, having information about the date and type of buildings found on the reservation will be useful in developing and prioritizing hazard mitigation actions.

Table 2-8 below provides a breakdown of housing types on the Umatilla Indian Reservation.

Table 2-8:[9] Housing

	All Housing Units on UIR	**Housing units occupied by American Indian & Alaska Native / Tribal Member**
Owner-occupied housing units	718	263 (36.6% of owner-occupied units)
Renter-occupied housing	360	206 (57.2% of renter-occupied units)
Owner-occupied housing with residents 65 and older	231	75 (28.5% of units [263])
Renter-occupied housing with residents 65 and older	72	32 (15.5% of units [206])
Total occupied Housing Units	1,078*	469**

* An increase of 65 units from 2000 Census

** An increase of 15 units from 2000 Census

This data reveals that Tribal-members comprise a larger percent (57.2%) of the rental market on the Reservation. The Housing Department manages 230 rental units on the Reservation. This leaves 141 occupied rental units on the Reservation not managed by the Tribal government. In ten years, the number of total occupied housing units on the Reservation has increased by 65 units; in contrast, the number of American Indian-occupied units has only increased by 15 units. Therefore it can be deduced that there has been an increase of 50 non-Indian-occupied units over the past ten years in contrast to 15 American Indian units.

Elders are present in 28.5% of the Tribal member-owned units and in 15.5% of the Tribal member rental units. According to Housing Department records, there are 44 elders (60±) living in rental units (more current than the 2010 Census data).[10]

8. - Employment and Industry

An important aspect in making a jurisdiction more resistant to hazardous events and more resilient in its recovery begins with the identification of the key components of a jurisdiction's economy and an understanding of how various hazardous events might disrupt the viability of that economy.

According to the Oregon Employment Department, the Mid-Columbia Region has experienced economic problems due to the downturn in the lumber, wood products and aluminum industries during the 1990s. To some extent, the region has been able to offset the loss of jobs in these industries by the addition of new manufacturing firms and regional distribution and service sector employment. The region's proximity to the Portland area, the Southern Pacific, Union Pacific and Burlington Northern railroad lines that run across the western edge of the region and Interstate 84 provide good opportunities for the transportation of manufactured and agricultural goods. In addition, the region's proximity to the Columbia River, the Cascade Mountains and the high desert terrain provide year-round sporting and tourism activities. Looking towards the future, healthcare services, manufacturing, retail trade, tourism, agriculture and food products, construction, lumber and wood products will continue to grow and develop to provide goods, services and work opportunities for area residents.

The Wildhorse Resort and Casino complex is the largest employer within the UIR and the second largest employer in Umatilla County. Obviously, it is very important to the UIR economy and has helped in improving the median household income of those living on the reservation. In total, there are more than 1600 people employed by the CTUIR and its enterprises.

Median household income is one indicator of the strength of a jurisdiction's economy. Median household income can be used to compare economic areas as a whole, but does not reflect how the income is divided among area residents. Table 2-7 illustrates the median household income for the reservation and county as compared to the entire state of Oregon in the year 2010. All three jurisdictions have median household incomes below the national average, which is $41,433.

9. - The Importance of Energy to the UIR

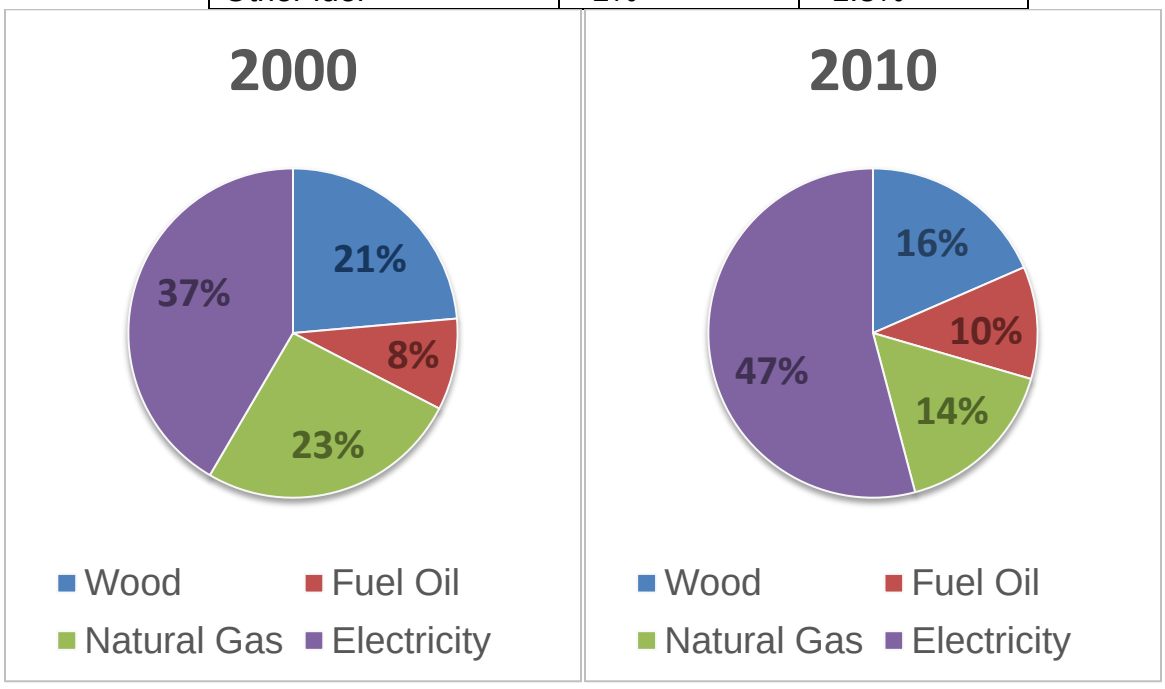
As of 2010, there were 1,078 occupied homes on the UIR. Most homes are heated by electricity, natural gas or wood. Wood is the traditional energy source for Native Americans and many households on the UIR still prefer wood heat to other heat sources. There are forested lands on the UIR and the UIR is in close proximity to the Umatilla, Wallowa-Whitman, and Malheur National Forests. Many residents of the Reservation gather their wood supply from these forests.

Residential electrical power needs on the UIR is estimated by utility providers at 5-6 megawatts, 1-2 for households and 3-4 for UIR operations. Peak demand for UIR is reported to be 3 megawatts, reached in both January and August.

In 2009, the CTUIR formally adopted an Energy Policy identifying energy related issues impacting the UIR and establishing goals. An Energy Policy Staff Team was also created to provide oversight of the Policy and the implementation of its goals.[11]

Table 2-9: UIR Residential Heating Sources Comparison 2000 to 2010[12]

	2000	2010
Wood	21%	15.9%
Fuel Oil	8%	9.5%
Natural Gas	23%	14.1%
Electricity	37%	46.6%
LPG	10%	12.2%
Other fuel	1%	1.8%



Governmental, Commercial and Industrial Energy Use – Umatilla Indian Reservation

Electrical power service is provided by Umatilla Electrical Cooperative and Pacific Power. Electrical distribution and transmission infrastructure maps are shown in Figure 2-3. The local distribution of natural gas service is provided by Cascade Natural Gas using one-inch to four-inch pipelines.

Wildhorse Resort and Casino – is the largest energy user among UIR enterprises. The resort includes an 18-hole golf course, gambling casino, conference center, Cineplex Theater, RV Park and 300-room 10-story hotel.

Tamástslikt Cultural Institute – is the second largest energy user among UIR enterprises due to its climate control for archival holdings and architectural style. This facility has undergone an energy efficiency study through Energy Trust of Oregon and successfully reduced its energy consumption from 1,169,920 kWh in 2003 to 439,120 kWh in 2012, a usage reduction of 62 %. In 2013, the Institute installed a 50 kW net metering wind turbine to offset an additional 25% of its current energy usage. The facility also reduced its use of natural gas from 38,464 BTU in 2003 to 9,425 BTU in 2012, a usage reduction of 75%.

Nixyáawii Governance Center Complex - Built in 2009, the main building's structural design includes energy efficiency and conservation. The Complex also includes a Public Safety Building (2007), the Department of Science and Engineering Field Station laboratory building (2012) and Kayak Public Transit maintenance building with bus barn (2013).

Coyote Business Parks (North, South and East completed in 2008) – Coyote Business Park South is a shovel-ready 286-acre industrial park consisting of 14 developable lots for light industrial use. Located south of I-84 on the Reservation, the site is currently undeveloped but water, sewer, gas and electric utilities have been installed. Therefore, at this time there is no utility usage other than for road lighting. Coyote Business Park North is a shovel-ready 67-acre commercial park containing 15 developable lots. Three lots are developed: Cayuse Technologies (a computer software developer/call center), Davita Dialysis Center (medical) and a 3-unit retail building currently containing Subway and Dairy Queen restaurants. Coyote Business Park East is a proposed 82-acre commercial park that would contain 12 lots. The current acreage in Coyote East is developed with the Arrowhead Travel Center and Kenworth Truck Repair businesses.

10. – Importance of Cultural Resources

Maintaining and enhancing cultural resources is of paramount importance to the UIR and the Tribes that make up the CTUIR. The importance of certain cultural resources is expressed in the "**CTUIR Department of Natural Resources First Foods**" prepared by Eric J. Quaempts, Director of the CTUIR Department of Natural Resources[13]. The First Foods strategy is significant to the UIR Hazard Mitigation Plan because it identifies the location of a number of important cultural resources scattered across the Reservation and to lands beyond.

The CTUIR Comprehensive Plan contains multiple Elements with specific emphasis on cultural resources: Natural Resources, Cultural Heritage and Treaty Rights. Comprehensive Plan Objectives listed for these Elements focus on tribal culture and resources. The following are a few example excerpts:

- *"Protect and preserve culturally significant places and resources including the graves and sacred items of the CTUIR members and ancestors, on the Umatilla Indian Reservation and within the CTUIR's ceded lands and traditional use areas."*
- *"Protect and restore the First Foods and exercise associated rights reserved in the Treaty of 1855 for the perpetuation of tribal culture."*
- *"To protect, preserve, and perpetuate the CTUIR's culturally significant places and resources for the benefit of current and future generations."*

The CTUIR has established a specific Program within the Department of Natural Resources, the Cultural Resources Protection Program, which also includes a Tribal Historic Preservation Officer. Although this Program is charged with promoting the protection, preservation and perpetuation of the CTUIR's culturally significant places and resources both on and off the UIR, all CTUIR governmental departments and programs are tasked with achievement of the Comprehensive Plan Objectives. To that end, the impact of natural and man-made hazards to cultural resources have been included for the evaluation of risks to these resources as reviewed in Section 3.

11. - Infrastructure on the Umatilla Indian Reservation

Water

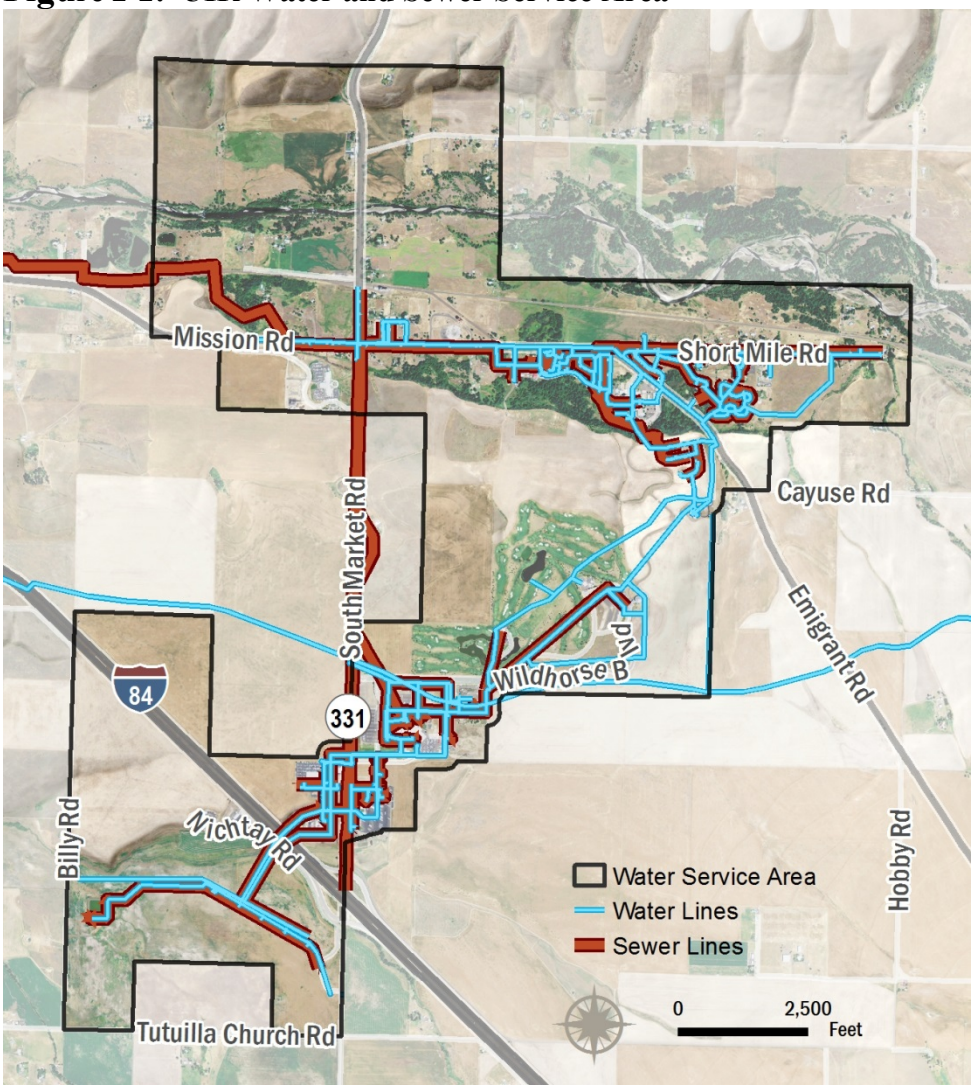
The CTUIR owns and operates its own water system. The Reservation's water system serves the Mission Community Planning Area which includes the governance center complex, Wildhorse Resort and Casino, business and industrial parks, Yellowhawk Tribal Health Clinic and residential housing. Five wells located in or near the Mission Community Planning Area provide the water source for the system's service area. A sixth well has been established south of the existing service area to supplement the system which is near capacity. Infrastructure to connect this well to the system has yet to be installed pending a funding mechanism.

Water system storage is provided by two 550,000 gallon water reservoirs (bolted glass-fused-to-steel tanks) that are 24 feet tall and 65 feet in diameter at an elevation of 1,390 feet. These reservoirs were constructed in 1995.

Although interconnected by the water system, wells numbers 1 through 4 primarily serve the community of Mission, while well number 5 primarily serves the Wildhorse Resort and Casino complex (includes hotel, casino, Cineplex, golf course and RV Park) and Tamastslikt Cultural Institute. The completion of well six with an additional water storage reservoir is essential to meet anticipated demands for Tribal housing as well as existing and future commercial and industrial development planned for the area. Well 6, along with providing a redundant supply of water to the existing community will provide the quantity and pressure for reliable fire suppression for the Reservation.

An intertie between the City of Pendleton water system and the CTUIR water system also exists. This allows water from the Pendleton system to be supplied to the Tribe's water system.[14]

Figure 2-2: UIR Water and Sewer Service Area



Sewer

Since 1972, an existing sewer trunk line from the city of Pendleton to the community of Mission has been the primary source for wastewater disposal. Additional trunk lines help remove wastewater from the Wildhorse Resort and Casino, Coyote Business Parks and the Arrowhead Travel Plaza back to the main line serving the community of Mission was added in 2008[15].

Electrical Power

The UIR has several electric utility companies that operate in either a transmission or local distribution capacity within the Reservation. The Bonneville Power Administration has a 35 Mile 230 kV high voltage transmission line that crosses the Reservation in a 100-foot wide right of way. This line is a regional transmission line that runs east-west between the boundaries of the UIR. A long term agreement between the CTUIR and BPA has been established to accommodate

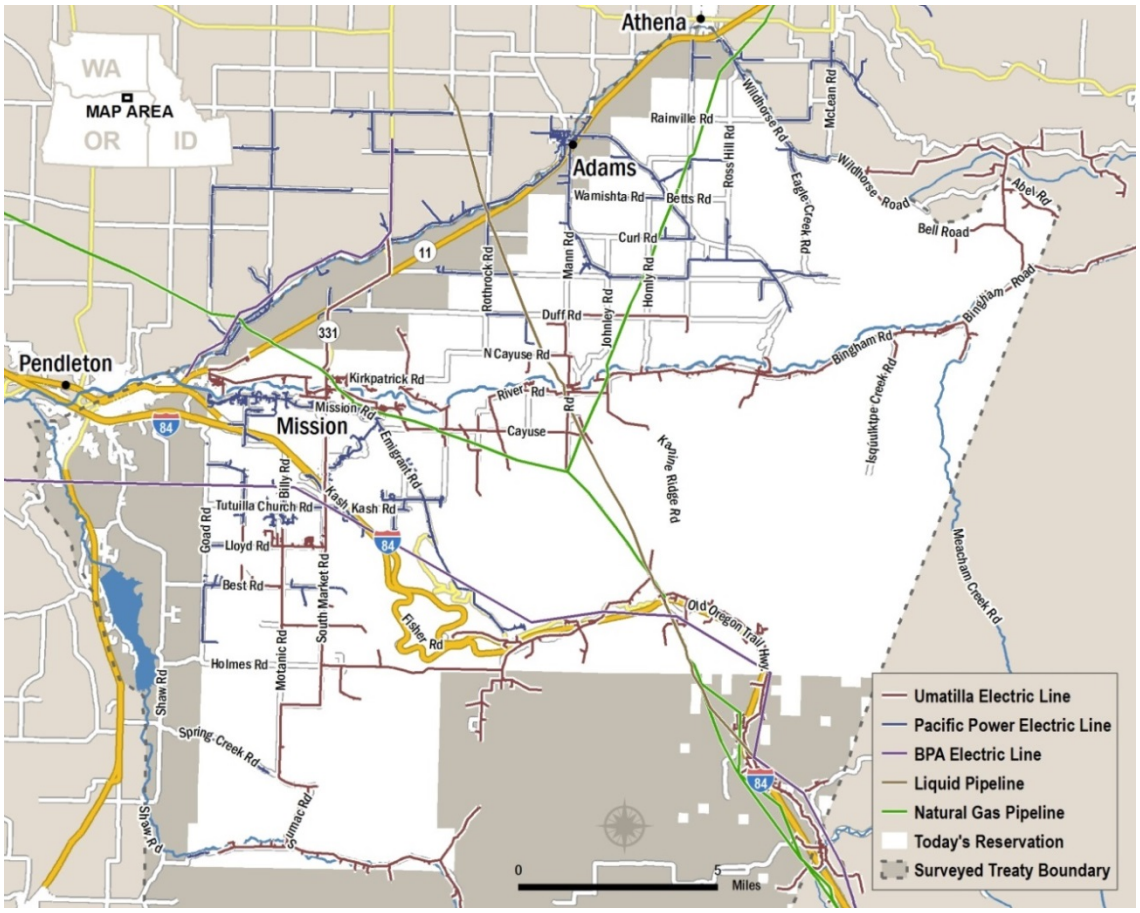
this line. The electricity being transmitted through this line does not directly serve the Reservation.

Local distribution of electrical service is provided by both Umatilla Electric Cooperative and Pacific Power. Local distribution and transmission infrastructure map is shown on Figure 2-3 and described below:

The Umatilla Electric Cooperative (dba UEC) is a rural electric cooperative that has its headquarters located in Hermiston, OR. UEC has a substation located at Mission. UEC primarily serves residents and farms.

PacifiCorp (dba Pacific Power) is a large investor-owned integrated electric power company. PacifiCorp is a wholly owned subsidiary of Berkshire Hathaway Energy with headquarters located in Portland, OR. Pacific Power serves the UIR from the Round-Up Substation that tie into the Bonneville 230 kV line. Pacific Power serves the primary commercial load on the Reservation including the Wildhorse Resort and Casino, Hotel, Cineplex, RV Park, Arrowhead Travel Plaza, Gulf Course and Tamástslikt Culture Institute as well as many of the more densely populated residential areas[16].

Figure 2-3: UIR Utility Transmission and Distribution on the



Natural Gas

The UIR has several natural gas companies that operate in either a transmission or local distribution capacity within the Reservation. Cascade Natural Gas Corporation (Cascade) is the local natural gas distribution company within the Reservation with a local distribution system that includes ½ inch to 4 inch diameter pipes. Cascade is a wholly owned subsidiary of MDU Resources Group, Inc. with headquarters located in Kennewick, WA.

Two major natural gas transmission pipelines traverse the UIR in roughly a northwest - southeast direction. The Williams Companies owns Northwest Pipeline, LLC which owns and operates the northwest natural gas transmission system through the UIR comprised of 30 inch, 22 inch and 6 inch diameter steel pipes.

Tesoro Logistics Northwest Pipeline, LLC (San Antonio, TX) provides liquid petroleum products through two liquid fuel transmission lines of 6 and 8 inch and still owns a tank facility on the reservation that is currently not used due to environmental concerns.

Fuel Storage

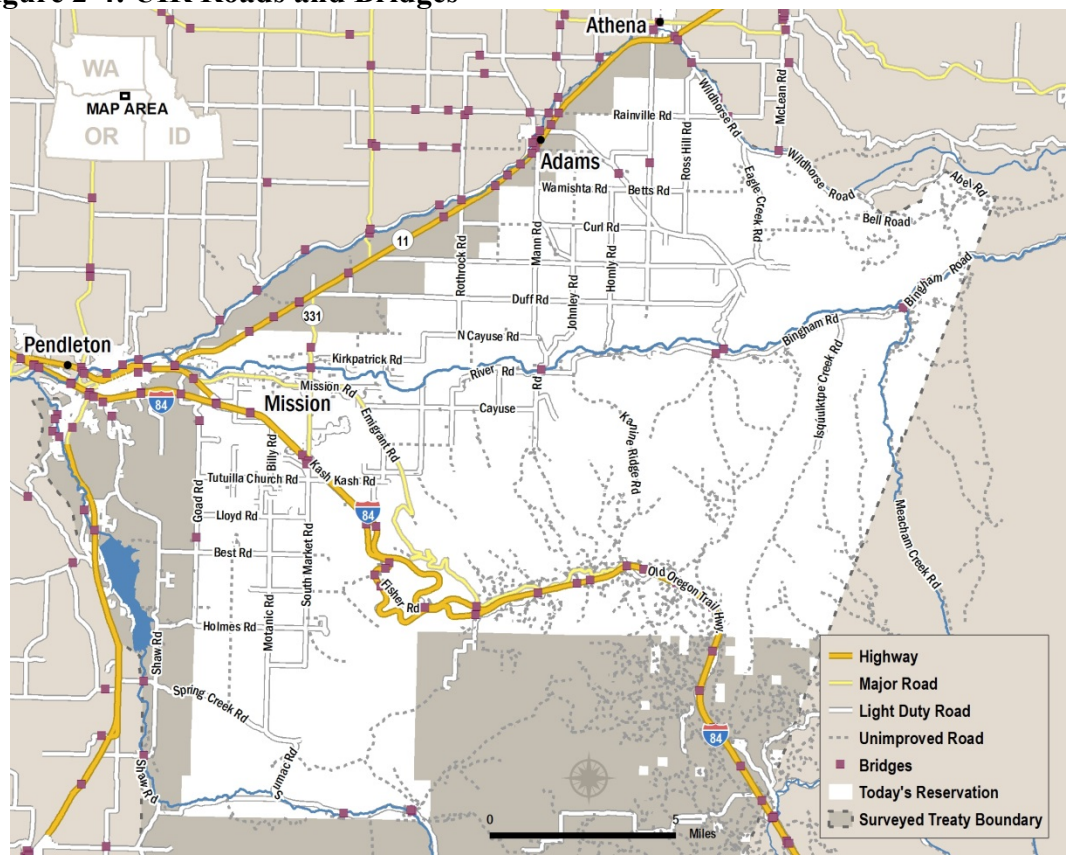
There is only one commercial transportation fuel station on the Reservation, the Arrowhead Travel Plaza. The plaza is owned by the CTUIR, is located on the northeast quadrant of the Interstate I-84 interchange with Oregon Highway 331 and contains a fast food chain restaurant, a mini-mart and services for truckers. The plaza provides gasoline, diesel and liquefied petroleum gas service and is diversifying to serve all travelers. A truck service/repair center is located adjacent to the Travel Plaza and is currently leased to Kenworth.

12. - Transportation

The UIR and Umatilla County rely primarily on automobiles and trucks as the main sources of transportation. Maintaining the highway and road system and to the reservation and within the reservation is essential to the area economy and general welfare of the residents of the UIR.

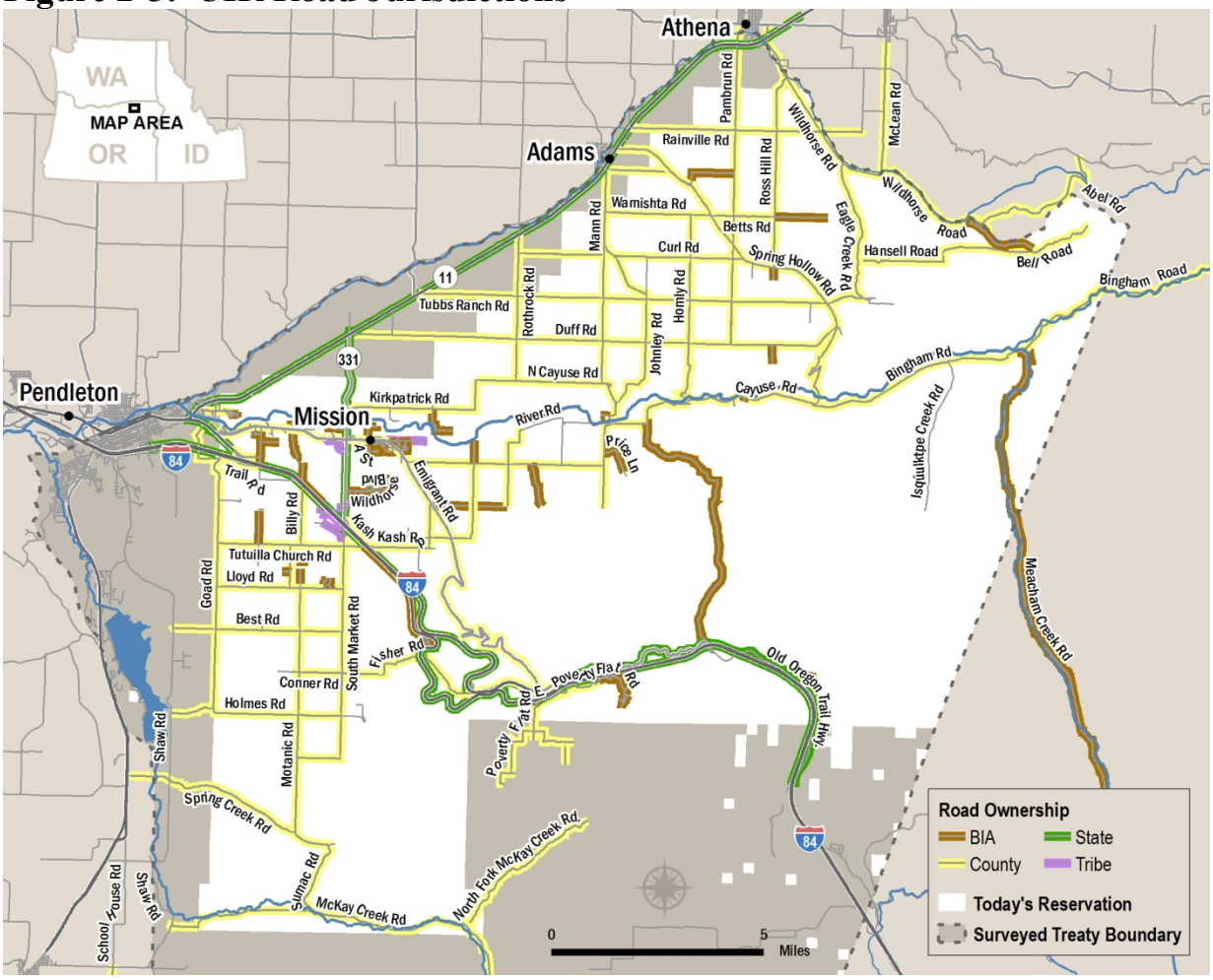
Interstate I-84 runs through the reservation east-west and Oregon State Highway 331 runs through the reservation north-south. The majority of roads and bridges on the Umatilla Indian Reservation are maintained and under the jurisdiction of Umatilla County with some roads and bridges under the jurisdiction and maintenance of the CTUIR Public Works Department. The figures below identify the various road types and jurisdictional ownership on the UIR.

Figure 2-4: UIR Roads and Bridges



Other transportation modes that exist on the UIR are Union Pacific Railroad lines, pipelines used for transporting natural gas, and high voltage electrical lines used by the Bonneville Power Administration to transport electricity.

Figure 2-5: UIR Road Jurisdictions



Commuting

The CTUIR and its enterprises are major employers in the area. The CTUIR operates a fixed bus route regional public transit system (Kayak Public Transit) throughout the northeastern Oregon and southeast Washington region and a subsidized taxi voucher program. Although a high percentage of workers drive alone to work, ridership has continued to increase each year as gasoline prices rise and population in the region increases. Figure 2-6 below identifies the Kayak service area and Table 11 demonstrates the increased use of the transit system.

Figure 2-6: Kayak Public Transit Service area

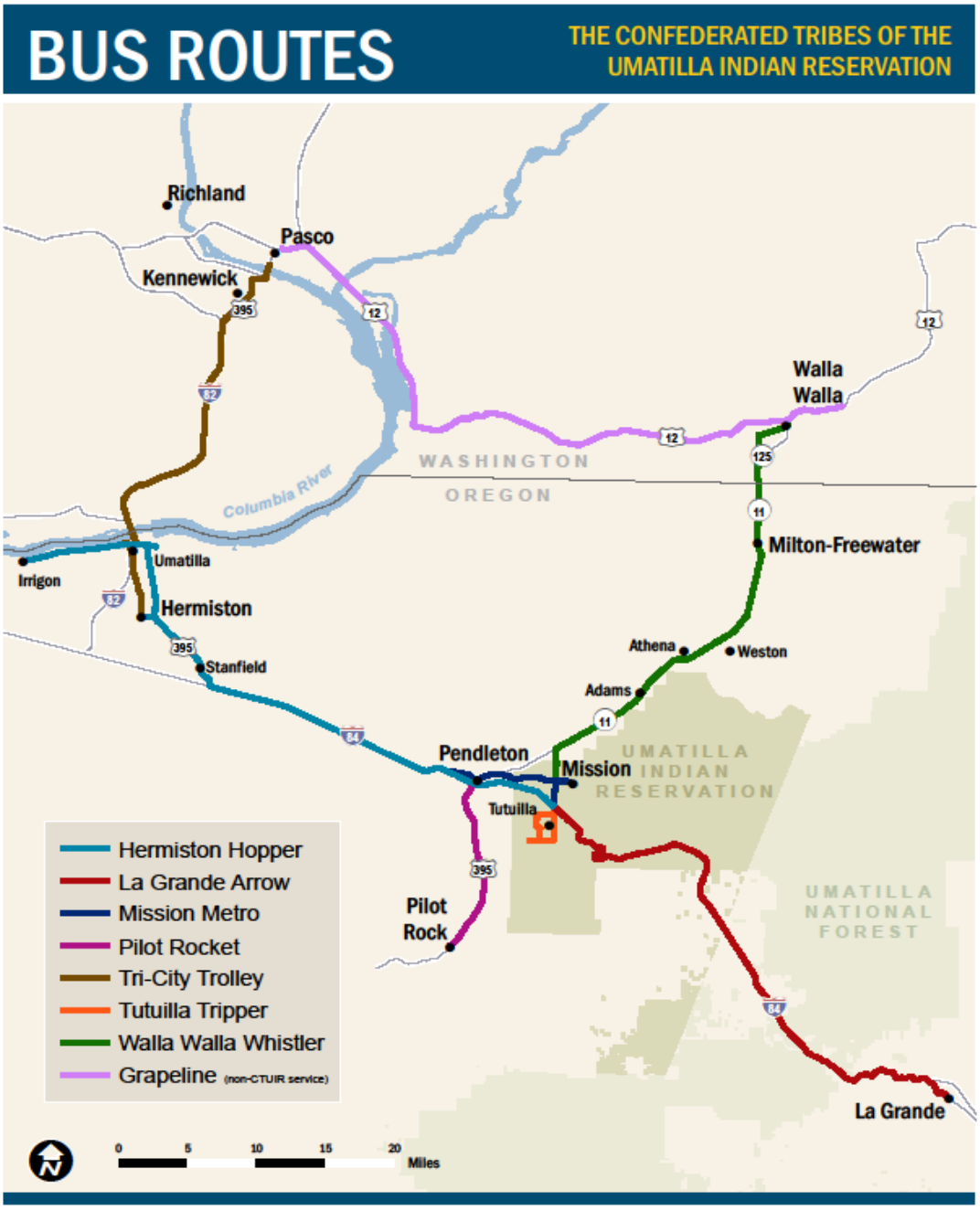
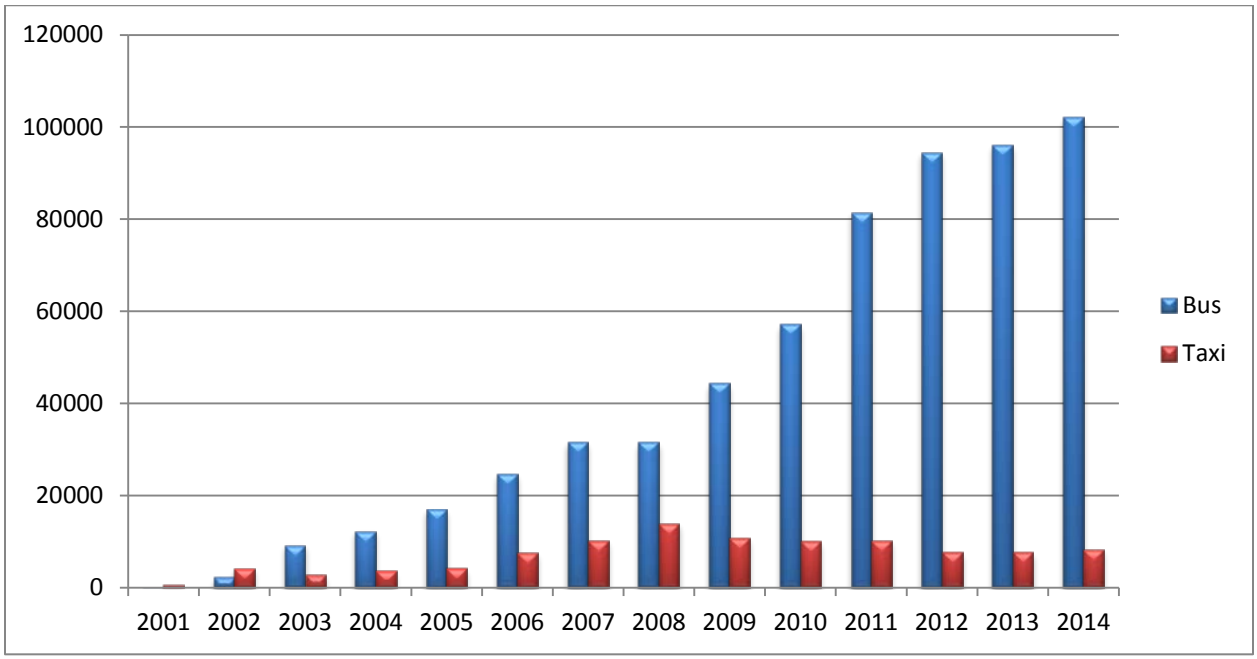


Table 2-10: Kayak Public Transit Ridership



As the area's population increases, there will be an increase of automobile and truck traffic that will place additional stress on local roads, bridges and infrastructure. The impact of an emergency can disrupt automobile traffic and the CTUIR transit system making evacuations difficult. This is particularly important where hazardous materials are being transported along Interstate 84 and nearby railroad lines. An accident involving hazardous materials could result in a dangerous situation. In addition, weather related hazards, such as severe winter storms, freezing fog and localized flooding can render roads unusable stranding residents. A severe winter storm has the potential to disrupt the daily driving routines of the entire Reservation population as well as interrupt services provided regionally by CTUIR's Kayak Public Transit.

Other modes of transportation for commuting on the UIR include the Wildhorse Resort and Casino Shuttle and Mid-Columbia Bus Company. The Casino Shuttle provides local service for patrons to and from the East Oregon Regional Airport and local hotels. The Bus Company contracts with area school districts providing school bus service only.

Bridges and Highways

There are 20 bridges on or partially on the reservation (Figure 2-4 above). Most bridges are not seismically retrofitted, creating significant risk to the commuting population, the region's economy, particularly in areas that may be at risk for earthquakes. Incapacitated bridges can disrupt traffic and exacerbate economic losses because of the inability of industries to transport services and products to clients. The bridges in the region are part of the interstate, state and local highway system. Some bridges are maintained by the Oregon Department of Transportation, while others are maintained by other jurisdictions.

13. - Critical and Important Facilities and Assets

Critical facilities are those facilities that are critical to government response and recovery activities immediately after a disaster. These facilities include but are not limited to police and fire stations, public works facilities, sewer and water facilities, medical facilities, bridges and roads, shelters. Important facilities may not be critical during or immediately after a disaster but are important to the resiliency and recovery of the reservation from a disaster.

Infrastructure and Critical Facilities

Nixyáawii Governance Center
Public Safety Building – Police Station
Umatilla Tribal Fire Station
Yellowhawk Health Clinic
Infrastructure Lifelines: Water; Electric transmission, distribution and substation; Natural Gas pipelines; Wastewater Disposal, Communication Facilities (telephone, broadband, cell); Transportation Corridors

Historic and Cultural Sites

Tamastslikt Cultural Institute
Nixyáawii Community School
St. Andrews Mission/Crow Shadow Institute of the Arts
Indian Cemeteries (3) [1 is off the Reservation near McKay Reservoir]
Veterans Memorial
Tribal Longhouse

Economic and Special Needs Assets

Elizabethan Manor [adult care facility]
Mission residential area
Coyote Business Parks (North, South and East)
Wildhorse Resort and Casino (hotel, golf course, RV Park, Cineplex)
Grain Elevator
Mission Market
Nixyáawii Governance Center
Nixyáawii Community School
BIA Offices
Farming Enterprise (Agricultural Land)

Environmental Assets

Golf Course
fish facilities (hatchery/acclimation)
wetlands/riparian areas
Indian Lake
range, agriculture and forest lands

[1] Employment statistics obtained from the CTUIR Department of Administration, Finance Office
[2] http://www.ocs.oregonstate.edu/county_climate/Umatilla_files/Umatilla.html
[3] CTUIR Renewable Energy Feasibility Study, June 20, 2005
[4] U.S. Bureau of the Census, 2010 Census
[5] Ibid
[6] Ibid
[7] U.S. Census Bureau, 2006-2010 American Community Survey and 2010 U.S. Census (Median is the middle value in a distribution)
[8] Data provided by the CTUIR Tribal Planning Office
[9] U.S. Bureau of the Census, Profile of Housing Characteristics 2010.
[10] CTUIR Housing Strategy Plan adopted by Board of Trustees Resolution No. 13-023 (September 9, 2013)
[11] CTUIR 2009 Energy Policy adopted by Resolution No. 09-142 on December 7, 2009
[12] 2008-2012 American Community Survey 5-Year Estimates
[13] Incorporating the CTUIR Department of Natural Resources First Foods Mission Into the CTUIR Comprehensive Plan, Eric J. Quaempts, Director CTUIR Dept. of Natural Resources, November, 2007
[14] CTUIR Water and Wastewater Master Plan, 2006, pp. ES -1to ES-4
[15] CTUIR Water and Wastewater Master Plan, 2006, p. ES -10
[16] Source: http://www.eere.energy.gov/tribalenergy/pdfs/umatilla05final.pdf CTUIR Renewable Energy Feasibility Study, June 20, 2005

Section 3 – Hazard Identification/Risk Assessment Summary

An essential component of the Umatilla Indian Reservation's Hazard Mitigation Plan is the identification of natural and man-made hazards that present potential risks to lives, property and the natural and cultural resources of the Reservation. The purpose of this section is to identify hazards that have the potential to cause injury or damage and evaluate whether or not they present a realistic threat to the residents of the Umatilla Indian Reservation (UIR). Each of these hazards is analyzed to determine the level of risk that each hazard presents. A summary table of the risk assessment findings for each hazard and the type and level of threat each hazard presents is provided for quick review. Additional risk assessment information for each hazard and the sources used to develop this assessment are contained in Appendix C.

1. Hazard Identification

The Hazard Mitigation Plan Steering Committee and public survey identified numerous hazards that could potentially cause injury to people living or visiting the UIR or cause property damage:

Natural Hazards
Flood
Wildfires
Severe Winter Storms
Spring-Summer Storms
Dust Storms
Drought
Fog
Earthquake
Volcanic Events
Landslides
Extreme Heat
Wind

Man-made Hazards
Hazardous Material Spills
Natural Gas Pipeline Break
Dam Failure

In addition to the hazards listed above, the Steering Committee considered and assessed the following hazards for inclusion in this Plan and determined that their impacts to the UIR did not warrant inclusion at this time: solar flares, cyber-attacks/communications failure, power grid failure, nuclear, epidemiological and railroad derailments.

Electronics in the form of electronic devices, broadband internet connections and circuits are integral to communications in today's environment. This is also tied to electrical power dependence. Electrical power and electronic devises have become essential to our society; economics, banking, emergency services and day-to-day living providing lifeline utility systems. Interference with the functioning of these devices, circuits and systems has the potential of severely impacting the citizens of the UIR. Power failure for a prolonged length of time can be hazardous to human health and life especially for the special needs population of the Reservation.

The Steering Committee will reconsider these hazards for inclusion in this Plan in future hazard mitigation updates as more data and industry research is available. At the time of this update, data history does not exist to evaluate the impact to the CTUIR citizens, businesses and government for such events.

Hazardous events happen somewhere in the world every day. Whether such events become a disaster depends on whether there are injuries, deaths or significant property, natural resource or cultural damage. Therefore, it is important to recognize possible hazardous events and their potential to cause damage and injuries to people living within the UIR. Based on this assessment which follows, the objective of this plan is to produce goals and mitigation measures designed to prevent injuries and reduce damage making the UIR more disaster resistant.

Assessing Threats from Natural and Man-made Hazards

As part of the risk assessment process, an analysis is provided addressing the potential impacts of hazardous events on the Reservation's infrastructure, economy, housing, transportation system, critical facilities and natural and cultural resources. Included in this assessment is information about the areas where potentially significant hazards may occur, the value of existing land, property and resources in those areas, and an analysis of the potential risk to life, property, and the environment that may result from significant hazardous events.

The identified hazards were analyzed by the following:

- Definition, cause and character
- History of occurrence
- Impacts to UIR
- Extent and probable intensity
- Vulnerability

Hazard Identification

The Hazard Mitigation Plan Steering Committee reviewed the comprehensive list of possible natural and man-made hazards that either have occurred or may present a threat to the UIR, its off-Reservation CTUIR-owned Trust lands and its citizens utilizing the following sources:

Innovative Emergency Management (Design for the CTUIR Emergency Operations Center)[1]

Oregon State Draft Hazard Mitigation Plan's Risk Assessment 2014

SHELDUS database for Umatilla County, Oregon from the University of South Carolina

Umatilla County Hazard Mitigation Plan 2014

Umatilla Indian reservation Hazard Mitigation Plan (2009)

Walla Walla County Multi-Jurisdictional Hazard Mitigation Plan (2010)

The Hazard Mitigation Steering Committee then identified those hazards that might present a threat to the UIR and thus, should be analyzed further. Most information used to prepare this section of the Plan is contained in Appendix C. Table 3-1 below shows the types of hazards that may occur in Umatilla County:

Table 3-1 **Identified Hazards** Hazards Identified By:	Floods	Wildfires	Winter Storms	SummerStorm	Wind Storms	Dust Storms	Drought	Fog	Earthquakes	Volcanic	Landslides	Extreme Heat	Hazardous Material Spills	Dam Failure	Gas Pipeline Failure
Innovative Emergency Mgt.	X	X	X	X	X	X	X		X	X	X	X	X	X	
State of Oregon	X	X	X		X	X			X						
SHELDUS	X		X	X	X		X								
Umatilla County	X		X	X	X	X	X		X	X	X		X		
CTUIR (Steering Committee public survey)	X	X	X	X	X	X	X	X	X	X			X		X

Two other sources containing information regarding hazardous events were also used. These sources are the National Weather Service and the United States Geological Survey.

Some hazards can almost be expected to occur. In eastern Oregon, cold winters and hot, dry summer months are normal conditions. Because these conditions exist every year, the possibility of a winter storm, a thunder storm or fog occurring is much greater than an earthquake or a volcano. These types of hazards are "chronic" hazards as they occur with some regularity and can sometimes be predicted through historic evidence and scientific methods. Volcanoes and earthquakes are considered to be "catastrophic" hazards as they do not occur with the frequency of chronic hazards and can have devastating impacts on life, property, and the environment on regions in close proximity when they do occur.

The criteria used for evaluating and analyzing the probability of hazardous events and the Reservation's vulnerability to various hazards are presented below in Table 3-2. By using these criteria, a comparison of each hazard can be made to determine which hazardous events are the greatest threats to the UIR. The assessment of each hazard is made based on how they score using the criteria in the column on the left in Table 3-2. The determination of the hazards which present the greatest risk is based on the combined score assessed against each criterion. For a more detailed explanation of these criteria see Appendix E. Tabulation of combined scores resulting in a risk factor determination of *HIGH, MEDIUM* or *LOW* is located at the end of this Section.

Table 3-2 Qualitative Impact-Risk Assessment Criteria[2]

	Very Low	Low	Medium	High	Very High	Catastrophic
Deaths	0-1	2-3	4-5	6-7	8-10	10+
Injuries	0-3	4-7	8-11	12-15	16-19	20+
Critical Facilities	Closed for less than 12 hours	Closed for 1-2 days	Closed for 3-6 days	Long-term disruption	Loss of 50% capacity	Destroyed
Lifelines	Interrupted for less than 12 hou	1-2 day loss of services	3-6 day Interruption	7-10 day Interruption	Long-term Interruption	Destroyed
Property Damage	Minimal	Localized repairable	Widespread repairable	Substantial damage – 25%	Substantial damage -50%	Widespread non-repairable
Environmental Impact	Minimal	Localized minor	Widespread minor	Localized severe	Widespread severe	Long-term degradation
Economic and Social Impact	Minimal	Temporary localized	Temporary widespread	1-2 Months	3-5 Months	Long-term disruption
Cultural Impact	Minimal	Localized	Temporary	Substantial	Irreversible damage	Destroyed
Score	**1**	**2**	**3**	**4**	**5**	**6**

Profiling Hazardous Events – How This Section Works

In this hazard profile, each hazard was assigned a number (#) within Section 3. The definitions, causes, and characteristics of each hazard are described in Subsection **A**.

Subsection **B**. details the history or previous occurrences of each hazard. Because information about past hazardous events is generally not specific to the Reservation, the hazard information in this subsection focuses primarily on Umatilla County. The history of previous occurrences is the basis for predicting which hazardous events are more likely to occur in the future. Based on past frequency, the following criteria were developed to help compare risks among the various hazardous events. The score from Table 3-3 is combined with the scores from Table 3-2 to develop a cumulative risk assessment score for each hazard.

Table 3-3 Criteria for the Frequency of Hazardous Events

Likelihood of Occurrence	200+ years	100-199 years	30-99 years	10-29 years	3-9 years	1-2 years
Score	**1**	**2**	**3**	**4**	**5**	**6**

A description of the impacts or how the hazardous event has or may affect the UIR is contained in Subsection C for each hazard. Also, the geographic extent and probable intensity of each hazard as well as the probability of future hazards is provided in Subsection D. Subsection E describes the Reservation's vulnerability to the hazard.

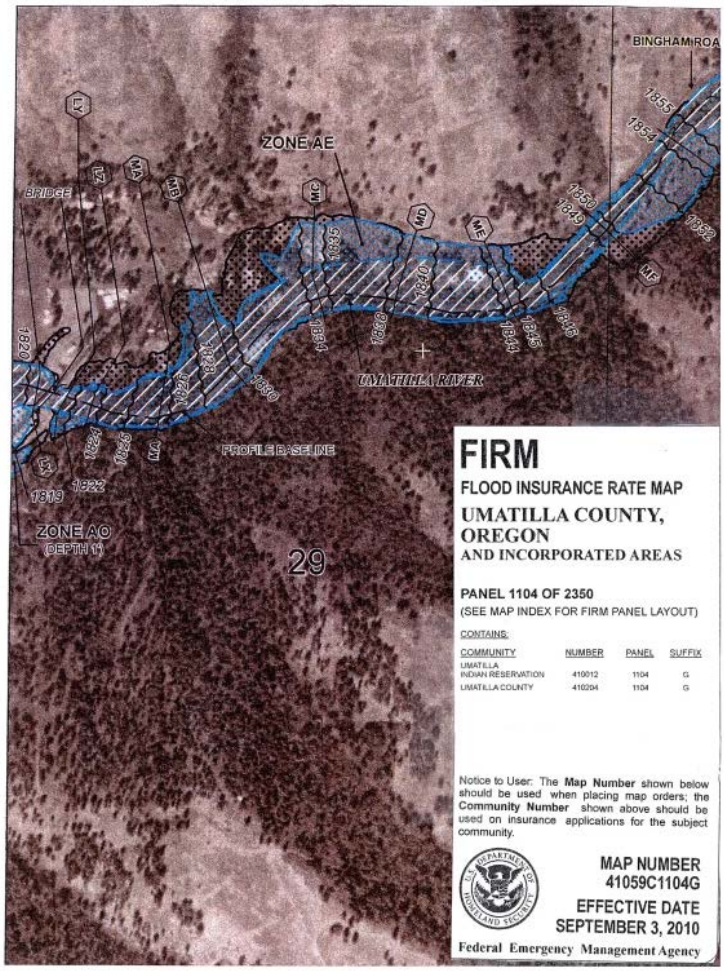
Climate Change – Effects on Hazardous Events

Although climate is an influential element in certain natural hazards, climate is not a distinct natural hazard. Temperature increases have been observed in the Pacific Northwest, 1.3 degrees Fahrenheit in the period from 1895-2011. In that same time period, Cascade Mountain snowpacks have declined and higher temperatures are causing earlier spring snowmelt and spring peak streamflows. These changes have impacts to all natural hazards; flooding, wildfires, storms and even public health.[3]

In response to these documented changes, the CTUIR is conducting a Climate Change Vulnerability Assessment apart from this Plan. The Assessment will be specific to the UIR area and is intended for use in the development of a future CTUIR Climate Change Adaptation Plan. It is important to the

CTUIR to be prepared to protect the residents, natural and cultural resources, and the First Foods of the UIR through emergency preparedness, hazard mitigation and comprehensive planning. Hazard mitigation efforts will be coordinated with the preparers of the Adaptation Plan and the Hazard Mitigation Plan amended either upon the completion of the Adaptation Plan or at the next required Mitigation Plan update as warranted.

2 - FLOODING



A. - Definition, Causes and Characteristics of Flooding

The National Weather Service defines a flood as any high flow, overflow, or inundation by water which causes or threatens damage. Floods can cause loss of life and damage to structures, crops, land, flood control structures, roads, and utilities. Floods also cause erosion and landslides and can transport debris and toxic products that cause secondary damage including health and environmental problems. Although floods can happen at any time during the year, there are typical seasonal patterns for flooding in Oregon and likewise for the Reservation. The following are the causes and characteristics of the types of floods likely to occur on the Reservation:

A sudden warm air front with rain on an accumulated snow pack in the Blue Mountains can and has caused mid-winter floods.

Rainfall combined with melting of the low-elevation snow pack typically causes early spring floods.

Severe thunderstorms may cause flash floods during the warmer months in Eastern Oregon.

B. - History of Flooding in Umatilla County and UIR

The following table identifies recorded flooding in Umatilla County or in or near jurisdictions relatively close to the UIR. In those instances where more precise information was provided about flooding on the UIR, it was highlighted in **bold** type.

Table 3-4 Flooding in Umatilla County

Date	Type	Location	Comments	Information Source
Dec 1964	Flooding	County	Umatilla River was 11.4 feet high and 12,300 cu ft per second	Umatilla Co. Haz Mit Plan
Jan 1965	Flooding	County	Umatilla River was 12.1 feet high and 15,500 cu ft per second	Umatilla Co. Haz Mit Plan
Jan 1975	Flooding	County	Umatilla River was 11.5 feet high and 14,082 cu ft per second	Umatilla Co. Haz Mit Plan
July 1978	Flash Flood	County	Crop damage	SHELDUS
Feb 1979	Flooding	County	Crop damage	SHELDUS
Feb 1986	Heavy Rain Flooding	County	Crop damage	SHELDUS
Jan 1990	Flooding	County	Crop damage	SHELDUS
May 1991	Flooding	County	Crop damage	SHELDUS
Aug 1991	Flash Flood	County	Crop damage	SHELDUS
May 1993	**Flooding**	**UIR**	**Dike broke - 10 homes flooded $50,000 damage**	**NWS**
Aug 1993	Flash Flood	Helix		NWS
May 1995	Flooding	McKay Reservoir		NWS
Nov 1995	Flooding	County	Crop damage	SHELDUS
Feb 1996	**Flooding**	**County and UIR**	**Flooding occurred affecting numerous areas within the UIR** Umatilla River was 11.2 feet high and 13,432 cu ft per second	**Presidential Declaration #1099 - Umatilla Co. Haz Mit Plan**
Dec 1996 – Jan 1997	Flooding	County		Presidential Declaration 1160
May 1997	Flash Flood	Pilot Rock		NWS
Sept 1998	Heavy Rain	Ukiah		NWS
Nov 1999	Heavy Rain Snow	Meacham	Closed I-84	NWS
Feb 2000	Heavy Rain	Pendleton	Washed-out Wildhorse Road near Weston - $4000 damage	NWS

Oct 2000	Heavy Rain	Mission	Small stream flooding with numerous secondary road washouts	NWS
Feb 2002	Heavy Rain on Snow	Gibbon	6.1 feet, flood stage 7.0. Small stream flooding along the river	NWS
Mar 2002	Heavy Rain	Meacham Cr.	Small stream flooding	NWS
Apr 2002	Heavy Rain	Mission, Foothills	Meacham Cr. And small stream flooding	NWS
Jan 2003	Heavy Rain	Gibbon	Umatilla crested at 2.0 feet, minor flooding, bank erosion and field flooding	NWS
Jan 2004	Heavy Rain on Mtn. Snow	Beaver Crk., Meacham, Gibbon	Beaver Creek out of bank and over several roads, Umatilla crested at 7.0 feet.	NWS
Apr 2006	Heavy Rain	Beaver Crk., Meacham	Beaver Crk. and small stream flooding in the Umatilla upper watershed	NWS
Dec 2006	Rain on Snow	Mission, Foothills	Umatilla River reached bank full and small stream flooding	NWS
Jan 2011	Heavy rain, snow melt	Gibbon to Echo	Gauge at Gibbon crested at 7.2, .21 above flood stage. Pendleton crested at 10.31, 2.51 above flood stage	NWS
April 2013	Heavy Rain/Snow Melt	Bingham Sprg., Cayuse, Hinkle	Flooding occurred at the Umatilla at Gibbon and Pendleton. The water washed out a section of the road near the Umatilla Forks Campground.	NWS
March 2014	Heavy Rain Snow Melt	Mission/Pendleton	Sandbagging required around one residence to protect well head and residence. Bank erosion.	CTUIR

Table 3-4 lists 30 floods that have occurred between 1964 and 2014. Based on this information, there is a flood every 1.89 years in the county. Table 3-4 also appears in the Umatilla County Natural Hazard Mitigation Plan. This information identifies **major** Umatilla and Walla Walla River flooding that has occurred since recorded history. This table is important because the Umatilla River runs through the Reservation.

Table 3-5: Worst Floods in Recorded History - Umatilla and Walla Walla Rivers[4]

Date of Flood Measurement	*Stage (Feet)*	*Flow (Cubic Feet per Second)*
Umatilla River		
December 14, 1882	12.5	17,000
May 30, 1906	12.1	15,500
January 30, 1965	12.1	15,500
February 22, 1949	12.1	15,400
December 12, 1946	11.6	13,700
December 29, 1945	11.6	12,400
January 25, 1975	11.5	14,082
April 1, 1931	11.5	13,500

December 23, 1964	11.4	12,300
February 8, 1997	11.2	13,432
Bank Full Level	6.4	3,380
Flood Stage	7.8	6,139
Walla Walla River		
December 22, 1964	18.9	33,400
January 30, 1965	13.7	15,800
January 6, 1969	14.1	14,600
February 12, 1985	15.5	12,200
February 24, 1986	14.9	10,100
Bank Full Level	10.0	3,780
Flood Stage	13.0	7,220

Table 3-5 reveals some important information. Despite the relatively close proximity of the Umatilla and Walla Walla River basins, major flooding that occurs in one river basin may not necessarily occur in the other river basin. This table reveals that the Umatilla River has a major flood approximately every 11.4 years, and since 1964, has had a major flood every 7.75 years.

C. - Possible Impacts from Flooding on the UIR

Flood events that impact the UIR have occurred primarily to lands and properties closest to the Umatilla River. However, areas beyond the immediate area near the Umatilla River are also vulnerable to flooding when conditions are extreme. The following discussion about the 1996 Umatilla River flood was obtained from press releases by the Bureau of Indian Affairs-Umatilla Agency and CTUIR.

> On February 7, 1997, the Superintendent of the Umatilla Agency of the Bureau of Indian Affairs declared a "local emergency" due to flood waters created by heavy rains and snow runoff from the Blue Mountains. All creeks channeling water into the Umatilla River throughout the Reservation were flooding.
>
> The Thornhollow and the Gibbon areas on the Reservation were closed to traffic. Some families stranded by floodwaters needed rescue. Łsqúulktpe Creek, McKay Creek, Section Line Road, South Market Road, Short Mile road and Confederated Way continued to be impacted by flooding
>
> On February 8, 1996, the new release from the UIR indicated that the Thornhollow and the Gibbon areas remained closed to traffic while the following areas were still impacted by floodwaters: Łsqúulktpe Creek, McKay Creek, Buckaroo Creek, Kirkpatrick Road, Section Line Road, South Market Road, and Short Mile Road.

On February 9, 1996, the UIR press release indicated that sandbags along Kirkpatrick road were holding, but those around Cayuse had not held and water had broken through. The Mission Community Center remained open for people needing shelter and food.

Impacts on Specific Areas within UIR

In 2001, the U.S. Army Corps of Engineers (COE), Jerry R. Gardenhire, PE, completed a "Report of Flood Fight Potential Sites in Umatilla County, Oregon" for the area within the Portland District that includes the UIR. This study identified areas on the Reservation which were vulnerable to flooding and those areas best suited for temporary or permanent flood prevention measures. Although data for this report was primarily gathered in 2001, it still provides an excellent historical basis on which to evaluate and build effective flood mitigation measures.

The Gardenhire Report focused on the Gibbon, Cayuse and Mission rural unincorporated residential community areas on the UIR that are located in close proximity to the Umatilla River on the UIR. A full copy of the Gardenhire report and a summary of the report as it pertains to the UIR are located in Appendix C.

Other areas within the UIR prone to flooding[5]. In the Gardenhire Report an evaluation of crossing structures located at previous flood damaged areas were varied; ranging from corrugated metal culverts to bridges of various kinds. Two areas where quite a few homes are located, are the Upper McKay Creek area and upstream and downstream of the Gibbon community on the Umatilla River.

There are three sites upstream of the Upper McKay Creek area where the creek eroded the county road, closing it. There are approximately 15 homes upstream of these sites, which would be cut off from access. Along the Umatilla River there are two sites, downstream from the Thorn Hollow area (between Gibbon and Cayuse) similar to the McKay Creek situation.

The Mission Community residential area known locally as the "July Grounds," although not within the designated Flood Hazard Overlay Zone as defined by the 100-yr flood plain on National Flood Insurance Rate Maps, is a low lying area where homes and roadways are subject to minor flooding due to high water table events. The Yellowhawk Tribal Health Clinic is located near the "July Grounds" and has been impacted when these events occurs with water running across access roads and parking areas.

Possible Impacts from Flooding on off-Reservation CTUIR-owned Trust lands

The off-Reservation CTUIR-owned Trust lands are identified in Section 2 and referred to as Wanapa, Wanaket and French Town. Although Wanapa and Wanaket lands are located near the Columbia River, this river is controlled by a series of dams that eliminate flood hazards.

The French Town property is located on the Walla Walla River which is a free-flowing river. Walla Walla County has recognized the need for a comprehensive floodplain management strategy and developed the Walla Walla Comprehensive Flood Hazard Management Plan which was completed in 1999. Based on the probability of occurrence and Walla Walla County's vulnerability, Walla Walla County determined flooding to have a medium risk rating as assessed in the Walla Walla County Multi-Jurisdictional Hazard Mitigation Plan. Therefore, this risk rating of moderate also applies to the CTUIR-owned French Town property.

Possible Impacts from Flooding on the Special Needs Population within UIR

The special needs population on the Reservation may be more vulnerable during flood events. Emergency assistance may be delayed or unavailable if roads are closed.

Conclusions

There are a number of areas within the UIR that are susceptible to flooding; the impacts from flooding vary. Based on the press releases reviewed and the Gardenhire Report on flood fight areas, the types of impacts from flooding by location are as follows:

Mission – flooded homes located close to the Umatilla River and homes impacted from high water tables;

Cayuse – flooded homes, possibly as many as 4 homes, water had broken through sandbags;

Thornhollow and Gibbon areas – flooded homes possibly as many as 8 homes, the area roads were closed to traffic for several days, stranded families needed rescuing

Upper McKay Creek - 15 homes cut-off from road access by flood waters. Stranded families needed rescuing, eroded roadways forced closures.

Ɬsqúulktpe Creek – road closures occur as the railroad and highway bridges were too low to allow flood waters to pass. The Union Pacific Railroad is in the process (2014-2015) of constructing a second track and new bridge at this location which will be constructed at a higher elevation. The existing railroad bridge will also be elevated to mitigate this hazard.

Buckaroo Creek – water over road

Kirkpatrick Road – water over road

South Market Road – water over road

Short Mile Road – water over road

Confederated Way – water over road

D. - The Extent and Probable Intensity of Flooding within the UIR

Flooding on the reservation is limited to low areas near the Umatilla River, Meacham Creek, Ɬsqúulktpe Creek, Buckaroo Creek, Patawa Creek, and McKay Creek. Major floods in this area usually last less than one week and occur in late winter or spring. Flash floods, that last only a few hours, may also occur from late spring through summer.

The most likely scenario for flood waters affecting the UIR is when a heavy snow pack exists in the Blue Mountains and a warm storm front occurs that carries an extensive amount of rain as was the case with the flood of February 1996. This “winter snow meets a pineapple express” scenario, although infrequent, is likely to occur again and become a major flood affecting the UIR.

Based on the history of flooding in Umatilla County over the last 40 years, there is a flood affecting Umatilla County at a rate of less than one flood every two years. Because this is a countywide statistic, the frequency of flooding within the UIR is much less than one flood every two years. However, based on the historic frequency of flooding in the county and likelihood that flooding will occur on the UIR is relatively high.

To address this, the CTUIR has entered into the National Flood Insurance Program (NFIP) to allow residents to obtain flood insurance and to better manage and mitigate for flood events. On February 14, 2011, the UIR was accepted to participate in the NFIP as a separate Community. Flood Insurance Rate Maps and CTUIR Land Development Code amendments were adopted meeting Federal Emergency Management Agency flood plain development regulations. Development within the designated Flood Hazard Overlay Zone (Special Flood Hazard Area) is and will continue to be regulated to reduce impacts of flooding and to reduce environmental impacts of development to First Foods. As of 2014, there are 17 flood insurance policies in effect and no claims have been reported.[6]

E. - The Vulnerability of the UIR to Flooding

Based on the study from Jerry R. Gardenhire and the history of flooding that has occurred within the boundaries of the UIR, the Reservation's vulnerability to flooding is medium. The Draft 2015 Oregon Natural Hazard Mitigation Plan Risk Assessment identifies Umatilla County as having a moderate vulnerability to flooding.

CTUIR critical facilities and the majority of utility infrastructure are located outside the designated 1% (100-year) flood zone. Facilities most susceptible include roads and existing residences located within the designated Special Flood Hazard Area (1%).

3. – Wildfire

A. - Causes and Characteristics of Wildfire

The following, from the Umatilla County Wildfire Protection Plan, is a good description of the characteristics of the various types of wildfires that occur in Umatilla County and can occur on the UIR:

An *agricultural fire* burns in areas where the primary fuels are flammable cultivated crops such as wheat. This type of fire tends to spread very quickly, but is relatively easy to suppress if adequate resources are available.

The classic example of a wildfire is the *forest setting.* Timber fuels this type of fire, along with associated fuels such as brush, grasses, logging residue and thick stands of reproduction. The forest type of wildfire can be extremely dangerous and difficult to suppress due to fuel and topography factors. These fires are often very costly to suppress.

Range fires burn across ground typically used for grazing or wildlife management purposes, and are typically open landscapes that lack heavy stands of timber or large accumulations of fuel. Juniper, bitterbrush, and sage are common fuels involved in a range fire.

Wildland-urban interface fires occur in portions of the state where urbanization and natural vegetation fuels allow a fire to spread rapidly from natural fuels to structures and vice versa. Structural suppression resources can be quickly overwhelmed, especially in the early stage of such fires, increasing the number of structures destroyed.

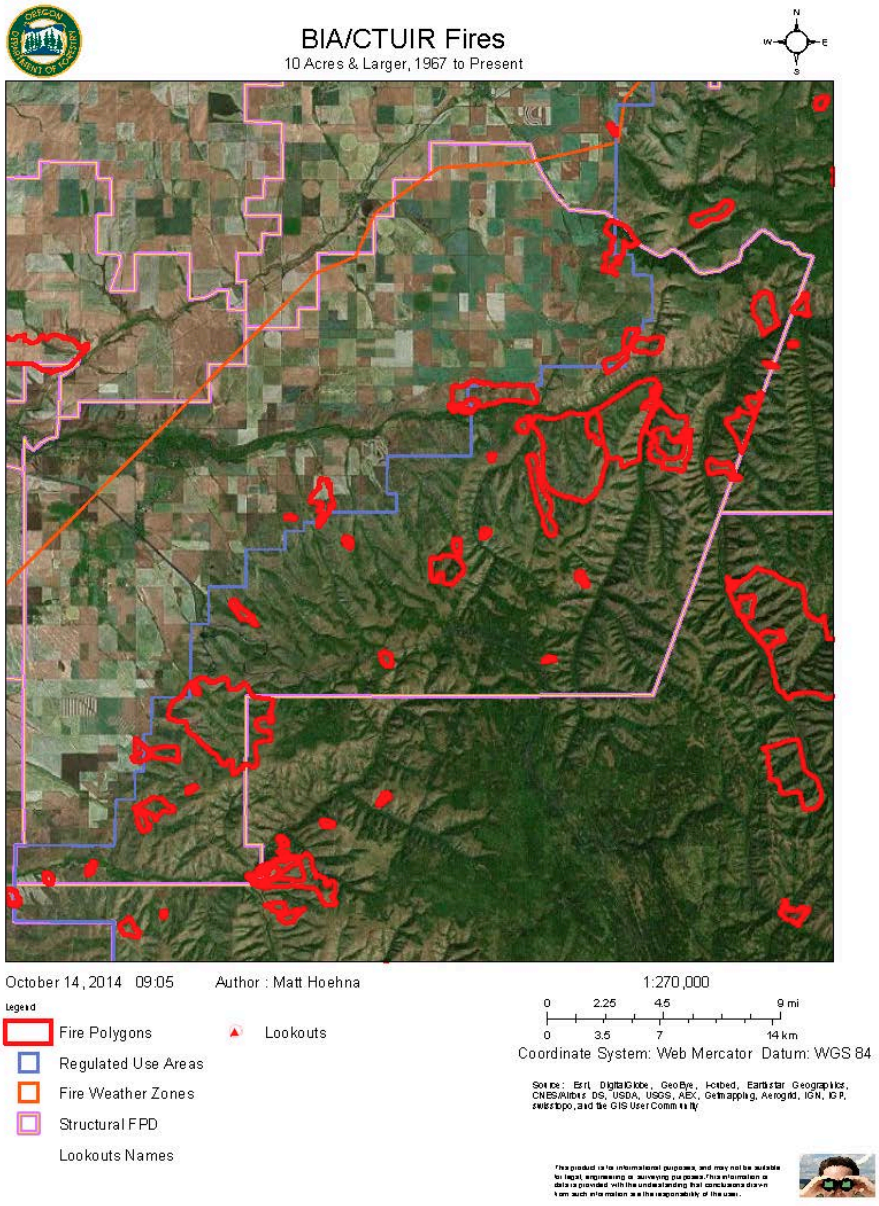
The most common causes of wildfires are lightening and human-caused events. Human-caused fires may be started by railroad activity, small or heavy equipment, recreational activities, such as camping, smokers, debris burning, vandalism, arson and other, less common events such as automobile accidents.

B. - History of Wildfires

Historical records of wildfires within and surrounding the UIR boundaries have been documented by three jurisdictional agencies. The US Department of Interior Bureau of Indian Affairs has jurisdiction for wildfire protection and prevention on lands held in Trust status within the UIR diminished boundary and on CTUIR-owned Trust lands within the Aboriginal Title areas. The Oregon Department of Forestry (ODF) provides wildfire protection and prevention on lands owned in fee status within the UIR and on lands located outside the UIR diminished boundaries. Lands held in fee title ownership, both within the UIR and outside UIR boundaries, are assessed a fee through Umatilla County Assessment and Taxation for this service provided by ODF. The U.S. Forest Service provides wildfire protection and prevention on off-Reservation Forest Service public lands which are adjacent to the UIR diminished boundaries.

Since Umatilla County, which includes the UIR, is prone to occasional droughts, dry summers and numerous lightning storms during spring and summer months, wildfires are relatively common. On average, 96% of the fires are suppressed at 10 acres or less, while 4% turn into wildfires that are difficult to suppress.[7] 84% of all fires are human caused. The two largest fires were caused by equipment and incendiary fires. Figure 3-1 below identifies the location of fires 10 acres or greater in size that have occurred on the UIR and adjacent Umatilla National Forest. See Table 3-2, Inventory Table of Wildland Fires Within the UIR, located in Appendix C.

Figure 3-1 Wildfires on UIR and Adjacent Lands



One of the oldest accounts of a major wildfire was described by W.H.B. Kent in 1904. He wrote the following about the fire in the Wenaha Forest Reserve (now fully incorporated into the Umatilla National Forest):

> "Practically every portion of the reserve has suffered more or less from fire. The largest and most important of these was one which came from the present Umatilla Indian Reservation about fifty years ago, burned up the river Umatilla, into the Reserve, then turned north along the west slope, across the heads of the Walla Walla's, and reached as far as the head of the Wenaha. This burn has generally restocked finely, principally to tamarack and lodge pole pine."

The fire area Kent describes was over 60,000 acres with much of it in what is now Umatilla County.[8]

The CTUIR's interests in protecting its forest lands from wildfire go beyond the boundaries of the Reservation. The CTUIR now owns land within the Aboriginal Titled area surrounding the diminished Reservation in both Oregon and Washington that have cultural and environmental significance. In 2006, a major wildfire occurred on lands in the state of Washington owned by the CTUIR. Many historical references document the use of broadcast burning by Tribal members for managing root and berry harvesting areas as well as grazing areas. However, with the onset of western settlements, the diminishment of the Aboriginal Title lands to a much smaller defined reservation and the federal government's sale of reservation lands into non-Indian ownership, the area available for subsistence living was greatly diminished. Having such a restricted area for First Foods habitat heightens the impact of wildland fires to the CTUIR Tribal culture and traditions.

C. - Possible Impacts from Wildfires

The impacts from wildfires can be devastating. If left uncontrolled, wildfires can burn homes, CTUIR governmental assets, businesses and destroy First Foods and their habitat. This is less likely to occur in the Mission area because the UIR Fire Department is housed within the community. However, a wildfire in the vicinity of Mission could cause a loss of revenue to the businesses located in Mission and would cost the CTUIR great expense in fighting the fire and protecting area residents.

Extensive smoke is another by-product of wildfires. Depending on the location of the wildfire and the direction of the winds, acute respiratory problems may also occur to residents and business patrons in relatively close proximity to wildfire.

The rural residential development clusters located in more remote areas of the Reservation are more at risk to wildfire than the Mission community.

The most likely impacts from a wildfire on the UIR would be financial (cost of suppression) and cultural in nature. Loss of residential structures, First Foods habitat, forest and agricultural land are critical to the sustainability of the UIR as a community and Native American culture. Temporary changes to the watershed and its water quality are also products of a major wildfire.

Possible Impacts from Wildfires on off-Reservation CTUIR-owned Trust lands

The Wanaket and Wanapa properties are located adjacent to the City of Umatilla and are currently undeveloped and relatively treeless. Fires that may occur on these lands or surrounding lands would be either Range or Urban Wildland Interface fires. In the event of a wildland fire in the area, there would be minimal short term impact. An irrigation pump station and associated irrigation lines on the Columbia River and a BPA power-line easement may be temporarily impacted. The CTUIR manages Wanaket as a Wildlife Area; impacts to Tribal First Foods could be temporarily impacted.

The French Town property is undeveloped and located in an agricultural and rural residential area adjacent to the Walla Walla River. Fires that may occur on this property or adjacent lands would have minimal short term impact since the property is relatively treeless and seeded to grass.

Possible Impacts from Wildfires on the Special Needs Population within UIR

The majority of UIR's special needs population resides near the community of Mission, there is a greater threat to the UIR's special needs population than the general population because they are less mobile and may have greater difficulty evacuating. Also, certain special needs residents may suffer

from respiratory conditions where smoke from a wildfire would put them at a much greater risk than the general population.

D. - The Extent and Probable Intensity of Wildfires within the UIR

The extent and probable intensity of wildfires on the Reservation depends on many factors. The grasslands and forestlands on the Reservation will always be vulnerable to wildfire. The extent and intensity will depend on when and where the fire starts and the ability of firefighting resources to mobilize to fight every wildfire.

Historically, most wildfires burn no more than 10 acres because of the success in suppressing them. As the Umatilla County Community Wildfire Protection Plan indicates, "the remaining 4% of the fires tend to be damaging and very difficult to suppress."[9]

E. – Vulnerability of the UIR to Wildfires

The UIR has a high probability of experiencing a wildfire. Lightning strikes occur frequently in Umatilla County and on land within the UIR. The Umatilla County Community Wildfire Protection Plan (2005) identifies 13 Wildland Urban Interface (WUI) areas, two of which are within the Reservation Boundaries; I-84 corridor (Meacham) and McKay Creek. These WUI areas have been evaluated and ranked according to their risk and susceptibility to wildfires. (See the wildfire section in Appendix C – Hazards).[10]

The Department of Interior Bureau of Indian Affairs (BIA) Wildland Fire Prevention Plan (WFPP) 2012-2016 is specific to the UIR lands owned in Trust status. The purpose of the WFPP is to define a prevention and education strategy and also to examine mitigation strategies. According to the US Department of Interior's Wildland Fire Management Information System (WFMI) which has documented wildfires on Trust lands within the Reservation, the following Table demonstrates at approximately 84% of the wildfires are human caused. The WFPP identifies 11 communities within the UIR boundaries as Urban Wildland Communities Within the Vicinity of Federal Lands that are at High Risk from Wildfires. Of these communities Meacham, I-84 Corridor, Meacham Lake and Gibbon are rated as High; the communities of Mission, Umatilla, Thornhollow and Cayuse are rated as Moderate; Umatilla River, McNary and Mission Highway Corridor are rated Low.

Table 3-6 WFMI Wildfire History and Cause Summary (2002-2011)[11]

Cause	Number of Fires	Trust Acres	Percent of Fires	Percent of Acres
CAMPFIRE	4	777	3	14
SMOKING	6	13	4	<1
FIRE USE	12	293	8	5
INCENDIARY	25	37	17	<1
EQUIPMENT	32	1910	22	34
RAILROADS	15	953	10	17
JUVENILES	11	42	7	<1
MISCELLANEOUS	19	557	13	10
HUMAN SUB-TOTAL	124	4582	84	81
NATURAL (LIGHTNING)	23	1098	16	19
TOTAL	147	5680	100.00	100.00

Since both the County and BIA Plans address wildfires or wildland fires on the UIR which involve multiple agencies, coordination by establishing inter-agency agreements is extremely important for efficient response and clarification of jurisdictional boundaries.

Four unincorporated communities on the UIR are identified as Urban Wildland Interface Communities and have a high risk for wildfire. These communities are among thousands of similar communities throughout the United States that are eligible for special wildfire hazard reduction activities.

The following listed communities will be used by interagency groups of land managers at the State and/or CTUIR level to collaboratively identify priority areas within their protection jurisdictions that would benefit from hazard reduction activity. This will ensure that available funding is focused on areas of local importance and where opportunities are most conducive to reducing risks on a meaningful scale.

4. – Severe Winter Storms

A. - Definition, Causes and Characteristics of Severe Winter Storms

Severe winter weather includes prolonged cold spells and winter storms. This potentially hazardous event is most likely to occur from late November through February when very cold artic air stalls over the region. When this phenomenon occurs, a prolonged cold spell is the result. When warm moist air from the Pacific moves across cold air trapped in valleys and drops precipitation, a winter storm occurs. This precipitation may fall as snow, sleet, or freezing rain.

Sleet is “pellets of ice composed of frozen or mostly frozen raindrops or refrozen partially melted snowflakes.” These pellets of ice usually bounce after hitting the ground or other hard surfaces as opposed to freezing rain which is rain that falls as a liquid but freezes into glaze upon contact with the ground[12].

Extreme winter temperatures are not particularly common in the Pendleton area. Below zero readings are recorded in approximately 60 percent of winters[13]. When cold spells and winter storms occur, most of the time, such weather is a mere inconvenience. However, when a severe winter storms occur, it can close I-84, it can harm businesses and reduce the flow of goods and services as transportation can be slowed to a crawl for several days. Usually, life returns to normal after a few days as temperatures warm. However, severe winter storms can lead to flooding if snowfall amounts were large and temperatures rise too quickly.

B. – History of Severe Winter Weather in Umatilla County

Umatilla County and the Umatilla Indian Reservation are quite used to winter storms. Based on the historical record, there is a winter storm almost every year. Most of the winter storms that occur fall into the nuisance category; a couple of inches of snow that lasts a day or two. However, a major winter storm occurs on average about every three years that is more than just a nuisance. Major winter storms have been defined as ten or more inches of snowfall. Table 3-7, located in Appendix C, provides documentation of historical severe winter storms.

C. – Possible Impacts from Severe Winter Weather on the UIR

Impacts from winter storms vary depending on the amount of moisture and the temperatures associated with the cold fronts that descend on the areas near the Blue Mountains. It is common for Umatilla County and the Reservation to have snowfall sometime during the winter. Based on the average annual snowfall for the last 44 years, the Pendleton area averages 16 inches of snow a year with a maximum annual accumulation of 50.3 inches and a minimum of 0.8 inches.[14] In addition to heavy snowfall, wind, freezing rain or sleet may accompany the cold temperatures associated with a winter storm.

Intense snow storms in the past have closed I-84 more than a day and have downed power lines, mostly due to falling trees, and caused power outages. State Highway 11 located north of the Reservation is often closed for various periods of time under windy conditions due to blowing snow. In such situations, businesses, school districts, and government offices often close or their hours of operation are reduced due to the storm. A major winter storm can last for days.

Winter storms that include wind, freezing rain or sleet can cause hazardous driving conditions and usually mean an increase in traffic accidents. If cold temperatures persist, crops can be damaged, water pipes can burst and livestock may perish. If power is out, the situation can range from a severe hardship to very dangerous as people try to keep themselves warm. In such situations, carbon monoxide poisoning often increases as people use various means to try and keep warm. Besides snow from a major winter storm, the Reservation must be concerned with flooding which can occur with a rapid snow melt.

Impacts from Severe Winter Weather on the Special Needs Population within UIR

The special needs population on the Reservation may be more vulnerable in severe winter weather, particularly if power outages occur. Those special needs residents that depend on electric heat may face very cold temperatures within their living quarters and may not be able to find alternative heat sources. Elders and those with special needs may be dependent on medications and may not have access to medicine or the ability to travel if roads are closed.

D. – The Extent and Probable Intensity of Severe Winter Weather

Table 3-8, located in Appendix C, is a good indicator of the extent and intensity of winter storms that occur almost every year in Pendleton and in the UIR; displaying annual snowfall from 1970 to 2014. In most years Pendleton received less than 20 inches of snow. However, in December 1983, January 1993 and December 2008 over 25 inches of snow fell. On several occasions, more than 10 inches of snow fell. Winter storms are a relatively common occurrence in this area.

Between 1970 and 2014, there are fourteen occasions where more than 10 inches of snow fell in a single month in Umatilla County. On three occasions more than 20 inches of snow fell within a single month. This much snow can cause disruptions in services and short-term but significant negative impacts to the area's economy.

Based on the history of winter storms occurring in Umatilla County and the number of snow storms occurring during the 44-year period between 1970 and 2014, the probability of winter storms affecting the UIR in the future remains high.

E. – The Vulnerability of the UIR to Experience Severe Winter Weather

The UIR is highly vulnerable to winter storms. The risk they present is reflected in the risk assessment provided at the end of this section. The Draft 2015 Oregon Natural Hazard Mitigation Plan Risk Assessment identifies Umatilla County as being highly vulnerable to winter storms.

5. - Spring & Summer Storms

A. – Definition, Causes and Characteristics of Spring and Summer Storms

Spring and summer storms are relatively common events in eastern Oregon. These storms normally occur during the months of April through September. Spring and summer storms may include thunder and lightning, hail, wind, intense rainfall and more infrequently, tornadoes.

Thunderstorms are produced by cumulonimbus clouds accompanied by lightning and thunder. A typical thunderstorm consists of several cells. A cell involves convection in the form of a single updraft, downdraft, or updraft/downdraft couplet, typically seen as a vertical dome or tower as in a towering cumulus cloud. Lightning is a visible electrical discharge produced by a thunderstorm. Thunder is caused by rapidly expanding gases in a lightning discharge. A tornado is a violently rotating column of air, usually suspended from a cumulonimbus cloud, with circulation reaching the ground. The Pacific Northwest averages six tornadoes during the year. July and August are the most common months to see a tornado although they have been reported in almost every month of the year. The majority of tornadoes occur between 1 pm and 9 pm. The usual strength is rated between an f0 and f2 – or better described as weak to strong with wind speeds ranging from 40 mph to 157 mph[15].

About 10 percent of the annual total precipitation for Umatilla County occurs during the months of July through September. The lighter summertime precipitation usually accompanies thunderstorms which often move into the area from the south or southwest. On occasion, these storms are quite intense, causing flash flooding and hail.

B - History of Spring & Summer Storms in Umatilla County

Table 3-9 in Appendix C documents the history of spring and summer storms that have occurred on or near the UIR since 1958.

Table 3-10 below indicates that the Pendleton area averages about 10 thunderstorms a year.

Table 3-10 Mean Number of Days with Thunderstorms near Pendleton[16]

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	Year
Mean Number of Days With Thunderstorms	0.0	0.0	0.2	0.9	1.8	2.0	2.0	2.1	1.2	0.3	0.1	0.0	10.6

There have been two documented tornadoes that "touched down" in Umatilla County since records were kept beginning in 1887[17]. They are described below:

July 9, 1995, near Hermiston in Umatilla County

Workers at the Simplot Plant southeast of Hermiston spotted a tornado that touched down for about two minutes in a nearby wheat field causing no damage. (From Oregon Climate Service Report)

May 1, 1991 near Pendleton in Umatilla County

This small tornado touched down in wheat fields near Pendleton causing little if any damage. It was visible from the National Weather Service forecast office in Pendleton. (From Oregon Climate Service Report)

C. - Possible Impacts from Spring & Summer Storms

The greatest impacts from spring and summer storms come from hail, flooding and wind which are described in Section 3.5. Spring and summer storms have produced hail from over ¾ of an inch to almost 2 inches in size. Hail often occurs with these storms and can cause economic damage to agricultural crops. Damage to property and possible injuries to people can also occur. The other major impact from spring and summer storms comes from flash floods. The impacts from flooding are described in Section 3.1.

Impacts from Spring & Summer Storms on the Special Needs Population within UIR

See section 3.5 for impacts from winds and 3.1. for impacts on flooding.

D. – The Extent and Probable Intensity of Spring & Summer Storms

Storms during the spring and summer months pass over Umatilla County several times a year. Their intensity varies. These storms are usually short in duration, lasting only a few hours, but can be intense. Besides thunder and lightning, relatively large-sized hail and intense rainfall, that can produce flooding, may occur.

There is a high probability that the UIR will experience future storms during the spring and summer months. Since 2012, the CTUIR has been a certified participant in the National Weather Service "StormReady" Program. StormReady is a nationwide community preparedness program that provides emergency managers with guidelines on how to improve hazardous weather operations. The CTUIR StormReady status has been renewed through 2018.[18] The likelihood of high winds, hail between ¾ inch and 1¼ inches and intense rainfall is high. The probability that a tornado will occur on the Reservation is low.

E. – The Vulnerability of the UIR to Spring & Summer Storms

The Vulnerability of the UIR to spring and summer storms is medium.

6. – Wind Storms

A - Definition, Causes and Characteristics of Wind Storms

The Oregon State Natural Hazards Mitigation Plan defines windstorm as "generally a short duration event involving straight-line winds and/or gusts in excess of 50 mph." The most frequent surface winds in Oregon are from the southwest. Winds begin with differences in air pressures. Air pressure that's higher at one place starts an air flow from the high pressure toward the low pressure (the greater the difference in pressure, the stronger the force). The distance between the area of high pressure and the area of low pressure also determines how fast the moving air is accelerated.[19]

Windstorms are often associated with storms moving onto the coast from the Pacific Ocean. Other common events include Chinook winds, which are strong easterly winds coming out of the Columbia Gorge. The Chinook wind is a warm dry wind that often leads to the rapid disappearance of snow, and can gust up to 100 miles per hour. West winds generated from the Pacific Ocean can be strong along the coast, but typically lose strength inland due to the obstruction of the Coastal and Cascade mountain ranges[20].

Extreme winds occur all over Oregon. Storm tracks bring major storms from the Pacific Ocean to the United States mainland and particularly to the Pacific Northwest usually occurring during winter months. The most persistent high winds occur along the Oregon Coast and the Columbia River Gorge, so much so that these areas have special building code standards.

The Columbia Gorge is the most significant east-west gap in the mountains between California and Canada. It serves as a funnel for east and west winds, where direction depends solely on the pressure gradient.

Tornadoes are the most concentrated and violent wind storms known to produce winds in excess of 300 miles per hour. However, most tornadoes are much weaker. Umatilla County has experienced some mild tornadoes, but they are not a common occurrence. Tornadoes are discussed in Section 3.5 – Spring and Summer Storms.

B. – History of Wind Storms in Umatilla County

Blowing wind is not uncommon in Umatilla County and on the UIR. Table 3-11, located in Appendix C, identifies recorded historical wind storms that have occurred in Umatilla County.

C. – Possible Impacts from Wind Storms

A big wind Jan. 4 blew up and down the West Coast and gusts of nearly 70 mph knocked over trucks on Interstate 84 and cars on Highway 11 between Pendleton and Milton-Freewater. Wind gusts of 67 mph were recorded about 8:15 a.m. Jan. 4 at the sheltered Department of Science and Engineering building on the Umatilla Indian Reservation. For the most part, wind damage here was limited to downed trees and broken limbs, but there were also reports of roofs blown off homes and out-buildings. A tree fell on a van owned by Michael Jackson Jr.Traffic was slowed when limbs littered Cayuse Road. At Gibbon, crews used chainsaws to cut through downed trees on Bingham Road to get to a fire on power poles. Some of the wheat at the grain elevator flew north when the wind tossed around part of the white plastic cover. At St. Andrew's Mission, a propane tank blew over, knocking the valve loose; the gaseous contents were safely released into the breeze. Residents should report wind damage by Jan. 11 using forms available through the CTUIR Emergency Management program by calling Melinda Alexander at 966-2524

Severe wind storms can break shingles and sometimes damage roof beams. Where trees are present, severe wind storms can cause trees to blow down or tree limbs to break and fall on power lines or roofs of homes or businesses. Power outages can occur as a result of major wind storms. Major wind storms can blow mobile homes off their foundations if not anchored properly. They can also damage doors and windows in buildings. Advertising signs may suffer damage or be blown down. Shrubbery

and trees can receive significant damage. Major wind storms can also damage public facilities and create disaster-related debris. Windstorm clean-up is another impact from wind storms. Hours of costly overtime pay for public agencies and private entities involved in clean-up are often incurred.

D. – The Extent and Probable Intensity of Wind Storms within the UIR

Generally, wind storms affect the entire UIR. Wind speed and duration of high winds vary. In the last ten years, the city of Pendleton has experienced wind storms each year where steady wind speeds have ranged between 40 to 55 miles per hour with wind gust ranging between 47 and 66 miles per hour. Summer wind storms that accompany thunderstorms are short duration, but very intense.

Two scales for judging wind intensity and determining potential damage from winds are the Saffir-Simpson Hurricane Scale and the Fujita Scale used for measuring tornadoes. The Saffir-Simpson

Hurricane Scale, which follows, identifies five categories based on wind speed and predicts potential damage.

Category One
Wind speed: 74-95 mph (119-153 km/h)
Damage: Damage primarily to unanchored mobile homes, shrubbery, and trees along with some coastal road flooding and minor pier damage

Category Two
Wind speed: 96-110 mph (154-177 km/h)
Damage: Roofing, door and window damage to buildings; Considerable damage to shrubbery and trees, mobile homes, poorly constructed signs, and piers

Category Three
Wind speed: 111-130 mph (178-209 km/h)
Damage: Structural damage to small residences and utility buildings; foliage blown off trees and large trees blown down; mobile homes destroyed

Category Four
Wind speed: 131-155 mph (210-249 km/h)
Damage: Extensive damage to doors, windows and lower floors of shoreline houses; total roof failures on small residences; shrubs, trees, and all signs blown down; mobile homes completely destroyed

Category Five
Wind speed: Greater than 155 mph (249 km/h)
Damage: Complete roof failure on many buildings and some complete building failures with small utility buildings blown over or away; severe and extensive window and door damage; mobile homes completely destroyed

The Fujita Scale, which is depicted in the table below, establishes categories for tornadoes based n wind speed. It also identifies potential damage.

Table 3-12: Fujita Scale

Category	*Wind Speed (mph)*	*Damage*
F0	Gale tornado (40-72)	**Light:** Damage to chimneys, tree branches, shallow-root trees, sign boards
F1	Moderate tornado (73-112)	**Moderate:** Lower limit is beginning of hurricane wind speed--surfaces peeled off roofs, mobile homes pushed off foundations or overturned, cars pushed off roads
F2	Significant tornado (113-157)	**Considerable:** Roofs torn off frame houses, mobile homes demolished, boxcars pushed over, large trees snapped or uprooted, light-object missiles generated
F3	Severe tornado (158-206)	**Severe:** Roofs and some walls torn off well-constructed houses, trains overturned, most trees in forest uprooted, cars lifted off the ground and thrown
F4	Devastating tornado (207-260)	**Devastating:** Well-constructed houses leveled, structures with weak foundations blown off some distance, cars thrown and large missiles generated
F5	Incredible tornado (261-318)	**Incredible:** Strong frame houses lifted off foundations and carried considerable distance to disintegrate, automobile-sized missiles fly through the air in excess of 100 yards, trees debarked

Based on the history of wind storms in Umatilla County, the intensity of most wind storms is F0 on the Fujita Scale and does not reach category one on the Saffir-Simpson Scale. On occasion, a few wind storms reach Category Two on the Saffir-Simpson Scale and F1 on the Fujita Scale. In this plan, these wind storms are considered major wind storms. Based on the history of wind storms listed in subsection 3.2.B., only three storms in the last forty years would be considered major wind storms. This is less than one major wind storm every 10 years.

Blowing wind is a common occurrence in Umatilla County and on the UIR. However, most wind storms cause no or very minimal damage. Major damage-causing wind storms are much less frequent. Therefore, the probability that the UIR will experience a major or damage-causing wind storm is medium.

E. – The Vulnerability of the UIR to Wind Storms

The UIR is not particularly vulnerable to wind storms. Damage from past major wind storms has been negligible; house siding and roofs and trees. Therefore, the UIR has a low vulnerability to wind storms. This local assessment for the Reservation varies significantly from the State of Oregon's assessment for Umatilla County. The draft 2015 Oregon Natural Hazard Mitigation Plan Risk Assessment classifies Umatilla County as having a high vulnerability to wind storms.[21]

7. – Dust Storms

This sign is located west of the city of Pendleton. It illustrates the concerns regarding dust storms

A. – Definition, Causes and Characteristics of Dust Storms

Dust storms are a hazard generally known to occur in the Mid-Columbia River region, which includes Umatilla County. Within Umatilla County, dust storms occur primarily in western Umatilla County between the Umatilla County line and City of Pendleton.

The following description of the causes and characteristics of dust storms was obtained from the State of Oregon Hazard Mitigation Plan:[22]

> A dust storm is a strong, violent wind that carries fine particles such as silt, sand, clay, and other materials, often for long distances. The fine particles swirl around in the air

during the storm. A dust storm can spread over hundreds of miles and rise over 10,000 feet. They have wind speeds of at least 25 miles per hour.

Dust storms usually arrive with little warning and advance in the form of a big wall of dust and debris. The dust is blinding, making driving safely a challenge. A dust storm may last only a few minutes at any given location, but often leave serious car accidents in their wake, occasionally massive pileups. The arid regions of Central and Eastern Oregon can experience sudden dust storms on windy days. These are produced by the interaction of strong winds, fine-grained surface material, and landscapes with little vegetation. The winds involved can be as small as "dust devils" or as large as fast moving regional air masses.

Approximately half of the dust in today's atmosphere may result from changes to the environment caused by human activity, including agriculture, overgrazing, and the cutting of forests. Data from dust traps near urban areas like Las Vegas show that the spread of housing and other human construction across the desert directly causes increases in dust storms by destabilizing the surface and vegetation.

Intensive tillage of soils in agricultural uses is also a significant condition releasing soil to make it easily transportable by high winds. Depending on the crop and region involved, tillage may be occurring in the spring and/or in the autumn. Research in north-central Oregon and south-central Washington indicates that region's dust problem isn't simply a matter of soil being redistributed from one field to another by the wind. Fine particulate becomes suspended in the air and may travel thousands of miles. Scientists indicate that the region is truly losing soil.

B - History of Dust Storm Disasters in Umatilla County

Table 3-13: Dust Storms in Umatilla County

Date	Type	Location	Comments	Information Source
May 23, 1975	Dust Storm	Near Echo	Winds up to 45 mph blew dust that caused a seven-car accident	Oregon State Hazard Mitigation Plan
March 24, 1976	Dust Storm	Near Stanfield	18 vehicles piled-up in two separate accidents killed one and injured 20	Oregon State Hazard Mitigation Plan
July 9, 1979	Dust Storm	Near Stanfield	two deaths and six injuries in a freeway accident - winds near 60 mph	Oregon State Hazard Mitigation Plan
Sept. 25, 1999	Dust Storm	Near Echo	A chain-reaction of car crashes involving 45 vehicles; killed eight people and injured more than 20.	Oregon State Hazard Mitigation Plan
May 3, 2010	Dust Storm	Lower Basin	Blowing dust caused traffic accidents near Stanfield on I-84	NWS
August 14, 2015	Dust Storm	UIR	Blowing dust combined with smoke from fires closed I-84 at the UIR	CTUIR Public Safety, ODOT

C. - Possible Impacts from Dust Storms

The impacts from dust storms are the lack of visibility which causes major problems to those driving, particularly while on I-84 where normal driving speeds are over 60 miles per hour. Also, dust will find its way into homes, barns, other buildings and vehicles which may require extra time spent on cleaning.

Over the past 30 years in Oregon, more than ten people have been killed and more than 60 people injured some very seriously, due to automobile accidents caused by dust storms, often exacerbated by excessive speed.

Of course, air quality is negatively impacted as high concentrations of particulate matter occur during dust storms. Also, loss of topsoil occurs during dust storms.

D. – The Extent and Probable Intensity of Dust Storms near the UIR

Historically, the area near the Umatilla-Morrow County line to the city of Pendleton is the area most affected by dust storms. Dust storm warning signs are posted on I-84 near milepost 165 and just to the west of the city of Pendleton. This sign warns drivers that dust storms may occur within this 40-mile corridor.

Because of the UIR's location further east of Pendleton at the foothills of the Blue Mountain, the reservation does not experience as intense dust storms as those experienced west of Pendleton. However, dust storms still occur and present a threat to the reservation.

There is not a detailed record of the effects of dust storms on the Umatilla Indian Reservation. There is a history of dust storms causing deaths, injuries damage to lands located in western Umatilla County. Dust storms have occurred and impacted citizens living on the Reservation. Although, the impacts from dust storms may not be as severe as the impacts that harm western Umatilla County, the probability that a future dust storm that affects the Reservation is medium.

E. – The Vulnerability of the UIR to Dust Storms

The Vulnerability of the UIR to dust storms is medium.

8. - Drought

A. – Definition, Causes and Characteristics of Drought[23]

Drought is a period of prolonged dryness resulting from a lack of precipitation or diversion of available water supplies. They appear to be cyclic and they can have a profound effect on the state's economy, particularly the hydro-power and agricultural sectors. The environmental consequences are also far-reaching. They include insect infestations in Oregon forests and the lack of water to support endangered fish species.

B - History of Drought in Umatilla County

Table 3-14: Significant Drought events in Oregon and Umatilla County

Date	Type	Location	Comments	Information Source
1904-1905	Drought	Statewide	Lasted about 18 months	Oregon State Hazard Mitigation Plan
1917-1931	Drought Period	Statewide		Oregon State Hazard Mitigation Plan
1939-1941	Drought	Statewide	Three years of intense drought	Oregon State Hazard Mitigation Plan
1959-1964	Drought Period	Eastern Oregon		Oregon State Hazard Mitigation Plan
1985-1997	Drought Period	Statewide	Dry period with drought years in 1992 and 1994	Oregon State Hazard Mitigation Plan
1999	Drought	Umatilla County	Crop damage - $2,260,000	SHELDUS
2005	Drought	Umatilla County		OR Haz. Mit. Plan Risk Assessment 2015
2007	Drought	Umatilla County	Disaster declared by the US Dept. of Agriculture for Umatilla and Union Counties	East Oregonian Newspaper – 10-10-07

The 2014 Umatilla County Hazard Mitigation Plan provides the following statement about droughts affecting Umatilla County:

> In a 2009 letter to Governor Ted Kulongoski, the Oregon Office of Rural Policy sited 44 states of emergency declarations for drought and low water conditions in 23 of Oregon's 36 counties over the last five years. Umatilla County submitted emergency declarations due to low water conditions and drought in 2002 and 2005.
>
> In addition to the surface water drought, the western part of Umatilla County has had approximately 104,000 acre-feet of groundwater rights curtailed due to groundwater declines. These groundwater declines have directly impacted fisheries, the aquatic environment, economic development and long-term rural and urban economic security[24].

The Oregon Water Resources Department is the state agency with primary oversight of drought conditions and mitigation activities. Based on the frequency of drought declarations issued by the Oregon Governor issued since 1995, the Oregon Natural Hazard Mitigation Plan Risk Assessment did not list Umatilla County as being highly vulnerable to drought.[25]

C. - Possible Impacts from Drought on the UIR

When a drought occurs it affects everyone living and working on the Reservation and Tribal interests beyond the Reservation boundaries. Droughts cause surface water as well as groundwater declines. Surface and groundwater declines can directly impact fisheries, the aquatic environment, economic development and long-term rural and urban economic security. Drought does not affect buildings or

infrastructure. People and livestock suffer most from droughts. In a drought, community water supplies can be affected sometimes forcing water conservation measures.

Droughts can affect the Tribes' interests in other ways. When a drought occurs, the desire to find other water sources increases. Droughts can force the execution of water rights which implements irrigation restrictions. This in turn can ruin agricultural crops. Accompanying this action can be pressure to change existing water allocations for fisheries, agriculture and other uses.

D. – The Extent and Probable Intensity of Drought within the UIR

By definition, droughts are prolonged periods of dryness. Based on the history of droughts in eastern Oregon, the probable intensity or extent of future droughts in this region will likely be a minimum of 18 months but more likely a three or more year event.

Oregon's drought history reveals many short-term and a few long-term events. The average recurrence interval for severe droughts in Oregon is somewhere between 8 and 12 years[26]. The probability that another drought will occur that affects the UIR is high[27].

E. – The Vulnerability of the UIR to Droughts

The UIR has a high vulnerability to droughts.

9. - Fog

A – Definition, Causes and Characteristics of Fog

Essentially, fog is just a cloud at ground level. It is made from condensed water droplets. The National Weather Service defines fog as water droplets suspended in the air at the Earth's surface.

Fog occurs when the air is cooled to the point (the dew point) where it can no longer hold all of the water vapor it contains[28]. Fog is often hazardous when visibility is reduced to ¼ mile or less. Thick fog or even freezing fog tends to occur in the Blue Mountains during the late fall and winter months.

Fog that presents the greatest risk occurs as very thick fog hovering over I-84 through the Blue Mountains.

B - History of Fog Disasters in Umatilla County

Table 3-15: Fog as a Hazardous Event in Umatilla County

Date	Type	Location	Comments	Information Source
Dec. 12, 1997	Fog	Pendleton	One injury	SHELDUS
Dec. 24, 1997	Fog	County	Four injuries	SHELDUS
Jan. 1999	Fog	County	Four injuries One death	SHELDUS
Jan. 2001	Fog	Foothills Blue Mtns	One injury	SHELDUS
2006	Freezing Fog	Foothills Blue Mtns	3 deaths	Dennis Olson
Feb 27, 2012	Freezing Fog	N. Blue Mountains	12 vehicle crash on I-84 near Deadman's Pass	NWS Pendleton

C. - Possible Impacts from Fog on the UIR

The impacts from thick fog are similar to those of dust storms in that the greatest danger occurs to automobile and truck traffic traveling at higher speeds. Within the boundaries of the UIR, fog becomes particularly hazardous for freeway travelers using I-84. In some cases, fog freezes making driving conditions much worse. Fog also has been a hazard on roads within the Reservation. Fog occurs when there is an inversion. This condition traps pollutants making air quality on the reservation along the river very poor. This can cause an increase in respiratory problems, particularly for those living on the reservation with respiratory problems.

Heavy fog, where visibility is equal to or less than ¼ of a mile occurs in Pendleton, Oregon on average about 30 days a year. The table below indicates that heavy fog is most likely to occur during the months of November through February[29]. Because the UIR borders the City of Pendleton, it is presumed the table below applies also to the Reservation.

Table 3-16: Mean Number of Days with Heavy Fog

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Mean Number of Days with Heavy Fog where Visibility ≤ 1/4 Mile	7.4	4.9	1.9	0.3	0.2	0.1	0.0	0.0	0.2	1.0	6.1	8.4	30.5

The probability of fog occurring during late fall and winter is very high. Fog primarily affects traffic using the I-84 as it passes through the Reservation. Despite the fact that fog is a relatively common occurrence during certain times of the year, fog does not actually affect the UIR very much. The greatest hazard fog presents is to travelers using I-84 where it passes through the Reservation.

D. – The Vulnerability of the UIR to Fog

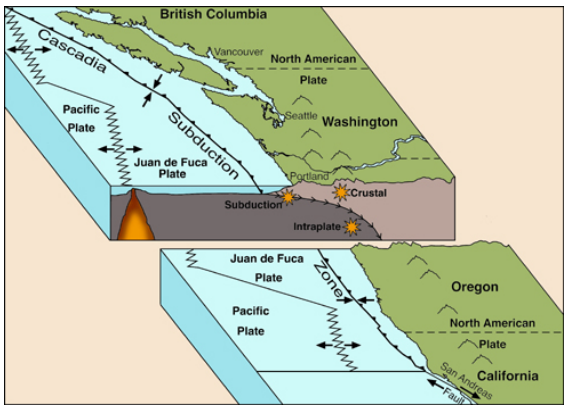
The vulnerability of the UIR to fog is high. The fact that fog does present a greater threat to I-84 travelers passing through the Reservation is a concern because the Tribe's emergency service providers are often first at the scene of an accident. Freezing fog presents an annual threat during winter months. Although the Federal Highway Administration and the Oregon Department of Transportation are responsible for managing the risks presented by fog on I-84, Cabbage Hill, the greatest obstacle to safe travel, is located on the Reservation. The CTUIR is willing to assist in minimizing the risks associated with the hazards presented by fog.

10. – Earthquakes

A. – Definition, Causes and Characteristics of Earthquakes

Earthquakes are sudden releases of energy that usually occur along existing fractures in the Earth's surface, called a fault or fault line. The US Geological Survey defines earthquakes as "a sudden slip on a fault, and the resulting ground shaking and radiated seismic energy caused by the slip, or by volcanic or magmatic activity, or other sudden stress changes in the earth." Earthquakes occur somewhere on Earth everyday (see http://www.iris.edu/seismon). The tectonic plates are always slowly moving, but they get stuck at their edges due to friction. When the stress on the edge overcomes the friction, there is an earthquake that releases energy in waves that travel through the earth's crust and cause shaking. Most earthquakes are small and virtually unnoticeable. Major earthquake can be catastrophic. The two pictures below show the Earth's tectonic plates and a closer look at the Cascadia Subduction Zone located just off the Oregon coast.

Earth's Tectonic Plates



Cascadia Subduction Zone

Two ways of measuring earthquakes that are commonly used are the Richter Scale and the Modified Mercalli Intensity Scale. The Richter Magnitude Scale and the Modified Mercalli Intensity Scale are provided below:

Richter Magnitude Scale

Less than 3.5	Generally not felt, but recorded.
3.5-5.4	Often felt, but rarely causes damage.
Under 6.0	At most slight damage to well-designed buildings. Can cause major damage to poorly constructed buildings over small regions.
6.1-6.9	Can be destructive in areas up to about 100 kilometers across where people live.
7.0-7.9	Major earthquake. Can cause serious damage over larger areas.
8 or greater	Great earthquake. Can cause serious damage in areas several hundred kilometers across.

Modified Mercalli Intensity Scale

I. People do not feel any Earth movement.
II. A few people might notice movement if they are at rest and/or on the upper floors of tall buildings.
III. Many people indoors feel movement. Hanging objects swing back and forth. People outdoors might ot realize that an earthquake is occurring.

IV. Most people indoors feel movement. Hanging objects swing. Dishes, windows, and doors rattle. The earthquake feels like a heavy truck hitting the walls. A few people outdoors may feel movement. Parked cars rock.
V. Almost everyone feels movement. Sleeping people are awakened. Doors swing open or close. Dishes are broken. Pictures on the wall move. Small objects move or are turned over. Trees might shake. Liquids might spill out of open containers.
VI. Everyone feels movement. People have trouble walking. Objects fall from shelves. Pictures fall off walls. Furniture moves. Plaster in walls might crack. Trees and bushes shake. Damage is slight in poorly built buildings. No structural damage.
VII. People have difficulty standing. Drivers feel their cars shaking. Some furniture breaks. Loose bricks fall from buildings. Damage is slight to moderate in well-built buildings; considerable in poorly built buildings.
VIII. Drivers have trouble steering. Houses that are not bolted down might shift on their foundations. Tall structures such as towers and chimneys might twist and fall. Well-built buildings suffer slight damage. Poorly built structures suffer severe damage. Tree branches break. Hillsides might crack if the ground is wet. Water levels in wells might change.
IX. Well-built buildings suffer considerable damage. Houses that are not bolted down move off their foundations. Some underground pipes are broken. The ground cracks. Reservoirs suffer serious damage.
X. Most buildings and their foundations are destroyed. Some bridges are destroyed. Dams are seriously damaged. Large landslides occur. Water is thrown on the banks of canals, rivers, lakes. The ground cracks in large areas. Railroad tracks are bent slightly.
XI. Most buildings collapse. Some bridges are destroyed. Large cracks appear in the ground. Underground pipelines are destroyed. Railroad tracks are badly bent.
XII. Almost everything is destroyed. Objects are thrown into the air. The ground moves in waves or ripples. Large amounts of rock may move.

Earthquakes often occur along fault lines. Faults are fractures in the Earth's crust along which the blocks of crust on either side have moved relative to one another parallel to the fracture.

B - History of Earthquakes in Umatilla County

Multiple small and some relatively moderate earthquakes have occurred in Umatilla County. However, the intensity of many previous earthquakes was not recorded because instruments able to record earth movement were not available for eastern Oregon until the last ten to 15 years. Earthquakes have been happening in this area throughout history but have not been recorded. DOGAMI believes that the information about earthquakes in eastern Oregon is underestimated[30].

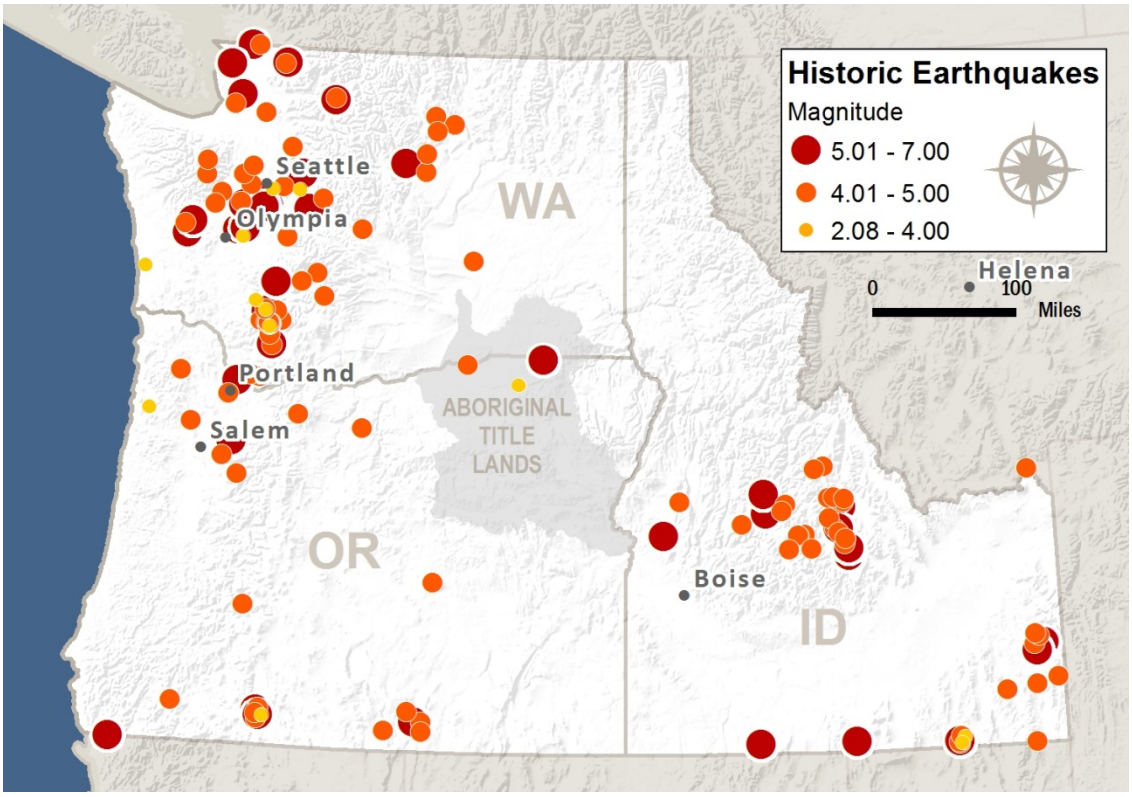
Table 3-17 identifies the three earthquakes that were intense enough to be registered as moderate earthquakes on the Richter Magnitude Scale and the Modified Mercalli Intensity Scale.

Table 3-17: Large Recorded Earthquakes in Umatilla County

March, 1893	Umatilla	VI-VII (Modified Mercali Intensity)	Damage unknown
July, 1936	Milton-Freewater	6.1	Eastern Oregon's largest event, several aftershocks, $100,000 in damaged based on 1936 dollars, chimney damage, houses shifted off foundations, school buildings damaged
January, 1951	Hermiston	V	Damage unknown
January 23, 2015	Cayuse	3.6	None

The earthquake that occurred closest to the UIR happened at 11:08 PM PST on July 15, 1936, near the State line between Milton-Freewater, Oregon, and Walla Walla, Washington. The magnitude 5.75 shock affected an area of about 272,000 square kilometers in the two States and adjacent Idaho. Ground cracking was observed about 6.5 kilometers west of Milton-Freewater, and there were marked changes in the flow of well water (VII). Also, chimneys were damaged, plaster was broken, and walls cracked. Similar damage was reported in the unincorporated community of Umapine. Total damage amounted to $100,000. There were numerous aftershocks up to November 17; more than 20 moderate shocks occurred during the night, and stronger ones were felt (V) on July 18 and August 4 and 27[31].

Figure 3-2: Historic Earthquakes



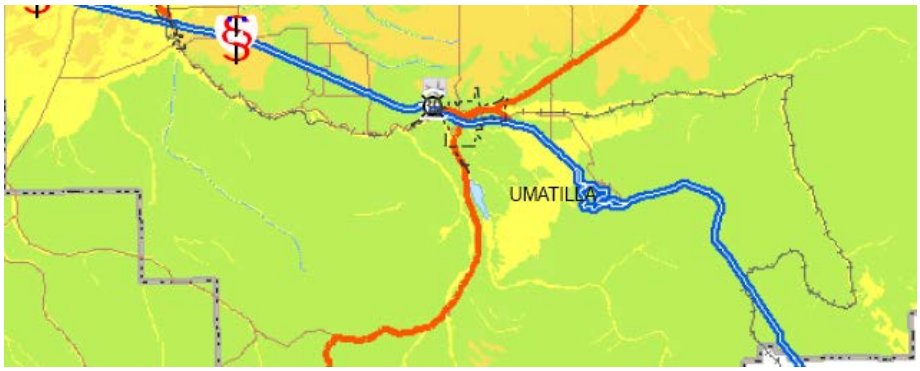
C. - Possible Impacts from Earthquakes

The main concern about earthquakes occurring on the Reservation is the possible injuries to the elderly and disabled from falling objects including toppled shelving and articles falling from shelves. Other impacts could be damage to utility infrastructure, aquifer fracturing and marked changes in the flow of well water, buildings and the resultant negative economic impact to the CTUIR governmental assets and therefore its citizens. Historical buildings that could suffer damage include St. Andrews Mission and the old BIA Office building.

Possible impacts from a relatively severe earthquake could result in: (1) breakage to sewer and water lines; (2) cracks in tribal and municipals wells allowing contamination to infiltrate into wells located on the reservation; (3) breaks to natural gas and oil pipelines; and (4) cracks or destruction to older buildings depending on the construction material and whether the building was designed to withstand earthquakes.

The Wildhorse Casino and Resort, 10-story Hotel, Tamastslikt Cultural Institute, the Public Safety Building (2007), Cayuse Business Park (2007) and Nixyáawii Governance Center (2009) were constructed to meet the International Building Code. It is not expected that these buildings would suffer significant damage from a moderate earthquake and hopefully, would withstand the shaking that would result from liquefaction. Liquefaction is caused when "earthquake waves cause water pressures to increase in the sediment and the sand grains to lose contact with each other, leading the sediment to lose strength and behave like a liquid. The soil can lose its ability to support structures, flow down even very gentle slopes, and erupt to the ground surface to form sand boils. Many of these phenomena are accompanied by settlement of the ground surface — usually in uneven patterns that damage buildings, roads and pipelines."[32]

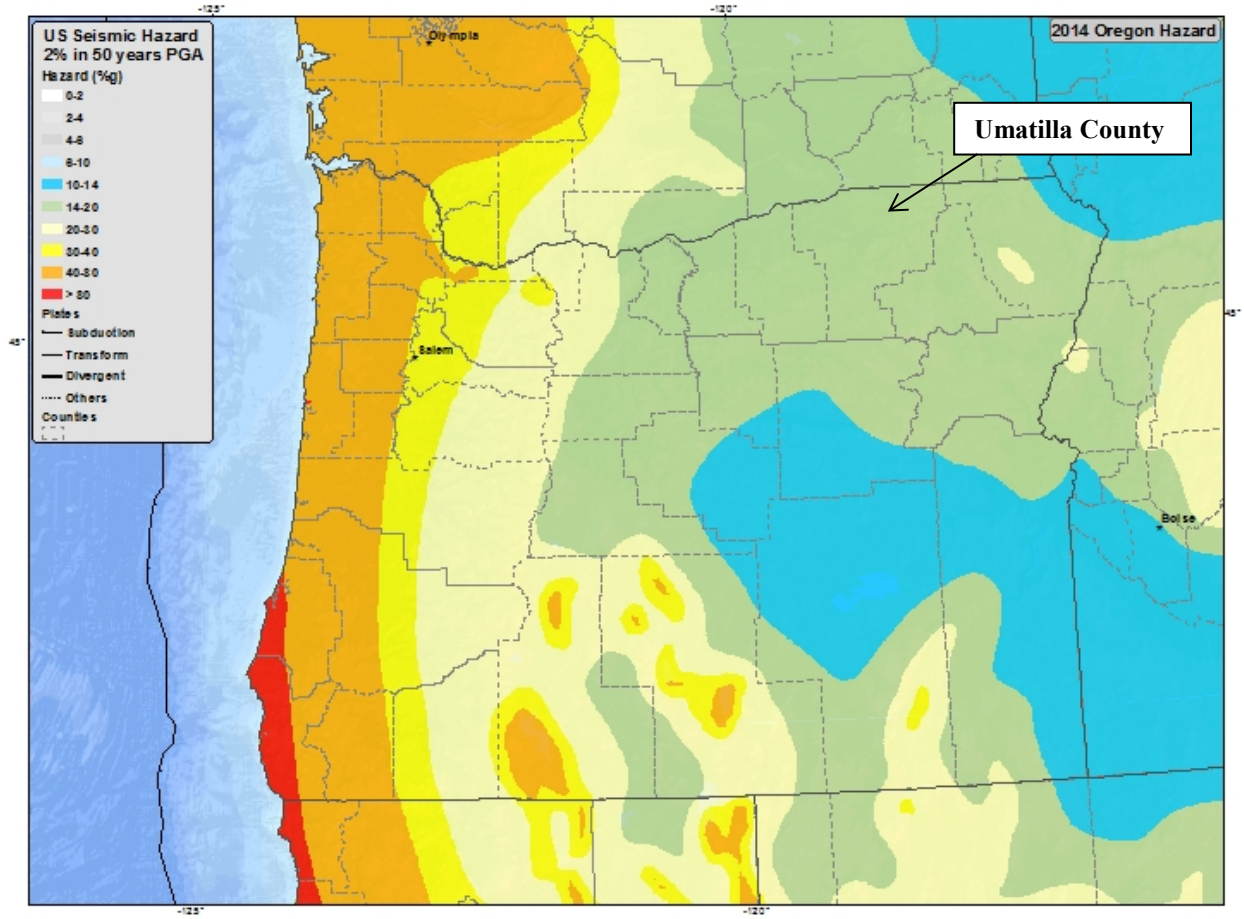
Most of the buildings in the Mission Community Planning Area are located on land that is identified by DOGAMI's Preliminary Liquefaction Susceptibility Map as having a "moderate" potential for liquefaction as depicted in **yellow** on the map below. This area also has a high potential for "ground shake amplification (See liquefaction susceptibility and ground shake amplification maps in Appendix C).



D. – The Extent and Probable Intensity of Earthquakes within the UIR

It is likely that the entire UIR will experience future earthquakes that could be of moderate to high intensity. This prognosis is based on information regarding past earthquakes with epicenters located near or on the Reservation (as depicted in the diagram below) and also on information supplied by the Department of Geology and Mineral Industries (DOGAMI) that indicates that all of Oregon has been scientifically established by the USGS to have a moderate to high seismic hazard probability.

Figure 3-3: USGS National Seismic Hazard Map 2014



Based on information from DOGAMI for eastern Oregon and the history of earthquakes that have occurred and been recorded in this area, there is a moderate to high probability that the UIR will experience an earthquake in the future that will affect the people and some buildings located on the UIR.

E. – The Vulnerability of the UIR to Earthquakes

Predicting when an earthquake will strike and its intensity is not feasible. The best that can be done is analyzing past earthquakes and estimating the chance of future similar earthquakes based on the intervals between those earthquakes of the past. Because information regarding past earthquakes affecting eastern Oregon is limited and that all of Oregon has been scientifically established by the USGS to have a moderate to high seismic hazard probability, the Hazard Mitigation Plan Steering Committee has concluded that the UIR has a moderate vulnerability to earthquakes.

11. – Volcanic Events

A. – Definition, Causes and Characteristics of Volcanic Events

Volcanoes are a result of the complex interaction of tectonic plates along the Cascadia Subduction Zone is the process that results in the seafloor plate subducting, or sinking, underneath the North American plate on which we live. As the subducted plate descends, it heats up and begins to melt. This provides the reservoir of heat and molten rock needed to create the magma chambers that lie kilometers deep underneath the Cascades[33].

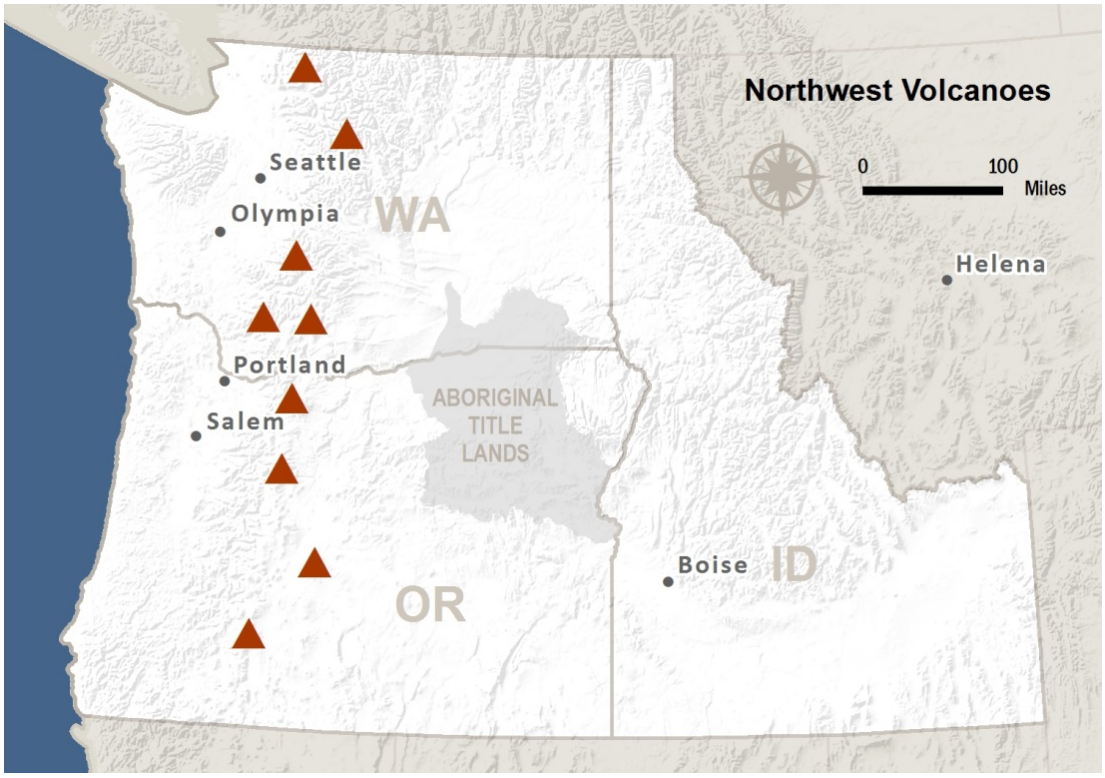
B - History of Volcanic Events in the Northwest

There have not been any volcanic eruptions in Umatilla County. The closest, most recent volcanic eruption was Mount St. Helens in the state of Washington. A brief history of the closest volcanic activity is discussed in Table 3-19 below[34].

Table 3-18: History of Volcanic Events

VOLCANO	ERUPTION YEAR	UNREST EPISODE
Mt. St. Helens, Washington	1980-1986, 2004-2005	1989-2003, occasional earthquake bursts, minor phreatic explosions, small mudflows
Mt. Hood, Oregon		Occasional earthquake swarms
Three Sisters, Oregon		Uplift began 1997; earthquake swarm March 2004

Figure 3-4 Northwest Volcanic Activity



C. - Possible Impacts from Volcanic Events on the UIR

The impacts from future volcanic events on Umatilla County[35] and the UIR would be relatively minor. The biggest impact from a Cascade Mountain volcanic event would likely be from terpha or volcanic ash that would be carried by the prevailing western winds from an erupting volcano. If just a small amount of ash (0.5 to 1.0 centimeters) is deposited on the Reservation, several negative impacts are possible. Particles of volcanic ash are so small that people and animals may need protection to ensure that breathing does not become impaired. Volcanic ash can short-circuit power lines and can also damage painted surfaces due to its abrasive nature.

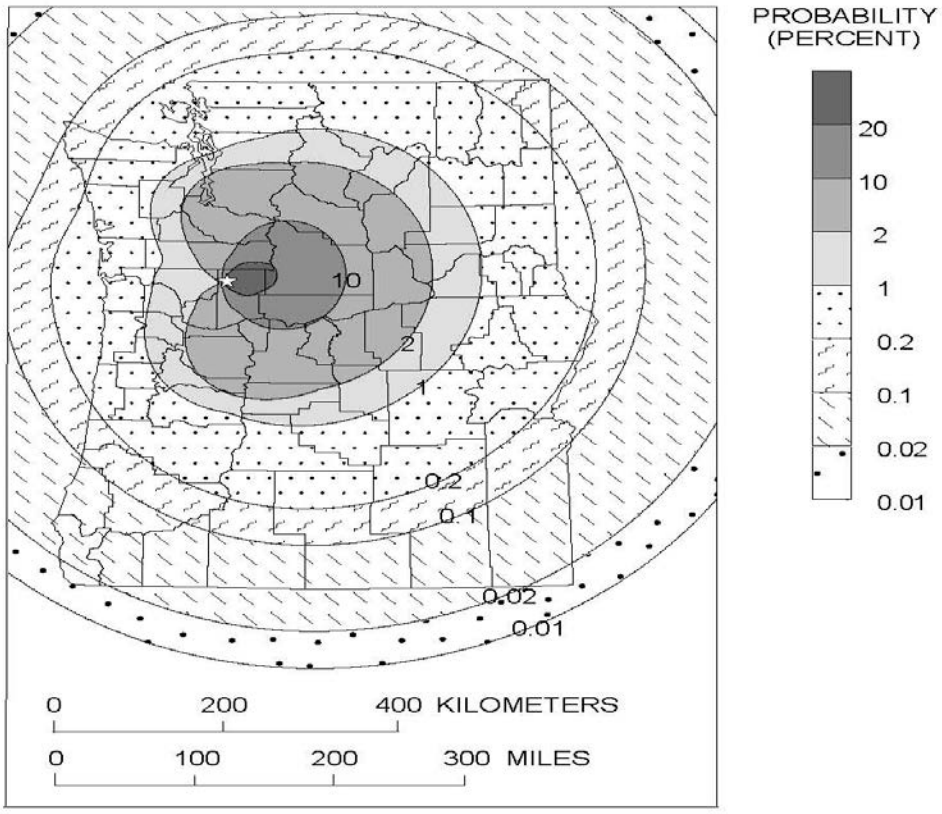
Perhaps the biggest problem associated with volcanic ash is that it can harm combustible engines and slow or completely stop transportation. This could negatively impact all businesses on the Reservation. On roads and streets, ash fall can create serious traffic problems as well as road damage. Vehicles moving over even a thin coating of ash can cause great clouds of ash to swell. This results in grave visibility problems for other drivers, calling for speed restrictions, and often forcing road closures. It also adds to the potential for health problems for residents of the area. Extremely wet ash creates very slippery and hazardous road conditions. Ash filling roadside ditches and culverts can prevent proper drainage and cause shoulder erosion and road damage.[36]

D. – The Extent and Probable Intensity of Volcanic Events

Because the Reservation is over 100 miles from the nearest Cascade Mountain volcano, the extent and intensity of a volcanic event from the UIR perspective would involve the amount of ash that might be deposited on Reservation property. The farther away from the volcano, the smaller the amount of ash will fall on the Reservation. During the eruption of Mount St. Helen, the Reservation received a

dusting of volcanic ash. The probable extent of ash from a volcanic event will be less than the 0.5 to 1.0 centimeters that will negatively impact the Reservation. The figure below indicates that the UIR has between a 1 percent and a 0.02 percent of being impacted by a Cascade Mountain Range volcano in the future. The probability distribution reflects the frequency of explosive eruptions at each major Cascade volcano, the variability in thickness of tephra that could be deposited at various downwind distances, and the variability in wind direction. Therefore, the probability that a volcanic event will impact the Reservation is very low.

Figure 3-5 Volcanic Hazard Probability



E. – The Vulnerability of the UIR to Volcanic Events

The vulnerability of the UIR to volcanic events is very low. Therefore, no further analysis or mitigation actions addressing this hazard will be provided.

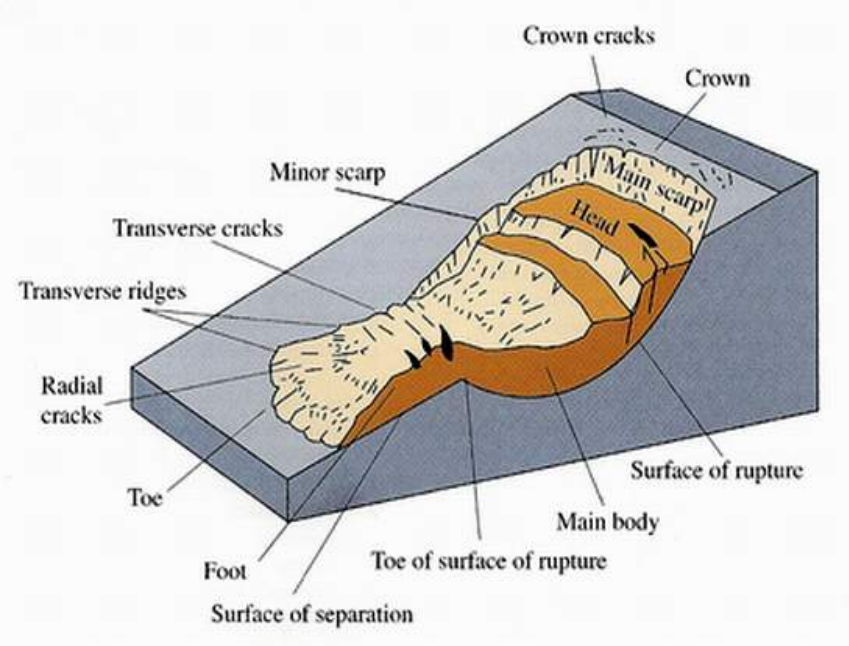
12. – Landslides

A. – Definitions, Causes and Characteristics of Landslides

Landslide or subsidence is the down-slope movement of rock, soil or other debris, or the opening of sinkholes. These hazards are often associated with other events, such as floods or earthquakes. Because of the moderate-to-high relief characteristics of the Reservation's river beds, along with hill and mountainous terrain in rural area, the chance of landslides occurring is high but is not deemed to present a serious threat to people or property.

The characteristics of a landslide are depicted in the following diagram from the US Geological Survey[37]:

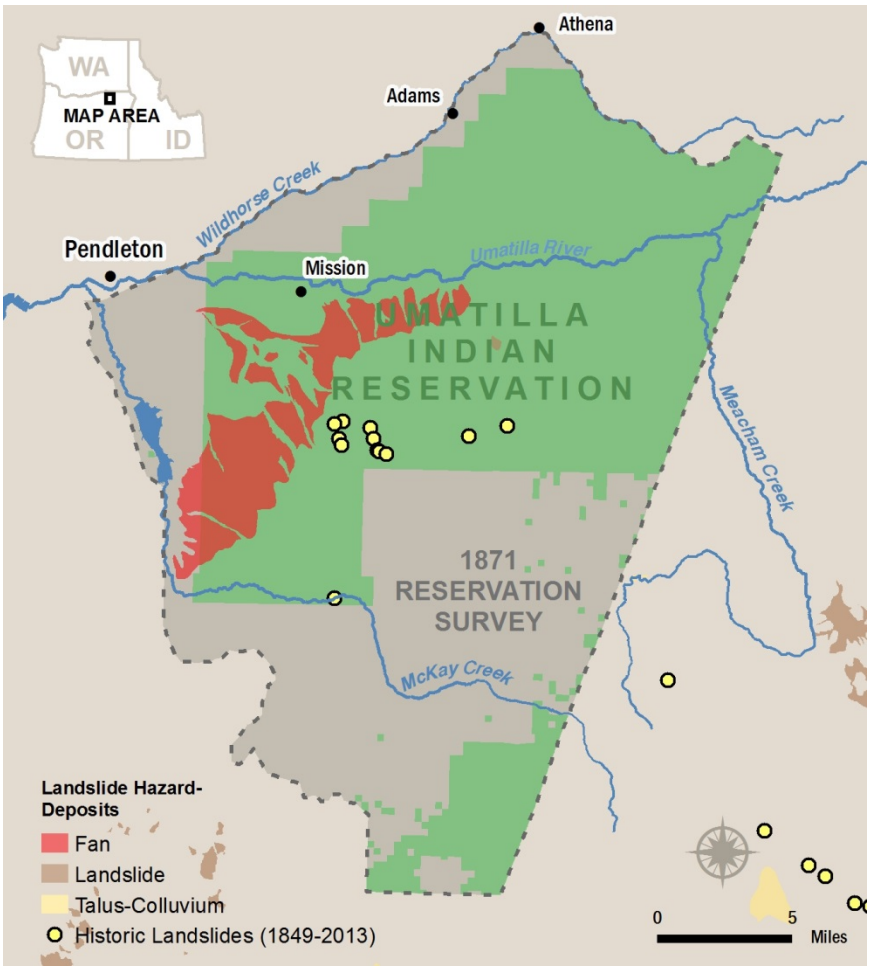
Figure 3-6: USGS Typical Landslide Diagram



B - History of Landslides Within the UIR

Little documentation exists regarding landslide history on the Reservation. Due to the fact that most landslide prone areas are located in areas with little or no development, many of the small and moderate slides have not been documented. Little or no damage resulting from landslides has occurred on the UIR or in other areas with Umatilla County.

Figure 3-7: Historic Landslides on the UIR[38]



C. - Possible Impacts from Landslides

Landslides on the Reservation could damage roads, block access roads, damage timber, streams and fisheries. Because the location of development on the Reservation is primarily in valleys some distance from higher elevations (where the greatest potential for most landslides exist), the impacts from landslides on the UIR are generally negligible.

D. – The Extent and Probable Intensity of Landslides within the UIR

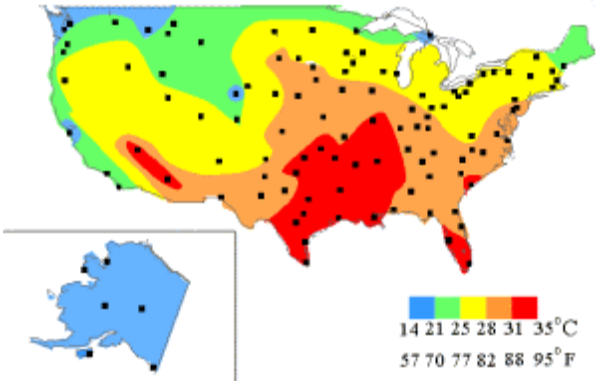
Figure 3-7 identifies 12 historic landslides on the UIR since 1849 (165 years). Therefore, the extent or intensity of landslides on the UIR is minimal.

Because landslides that do occur on the reservation occur in remote areas away from any populated areas, the probability that landslides will affect the UIR is very low.

E. – The Vulnerability of the UIR to Landslides

The vulnerability of the UIR to landslides is very low. Therefore, no further analysis or mitigation actions addressing this hazard will be provided.

13. – Extreme Heat



A. – Definition, Causes and Characteristics of Extreme Heat[39]

Generally, temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks are defined as extreme heat. Humid or muggy conditions, which add to the discomfort of high temperatures, occur when a "dome" of high atmospheric pressure traps hazy, damp air near the ground. Excessively dry and hot conditions can provoke dust storms and low visibility. Droughts occur when a long period passes without substantial rainfall. A heat wave combined with a drought is a very dangerous situation[40]. At certain levels, the human body cannot maintain proper internal temperatures and may experience heat stroke. Extreme summer heat occurs primarily east of the Rocky Mountains. Oregon does not experience the very dangerous extreme heat waves like those that occur east of the Rocky Mountains.

Oregon's hottest weather occurs when strong high pressure over Oregon brings descending, warming air and clear skies. Winds from the east or south are customary during such periods. Sometimes heat waves in Oregon are very short-lived; in other cases, hot weather can persist for many days. Eastern Oregon experiences much greater temperature variations than western Oregon, and higher temperatures are likely to last longer and be more intense than those west of the Cascades. Much of the marine air that keeps western Oregon cooler in the summer is blocked by the Cascades and prevented from reaching the eastside, and any air which does cross the Cascades is greatly modified, becoming warmer and drier. As a result, air temperatures typically decrease with increasing elevation, highest air temperatures generally occur at low elevations. Most of eastern Oregon is above 4,000 feet so high temperatures are considerably lower than in the low elevation deserts of the southwestern U.S. (such as the infamous Death Valley which is actually below sea level). In some places, however, deep river valleys in eastern Oregon have much lower elevations, producing Oregon's hottest summer temperatures. Pendleton, Ontario and Hermiston are examples of places which frequently experience hot temperatures in summer.

B. - History of Extreme Heat Disasters in Umatilla County

Many of the highest single-day temperatures were recorded at Umatilla, on the Columbia River, not far from Pendleton. Before the Umatilla weather station closed in 1965, it had reported temperatures of 117°, 115° (three times), and 114° (four times)[41]. However, the fact that high temperatures occur in eastern Oregon, Umatilla County and the UIR does not mean such conditions turn into disasters for two reasons: first, these conditions occur without the high humidity that normally occurs during heat waves in the Midwest, southern and east coast. Second, prolonged extreme heat is not a common occurrence. Most heat waves in Oregon are short lived.

C. - Possible Impacts from Extreme Heat

Extreme heat conditions don't normally occur in the Oregon. High temperatures do occur normally during the summer or early fall. If a stagnant high predominates to the north or east of Pendleton during the spring, the hot, dry conditions may prove detrimental to crops during late May and June, and cause fire danger in the forest and grassland areas during late summer and early fall.

In the Midwest, south and eastern United States, extreme heat can affect people in a number of ways. If an extreme heat wave persists, death can occur if proper precautions are not taken. Extreme heat can kill by pushing the human body beyond its limits. In extreme heat and high humidity, evaporation is slowed and the body must work extra hard to maintain a normal temperature.

Heat exhaustion which affects people by dizziness, fatigue, headache, nausea and lightheadedness can occur. Dehydration is common particularly where extreme heat and high humidity combine. However, the UIR has not experienced these type of "extreme heat" conditions.

Impacts from Extreme Heat on the Special Needs Population within UIR

Because the UIR does not experience the dangerous extreme heat conditions that occur in other parts of the country, there are no impacts to the special needs population on the Reservation from extreme heat events.

D. – The Extent and Probable Intensity of Extreme Heat within the UIR

Table 3-19 below provides information regarding the intensity of high temperatures experienced in Pendleton, Oregon. Several temperature over 100 degrees were reported. No information regarding the length of these high temperatures was provided. The National Weather Service did not list any temperature extremes as an identified disaster.

Table 3-19: Temperature Records for Umatilla County

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Normal Daily Maximum	39.7	46.9	54.2	61.3	70.0	79.5	87.8	86.2	76.3	63.7	48.9	40.5	62.9
Mean Daily Maximum	39.5	46.3	53.7	61.5	70.1	78.5	87.7	85.9	76.9	63.4	48.9	40.9	62.8
Highest Daily Maximum	70	75	79	91	100	108	110	113	102	92	80	67	113
Year of Occurrence	1995	1996	1964	1977	1986	1961	1939	1961	1955	1980	1999	1980	Aug 1961
Mean of Extreme Maximums	58.4	62.2	68.1	77.7	88.0	94.6	101.4	99.7	92.4	79.9	65.9	59.3	79.0
Normal Daily Minimums	27.2	31.6	35.4	39.4	45.8	52.9	58.0	57.7	49.9	41.0	34.1	27.9	41.7

Because very high temperatures and high humidity do not occur together in eastern Oregon, the probability that an extreme heat condition will occur is very low. Typically, extreme high temperatures that occur during the summer months last only a few days. The high humidity that combines with high temperatures to cause heat waves in the south, Midwest and eastern United States do not occur in the Pacific Northwest.

E. – The Vulnerability of the UIR to Extreme Heat

The vulnerability of the UIR to experience extreme heat is very low. Therefore, no further analysis or mitigation actions addressing this hazard will be provided.

13. – Man-Made Hazards

Three man-made hazards are addressed in this plan:
1. Hazardous Material Spills
2. Dam Failure
3. Gas Pipeline Failure

1. Hazardous Material Spills

A. - Definition, Causes and Characteristics of Man-Made Hazards

Although not common, man-caused accidents involving hazardous materials have the potential to turn into disasters. Because hazardous materials possess at least one of four characteristics; which are ignitibility, corrosiveness, reactivity, or toxicity, they can cause death or serious injury if improperly or accidentally released into the environment. A hazardous material can be in the form of a solid, liquid or gas and, if not properly contained, can cause long-lasting health effects, damage to buildings, homes, water bodies, First Foods and possibly long-term contamination leaving the immediate environment toxic. Although infrequent, hazard material accidents are most commonly associated with transportation accidents occurring on highways, rail, waterways or pipelines. However, manufacturing and agricultural industries use hazardous materials every day and can also be a source for man-caused accidents.

A number of hazardous materials are transported by rail, highway and pipeline through the Umatilla Indian Reservation, and hazardous material accidents can be difficult to contain. So much depends on conditions outside of an emergency-responders control. If a chemical spill occurs, the level of danger and type of emergency response depends on the chemical involved. If a poisonous gas is involved, weather conditions, wind direction and speed and whether it is day or night are all variables that will affect the type of response.

The following information provides some additional definitions and describes the characteristics of chemical spills[42]:

The principal modes of human exposure to hazardous materials include:

a) Inhalation of gaseous or particulate materials via the respiratory (breathing) process,
b) Ingestion of hazardous materials via contaminated food or water,
c) Direct contact with skin or eyes.

Exposure to hazardous materials can result in a wide range of negative health effects on humans and animals. Hazardous materials are generally classified by their health effects. The most common types of hazardous materials are summarized below.

Flammable materials are substances where fire is the primary threat, although explosions and chemical effects listed below may also occur. Common examples include gasoline, diesel fuel, and propane.

Explosives are materials where explosion is the primary threat, although fires and chemical effects listed below may also occur. Common examples include dynamite and other explosives used in construction or demolition.

Irritants are substances that cause inflammation or chemical burns of the eyes, nose, throat, lungs, skin or other tissues of the body in which they come in contact. Examples of irritants are strong acids such as sulfuric or nitric acid.

Asphyxiants are substances that interfere with breathing. Simple asphyxiants cause injury or death by displacing the oxygen necessary for life. Nitrogen is a good example. Nitrogen is a normally harmless gas that constitutes about 78% of the atmosphere. However, nitrogen releases in a confined space may result in asphyxiation by displacing oxygen. Chemical asphyxiants are substances that prevent the body from using oxygen or otherwise interfere with the breathing process. Common examples are carbon monoxide and cyanides.

Anesthetics and Narcotics are substances which act on the body by depressing the central nervous system. Symptoms include drowsiness, weakness, fatigue, and in coordination, which may lead to unconsciousness, paralysis of the respiratory system and death. Examples include numerous hydrocarbon and organic compounds.

Hazardous material may be located at the following locations on the Reservation:

- Umatilla Electric Coop Substation at Mission;
- The Williams Natural Gas Company has three pipelines of 30 inches, 22 inches and 6 inches that cross the Reservation;
- Cascade Natural Gas has local distribution lines of ½ inch to 4 inches that serve the Reservation;
- Tesoro has two liquid petroleum pipelines of 6 and 8 inches that cross the Reservation;
- Arrowhead Travel Plaza has storage facilities for gasoline, diesel and LPG.
- Tribal Environmental Recovery Facility (TERF) is a solid waste collection and recycling transfer station which is equipped to also accept, store and transfer household hazardous waste.
- CTUIR Department of Science and Engineering Field Station.
- CTUIR Kayak Public Transit Maintenance facility.
- Coyote Business Park East; Kenworth Truck Repair (facility leased from CTUIR)

B. - History of Hazardous Material Incidents on the UIR

A Williams's natural gas pipeline break and accompanying fire occurred on the morning of January 2, 1999 about four miles east of the community of Mission. The fire lasted about 3 hours. No one was injured and no property was damaged (Source: CUJ Newspaper, page 1, Jan. 1999).

Hazardous materials are transported every day by rail, truck, river and pipeline. Also, hazardous chemicals are in storage at area businesses. Thousands of hazardous materials shipments pass through the UIR on the Interstate and on rail lines that pass through the Reservation. The companies that transport and store these chemicals do a very good job with careful handling. Most hazardous material spills are very small and do not require emergency precautions, such as evacuation or shelter in-home protection; but on occasion accidents happen. The following table identifies train accidents on public road crossings on the Reservation. Only two accidents at the Davis Lane rail crossing involved the transport of hazardous material. No spills were reported.

Table 3-20: Incidents at Public Rail Crossings[43]

Public Road - Rail Intersections	Crossing Number	Past Accidents	Date(s) of Accident	Transported Hazardous Materials	Hazardous Materials Released
Mission Frontage Road	748570G	0		No	
Davis Lane	809034J	3			
			9-Dec-80	Yes	Not reported
			10-Oct-94	Yes	Not Reported
			24-Aug-98	No	
Mission State Hwy 2	809036X	1	6/19/1994	No	
Parr Lane	809037E	3			
			12/4/1982	No	
			6/8/1991	No	
			5/13/1998	No	
Minthorn Niktyoway Road	809040M	2			
			3/16/1991	No	
			11/22/1995	No	
Minthorn Old River Road	809041U	1	10/10/1985	No	
Minthorn Old River Road	809044P			No	
Cayuse-Adams Road	809046D	1	7/16/1980	No	
Thorn Hollow Road	809048S	0		No	
Bingham Road @ Thorn Hollow	809051A	0		No	
Bingham Road @ Gibbon	809211L	0		No	
Cayuse Road @ Gibbon	809213A	0		No	
Main Street Meacham	809221S	0		No	
Old US Hwy 30 @ Meacham	809223F	0		No	
Oregon Trail @ Meacham-I-84	809224M	0		No	

Westbound I-84 at Cabbage Hill

Truck traffic through the reservation via I-84 freeway presents another opportunity for a hazardous material spill. The following statements about Emigrant Hill are found on the Oregon Department of Transportation's (ODOT) website[44]:

> Emigrant Hill - Emigrant Hill, commonly called "Cabbage Hill," is a very hazardous part of Interstate 84, west of La Grande in Eastern Oregon. This hill experiences some of the most changeable and severe weather conditions in the Northwest. Visibility is often limited and road surfaces are often icy. To get down Cabbage Hill, truckers lose about 2,000 feet of elevation in six miles and twist through a double hair pin turn at a 6% downgrade. More than 90% of the Cabbage Hill crashes involve out-of-state motor carriers!
>
> Truckers get a white-knuckle experience traveling Interstate 84 from La Grande to Pendleton as they lose 2,000 feet of elevation and twist through a double hairpin turn at a 6% downgrade on Emigrant Hill, also known as Cabbage Hill. Now a new advisory system is cautioning transponder-equipped trucks about the steep downgrade so drivers will slow to a safe speed. The system is linked with the Green Light pre-clearance system at the Emigrant Hill weigh station. If a truck is equipped with a Green Light transponder, a variable message sign displays a personalized message for the truck and a recommended speed that is based on that truck's weight as recorded when it passed the Emigrant Hill weigh station.
>
> Emigrant Hill, from mileposts 219 to 228, has historically experienced a plague of accidents. In the eight-year period from 1997 through 2004, the area had 65 truck accidents, including 32 in which a truck was at-fault. The accidents resulted in a total of 24 injuries and 1 death.
>
> The new speed advisory system is designed to help inexperienced drivers who don't realize how difficult it is to slow to a safe speed once they get started down this hill. When following trucks here it's not uncommon to see smoke coming from the back of a truck as its brakes heat up. Emigrant Hill has a runaway ramp that trucks can use as a last resort to escape serious trouble.

More information from ODOT about Cabbage Hill can be found in Appendix C under Man-Made Disasters.

C. - Impacts from a Hazardous Material Incident on the UIR

If a hazardous material spilled or an accident occurred and the result was release of a hazardous material into the atmosphere, the danger from such an event would be possible exposure of hazardous substances to humans, animals and First Foods. The principal modes of human and animal exposure to hazardous materials would be from:

1. Inhalation of gaseous or particulate materials via the respiratory (breathing) process,
2. Ingestion of hazardous materials via contaminated food or water,
3. Direct contact with skin or eyes.

Exposure to hazardous materials can result in a wide range of negative health effects on humans and animals including death, long-term health problems, and major and minor injuries. Hazardous materials are generally classified by their health effects. The most common types of hazardous materials are summarized below.

Flammable materials are substances where fire is the primary threat, although explosions and chemical may also occur. Common examples include gasoline, oil, diesel fuel, and propane.

Explosives are materials where explosion is the primary threat, although fires and chemical effects listed below may also occur. Common examples include dynamite and other explosives used in construction or demolition.

Irritants are substances that cause inflammation or chemical burns of the eyes, nose, throat, lungs, skin or other tissues of the body in which they come in contact. Examples of irritants are strong acids such as sulfuric or nitric acid.

Asphyxiates are substances that interfere with breathing. Simple asphyxiates cause injury or death by displacing the oxygen necessary for life. Nitrogen is a good example. Nitrogen is a normally harmless gas that constitutes about 78% of the atmosphere. However, nitrogen releases in a confined space may result in asphyxiation by displacing oxygen. Chemical asphyxiates are substances that prevent the body from using oxygen or otherwise interfere with the breathing process. Common examples are carbon monoxide and cyanides.

Anesthetics and Narcotics are substances which act on the body by depressing the central nervous system. Symptoms include drowsiness, weakness, fatigue, and coordination problems, which may lead to unconsciousness, paralysis of the respiratory system and death. Examples include numerous hydrocarbon and organic compounds.

HAZMAT incidents involving chemicals can lead to a situation where people must shelter in place or evacuate quickly. In some cases, people may be away from their home or business for up to a few days. Hazardous material spills can damage habitat and Native American cultural sites. For example, "Biscuit Root" or "Xh-oush" is an important traditional Native American food that is found in several higher elevation locations next to I-84.[45] A large chemical spill from a traffic accident on Interstate 84 or an accident involving the railroad could damage an important cultural food source for many years.

D. - Impacts to Special Needs Population

This population is most susceptible to this hazard due to limited mobility and ability to evacuate expeditiously in the event of an emergency involving hazardous material.

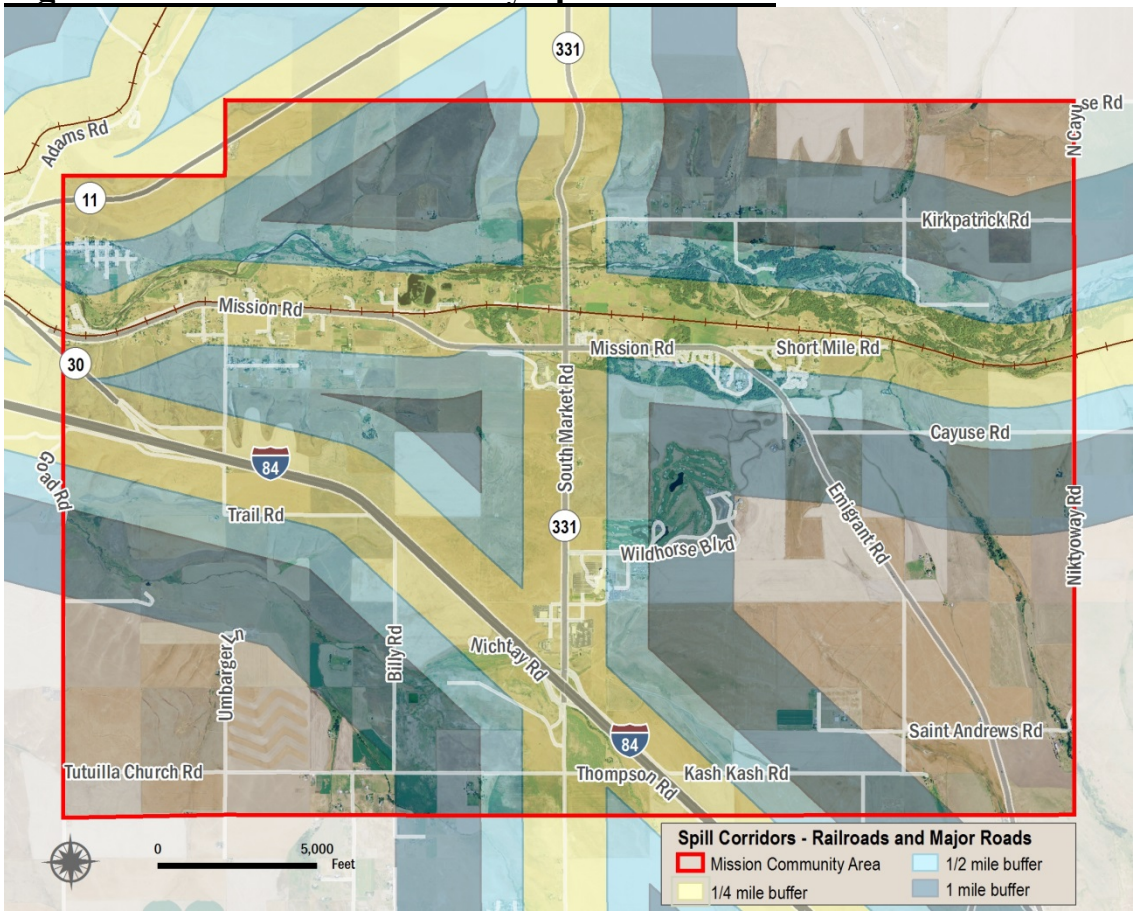
E. - Extent and Probable Intensity of a Hazardous Material Incident

It is difficult to project the probable intensity or extent of any hazardous material spill or release incident for an affected community because whether it becomes a disaster depends on several factors, including:

a) the toxicity of the hazardous material,
b) the quantity of the hazardous material spilled or released,
c) the dispersal characteristics of the hazardous material,
d) the local conditions such as wind direction and topography, and
e) the location of the spill or release in proximity to sensitive environmental areas such as a watershed that provides a community's drinking water, and
f) the efficacy of response and recovery actions.[46]

Based on information contained the Emergency Response Guidebook[47], Table 3-21 (located in Appendix C) identifies the initial safety distances if a hazardous material accident occurs. This information suggests the initial extent of properties that might be affected at the point of a hazardous material spill. If an accident occurs, greater evacuation distances may be necessary depending on wind direction and whether it is day or night.

Figure 3-8 - Mission Community Spill Corridors



The probability of a man-made disaster occurring on the Reservation is low. Precautions are already in place for dealing with some hazardous materials being transported through the Reservation. For example, trucks that transport hazardous material are not allowed to park near the Wildhorse Resort and Casino or other critical facilities.

Historically, there have been very few man-made disasters on the Reservation. This fact supports the conclusion that the probability of future man-made disasters is low. The most likely places for a hazardous material spill on the Reservation would be from a truck accident on Cabbage Hill or a train accident along the railroad corridor. However, based on the initial safety distances required for most chemicals and, the most populated areas of the Reservation would not be severely threatened.

F. – The Vulnerability of a Hazardous Material Incident on the UIR

Because hazardous materials pass through the Reservation every week, the UIR will be vulnerable. However, based on the history of both rail and truck transport, the vulnerability to populated areas within the Reservation is normally low. However, the risk to the Reservation increases depending on the weather. During periods of dust storms, severe winter weather, and thick fog, the chances of traffic accidents increase significantly. Of course, the chances for accidents involving trucks transporting hazardous materials also increase.

The locations where hazardous material accidents are most likely to occur is on I-84 on Cabbage Hill or along the railroad corridor. An accident on Cabbage Hill involving hazardous waste may raise significant environmental problems, but should not endanger citizens living on the Reservation. The I-84 Interstate corridor is more than two miles from residential areas. However, a railroad accident involving hazardous waste materials could have severe negative environmental and cultural resource consequences. The railroad corridor is located within the floodplain of the Umatilla River and its tributary, Meacham Creek. Water, both surface and sub-surface, is sacred to the Tribal people having both religious and cultural significance. All Tribal First Foods, including fish, big game, roots and berries, could be impacted. By Tribal standards, any potential negative impact to these resources makes the Reservation highly vulnerable to a Hazardous Material Incident.

Indian Lake Dam

2. Dam Failure

A. - Definition, Causes and Characteristics of a Dam Failure

Indian Lake Dam (Lake Hum-Ti-Pin) is the only large dam located on the UIR. The crest length of Indian Lake Dam is 560 feet, and it is 54 feet high. The dam creates an 80-acre reservoir, Lake Hum-Ti-Pin, holding approximately 1200 acre-feet of water which fluctuates with the seasons. The dam is owned, operated and maintained by the CTUIR. The primary use of the reservoir is recreation. Indian Lake Dam is located on Jennings Creek which drains into the Grande Ronde watershed.

Safety concerns about the dam were identified by the U.S. Bureau of Reclamation during a comprehensive safety review February 21, 2008. The result of that review revealed safety concerns about the integrity of the dam due to erosion from water flowing through the dam and from overtopping. The dam's spillway is a concrete overflow structure with no means of significantly altering the outflow rate and the 10-inch diameter outlet pipe was plugged, cracked, and not a viable means of draining the reservoir.[48] To address these safety concerns, the dam's outlet pipe has been

sealed to prevent the leaks that were causing erosion compromising the dam's structure, an electronic water level monitoring system installed and an Emergency Action Plan has been developed by the Bureau of Indian Affairs and is monitored by the CTUIR Department of Natural Resources Water Resources Program.

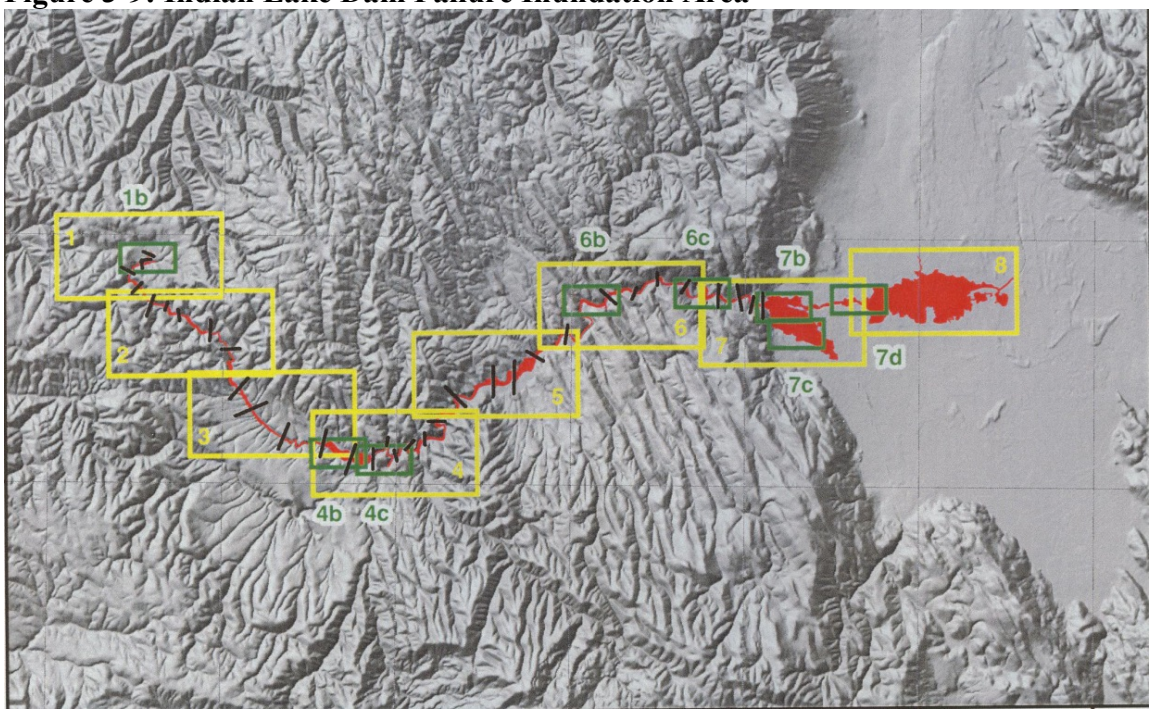
B. - History of a Dam Failure on the UIR.

There is no history of dam failure for the Indian Lake Dam.

C. - Possible Impacts of Dam Failures on the UIR

A failure of Indian Lake Dam would have a minor impact on Reservation lands and no impact on the populated areas within the Reservation but would have an impact to off-Reservation lands. The dam holds 1,200 acre-feet of water. This volume of water, if released from a dam failure, would drain within the Grande Ronde River watershed and be a real nuisance to the city of La Grande, Oregon. A dam failure could lead to major damage to I-84 and would impact the traveling public using I-84 and disrupt freight delivery using I-84 and possibly the rail line located in the same narrow corridor and in La Grande.

Figure 3-9: Indian Lake Dam Failure Inundation Area



D. – The Extent and Probable Intensity of a Dam Failure on the UIR

Indian Lake Dam on the Umatilla Indian Reservation would empty in a direction away from populated areas on the Reservation but would create a flash flood impacting the I-84, State Route 244 and deliver up to approximately two feet of water in the City of La Grande (See Figure 3-9 below). The intensity of the flood likely would be enough to damage I-84, State Route 244 and damage cabins located in the path of the damage. The extent of the damage to the city of La Grande would not be that great as the intensity and size of the wall of water would not be very high.

The Bureau of Reclamation has identified three Expedited Dam Safety Actions (EDSAs) associated with potential failure modes at Indian Lake Dam: (1) The dam has an unacceptably high probability of failure due to piping or internal erosion of embankment soil by seepage flow into and through the coarse-grained backfill which surrounds the outlet works conduit, or through the backfill and along the concrete encasement which encapsulates the conduit. (2) The dam has an unacceptably high probability of failure due to piping or internal erosion of embankment soil by seepage flow into the outlet works (through cracks and open joints). (3) The dam has an unacceptably high probability of failure due to elevated reservoir levels during an extreme hydrologic (storm) event that leads to embankment overtopping. The Bureau of Reclamation has recommended that the Bureau of Indian Affairs take expedited actions to address these three safety concerns.

The probability of an Indian Lake Dam failure is low since identified structural deficiencies have been addressed and monitoring system established.

E. – The Vulnerability of the UIR to a Dam Failure

A dam failure where the UIR receives extensive damage is non-existent. If the Indian Lake Dam were to fail, a flash flood of water from the dam would flow away from populated areas on the reservation toward the city of La Grande. I-84 and the city of La Grande would suffer the most damage from the failure of Indian Lake Dam. Therefore, I-84 and the city of La Grande would have a higher vulnerability to dam failure.

3. Natural Gas Pipeline Breaks

A. - Definition, Causes and Characteristics of Pipeline Breaks

Risks to the public from hazardous liquid and gas transmission pipelines result from the potential unintentional release of products transported through the pipelines which can impact surrounding populations, property, and the environment, and may result in injuries or fatalities. A pipeline failure is when a break in an existing line allows the product to escape.[49] Products are transported under pressure and a weak spot in the line, earthquake or accidental puncture could result in a break. Although lines are monitored and maintained there is no way to predict when or where a pipeline break may occur.

Major natural gas transmission pipelines (both gaseous and liquid) traverse the UIR in roughly a northwesterly to southeasterly direction. The ownership and location identification of these pipelines is described in Section 2.

B. - History of Pipeline Failures on the UIR

There has been one gas pipeline failure on the Umatilla Indian Reservation. A gas pipeline exploded on January 2, 1999 about four miles east of the community of Mission. No one was injured and no property was damaged as a result of the pipeline failure[50]. The distribution of natural gas to Walla Walla, Washington and natural gas users north of the Reservation were without natural gas while the pipeline was being repaired.

There has not been a liquid fuel pipeline failure on the UIR.

C. - Possible Impacts of Pipeline Failure on the UIR

The impacts of a nature gas pipeline rupture depend on where the failure occurs. If a failure occurred within a populated area, loss of life and serious property damage is possible. If the failure occurs in a rural area, as was the case in the only pipeline rupture that occurred on the UIR, no loss of life or property damage will occur. In any case, loss of natural gas service until the pipeline is repaired could result in loss of heat and energy to residents and industries dependent on natural gas.

A liquid fuel pipeline failure would likely cause environmental damage to immediate area surrounding the break.

D. – The Extent and Probable Intensity of a Pipeline Failure on the UIR

The extent of a natural gas or oil pipeline failure is confined to the immediate areas adjacent to the pipelines. A natural gas pipeline failure and possible explosion would be confined to primarily sparsely settled areas of the UIR. The intensity of a pipeline failure if an explosion occurs could be fairly intense particularly if it occurred during the drier season and a wildfire also occurred.

A liquid fuel pipeline failure should be much less intense (as oil is less explosive than natural gas) and would likely be confined to area near the immediate break. The liquid fuel pipeline generally follows the I-84 corridor.

E. – The Probability of a Gas Pipeline Failure Affecting the UIR

The likelihood of a natural gas pipeline failure is low. There has only been one failure on the Reservation, and no injuries or damage occurred.

F. – The Vulnerability of the UIR to a Gas Pipeline Failure

The vulnerability to the UIR for another natural gas pipeline failure is low.

15. - Vulnerability Analysis Summary

The UIR's Hazard Mitigation Plan Steering Committee analyzed each of the hazards using the criteria described in the beginning of this Section. A more detailed explanation of the criteria can be found in Appendix D.

Hazards Impact-Risk Assessment for the Umatilla Indian Reservation:

	Deaths	Injuries	Critical Facility	Lifelines	Property Damage	Environ-mental Impact	Econ/Soc Impact	Cultural Impact	Likely to Occur	Total	Rank
1. Winter Storms	3	3	2	3	3	1	3	2	4	24	**High**
2. Wildfires	1	2	1	1	3	3	4	3	6	24	**High**
3. Fog	5	5	1	1	1	1	2	1	6	23	**High**
4. Drought	1	1	1	1	2	4	4	4	5	23	**High**
5. Flooding	1	1	1	1	3	3	4	1	5	20	Med
6. Dust Storms	1	2	1	1	2	2	2	1	6	18	**Med**
7. Spring/Summer Storms	1	1	1	2	2	2	1	1	6	17	**Med**
8. Earthquake	1	1	1	2	3	1	3	1	4	17	**Med**
9. Wind Storms	1	1	1	2	2	1	2	1	4	15	**Low**
10. Landslides	1	1	1	1	2	1	1	1	6	15	**Low**
11. Man-made Disasters	1	1	2	2	1	2	1	1	3	14	**Low**
12. Volcanoes	1	1	1	1	1	1	1	1	1	9	**Low**
13. Extreme Heat	1	1	1	1	1	1	1	1	1	9	**Low**

The point totals for hazardous events were further refined into three categories to better illustrate which hazards present the greatest threat to the UIR. The three categories and the point total that defines each category are as follows:

High = more than 20 points
Medium = 16-19 points
Low = 8-15 points

[1] Note: The study by Innovative Emergency Management identified numerous hazards that it believed should be evaluated in selecting the best site for the UIR Emergency Operations Center. Because of this study, the original Tribal Emergency Response Committee convening to develop the 2008 CTUIR Hazard Mitigation Plan decided that this plan should also analyze a comprehensive number of possible hazards beyond those more likely hazards analyzed by the State of Oregon and Umatilla County.

[2] Adapted for the UIR from the qualitative risk analysis used in the Washington State Hazard Mitigation Plan,

[3] 2015 Oregon Natural Hazard Mitigation Plan Risk Assessment, p. 17

[4] Umatilla County Hazard Mitigation Plan, 2014 p. 134, Table 5-4

[5] 2001 U.S. Army Corps of Engineers Jerry R. Gardenhir, P.E., *Report of Flood Fight Potential Sites in Umatilla County, OR.*

[6] Information provided by FEMA Region 10 Hazard Mitigation Division.

[7] Umatilla County Community Wildfire Protection Plan, p 6-10

[8] Umatilla County Hazard Mitigation Plan 2014

[9] Umatilla County Community Wildfire Protection Plan, p.6-10

[10] Ibid, p. 8-7

[11] Umatilla Agency Wildland Fire Prevention Plan 2012-2016, Table 1

[12] Definitions from the National Weather Service - http://www.weather.gov/glossary/

[13] http://www.weatherexplained.com/Vol-5/2001-Pendleton-Oregon-PDT.html

[14] NOAA National weather Service, Pendleton, OR

[15] http://www.wrh.noaa.gov/pqr/seasonal/may8.php

[16] Weather Explained –http://www.weatherexplained.com/Vol-5/2001-Pendleton-Oregon-PDT.html

[17] http://www.wrh.noaa.gov/pqr/paststorms/tornado.php

[18] Email notice from National Weather Service 6-18-2015 (Appendix C)

[19] National Weather Service - http://www.nws.noaa.gov/glossary/index.php?letter=w

[20] Oregon State Natural Hazard Mitigation Plan - http://aaa.uoregon.edu/csc/onhw/index.cfm?mode=stateplan&page=part3

[21] Draft 2015 Oregon Natural Hazard Mitigation Plan Risk Assessment Table 2-V-1: Local Vulnerability Rankings by County

[22] Oregon State Hazard Mitigation Plan, Dust Storms

[23] From the Umatilla County Hazard Mitigation Plan and Oregon State Natural Hazard Mitigation Plan, Region 5

[24] Umatilla County Hazard Mitigation Plan, p. 80

[25] Draft 2015 Oregon Natural Hazard Mitigation Plan Risk Assessment

[26] Oregon State Natural Hazard Mitigation Plan, Region 5

[27] Note: In the Oregon State Natural Hazard Mitigation Plan, Umatilla County did not rank or identify drought as a significant concern.

[28] Weather Questions. Com - http://www.weatherquestions.com/What_causes_fog.htm

[29] Weather Explained – http://www.weatherexplained.com/Vol-5/2001-Pendleton-Oregon-PDT.html

[30] Comments from Bill Burns, Geologist, DOGAMI

[31] Earthquake information and Figure 3-14 data from Interior Geospatial Emergency Management System (IGEMS) supported by the U.S. Department of Interior Office of Emergency Management: http://igems.doi.gov

[32] http://geomaps.wr.usgs.gov/sfgeo/liquefaction/aboutliq.html

[33] State of Oregon Natural Hazards Mitigation Plan, Volcanic Hazards Chapter, April 2004

[34] OPEN-FILE REPORT 2005-1164, An Assessment of Volcanic Threat and Monitoring Capabilities in the United States: Framework for a National Volcano Early Warning System by John W. Ewert, Marianne Guffanti, and Thomas L. Murray, U.S. Geological Survey, April 2005

[35] Umatilla County Hazard Mitigation Plan, FIGURE O: Volcano Impact Probability, p. 74

[36] State of Oregon Natural Hazards Mitigation Plan, Volcanic Hazards Chapter

[37] US Dept. of Interior, USGS, Fact Sheet 2004-3072

[38] Oregon Department of Geology and Mineral Industries (DOGAMI) http://www.oregongeology.org/sub/slido/data.htm AND http://www.oregongeology.org/slido/index.html

[39] Information in this Section 3.12.A was obtained from two sources – The Oregon Weather Book, George H. Taylor and Raymond R. Hatton http://www.ocs.orst.edu/page_links/publications/weather_book/weather%20events/Hot%20weather.pdf and from the City of Claremore, OK Hazard Mitigation Plan, R.D. Flannagan and Associates, p. 3-41.

[40] FEMA.gov - http://www.fema.gov/hazard/heat/background.shtm#3

[41] Roseburg Explosion

[42] Columbia County, WA Hazard Mitigation Plan, Chapter 14 – Hazardous Materials

[43] US Dept. of Transportation Crossing Inventory information, 1-15-2015

[44] http://www.oregon.gov/ODOT/MCT/EDUCATION.shtml

[45] Armand Minthorn, CTUIR Board of Trustees, Sept. 27, 2007

[46] Ibid, pp. 14-1 and 14-2

[47] 2004 Emergency Response Guidebook, the Orange Guides Chapter

[48] Indian Lake Dam Emergency Operations Plan and other dam information from CTUIR DNR Water Resources Dept.

[49] http://primis.phmsa.dot.gov/comm/publications/PIPA/PIPA-PipelineRiskReport-Final-20101021.pdf

[50] Confederated Umatilla Journal, page 1, January 1999.

Section 4 - Projected Impacts of Hazards

This section of the UIR Hazard Mitigation Plan takes the information in the Plan's risk assessment in Section 3 one step further. It responds to a number of hazard mitigation planning requirements: (1) identifies "the hazard area" for each hazard; (2) provides a list of critical facilities, and tribe-owned and operated assets impacted by identified hazard areas; (3) contains an overview and analysis of potential losses to identified structures and assets from each hazard. Estimates of potential dollar losses from the hazards identified by the Hazard Mitigation Plan Steering Committee are included in the overview of potential losses.

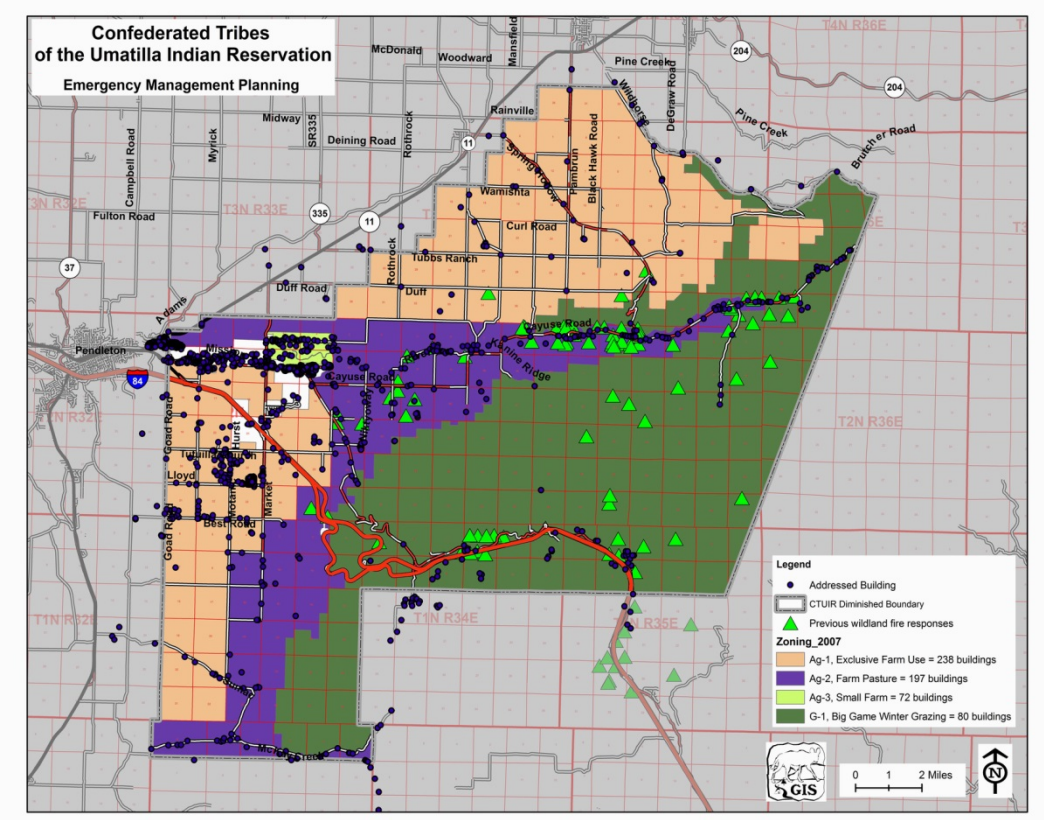
1. - Identified Hazard Areas

The areas on the UIR identified as having the potential for a natural hazard are described below:

1. Flooding – The flood prone areas identified on the adopted National Flood Insurance Program Flood Insurance Rate Map as Special Flood Hazard Areas in the UIR and the French Town off-Reservation CTUIR-owned trust lands located in Walla Walla County, Washington.

2. Wildfires – The entire UIR, but primarily areas located outside the immediate Mission Community (the most populated portion of the reservation that is protected by the CTUIR Fire Department). The possibility of grassland wildfires and wheat fires exists for the lands at the base of the Blue Mountains.

Figure 4-1: Developed Areas of the UIR. Forested lands identified as green (G-1) are the most vulnerable to wildfires on the Reservation.



3. Severe Winter Storms – The entire UIR

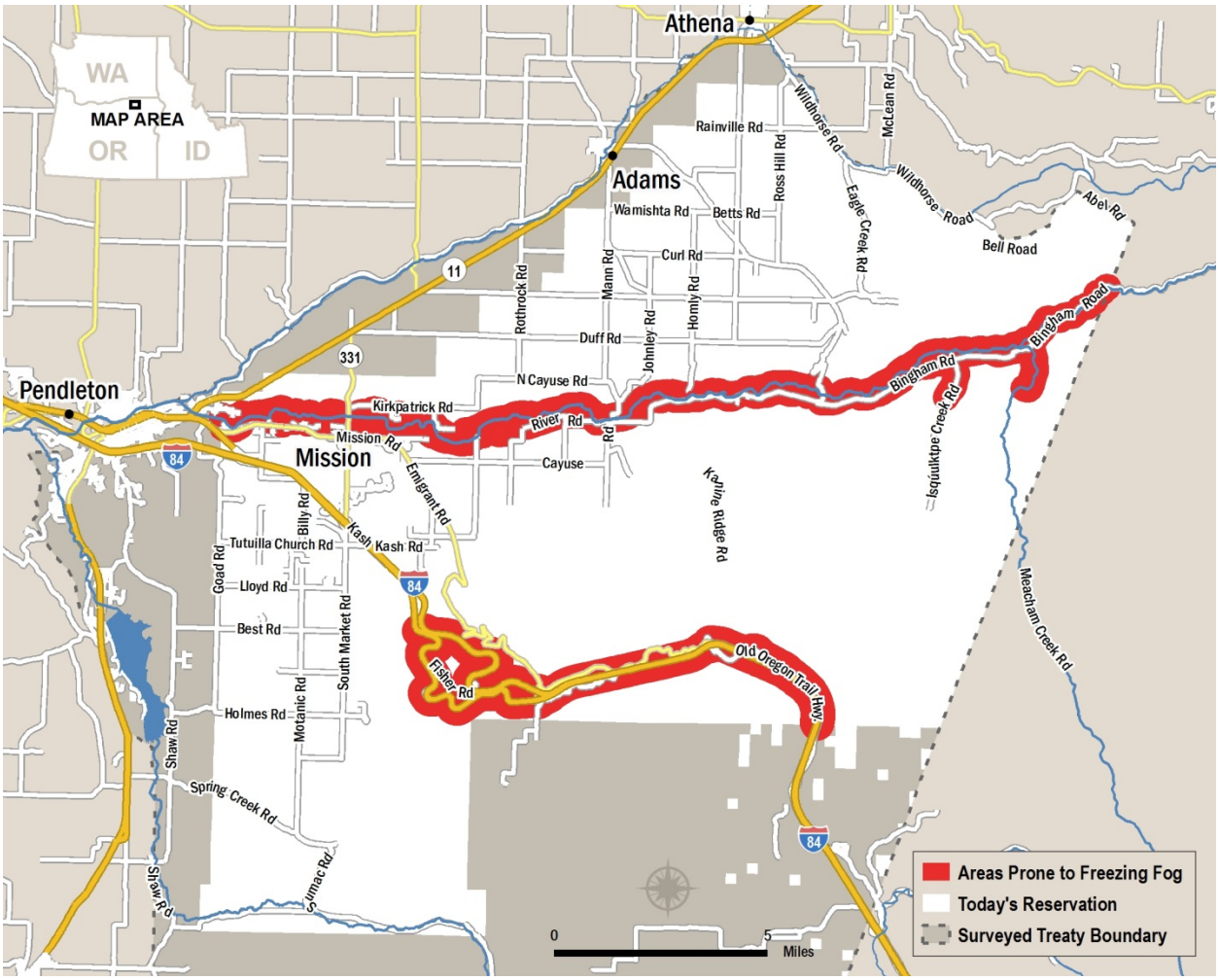
4. Spring/Summer Storms – The entire UIR

5. Wind Storms – The entire UIR

6. Dust Storms – Primarily the valley areas at the base of the Blue Mountains.

7. Drought – The entire UIR; agricultural land, First Foods and Mission Community Water System service area.

8. Fog- **Figure 4-2: Areas Prone to Freezing Fog:** Umatilla River and I-84 corridor

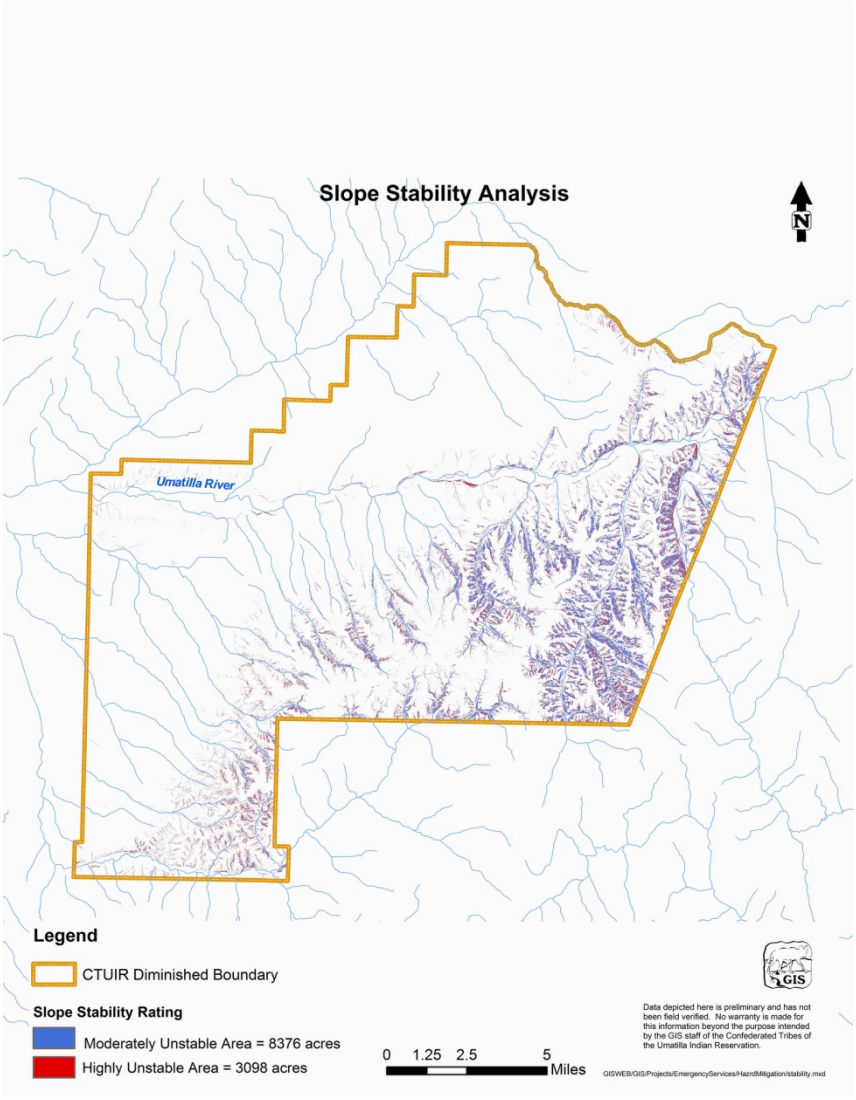


9. Earthquake – The entire UIR

10. Volcanoes – The UIR is not in the danger zone for volcanic events. If ash is expelled from a Cascade Mountain Range volcanic event, all of the UIR and the off-Reservation CTUIR-owned trust lands may be impacted.

11. Landslides – The populated areas of UIR are not significantly affected by landslides although landslides may occur.

FIGURE 4-3: Slope Stability Analysis

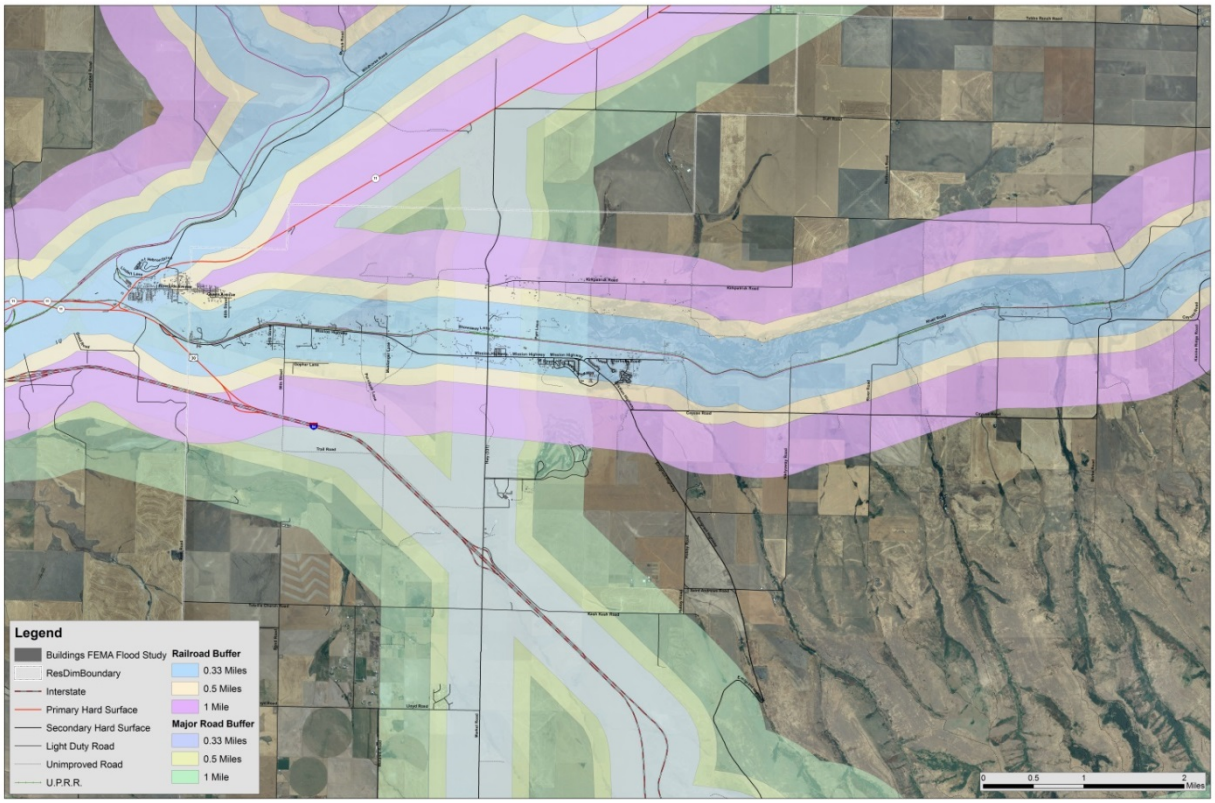


12. Extreme Heat – The entire UIR.

13. Man-Made Disasters –

A. Hazardous Material Spills – The areas on the UIR with the highest potential for a hazardous material spill would be along one of the transportation routes identified on the following map. Safety distances for a number of hazardous materials are identified on the below for rail and highways near UIR's populated areas:

Figure 4-4: Potential Spill Corridors



B. Natural Gas Pipeline Break – The map below identifies the various pipeline corridors that cross the Reservation. Although the majority of the pipeline route is located in rural areas without significant population centers, the eastern route does transect the Mission Community Area which as the highest population density dissecting the Mission Creek Indian housing complex. If a break were to occur in this line it could significantly impact the Tribal community.

C. Dam Failure – The identified hazard area that would be primarily affected by Indian Lake Dam failure is the city of La Grande (which is located outside the UIR). The inundation area has been calculated and is identified by red lines on the map below:

Figure 4-5: Indian Lake Dam Failure Inundation Area

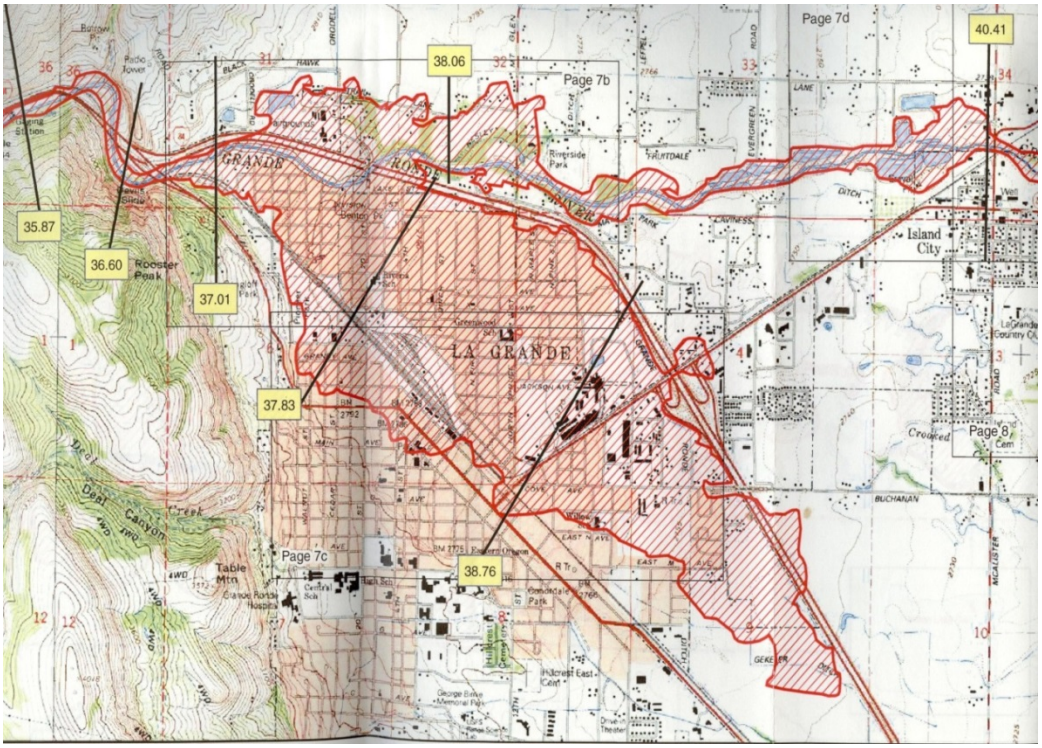
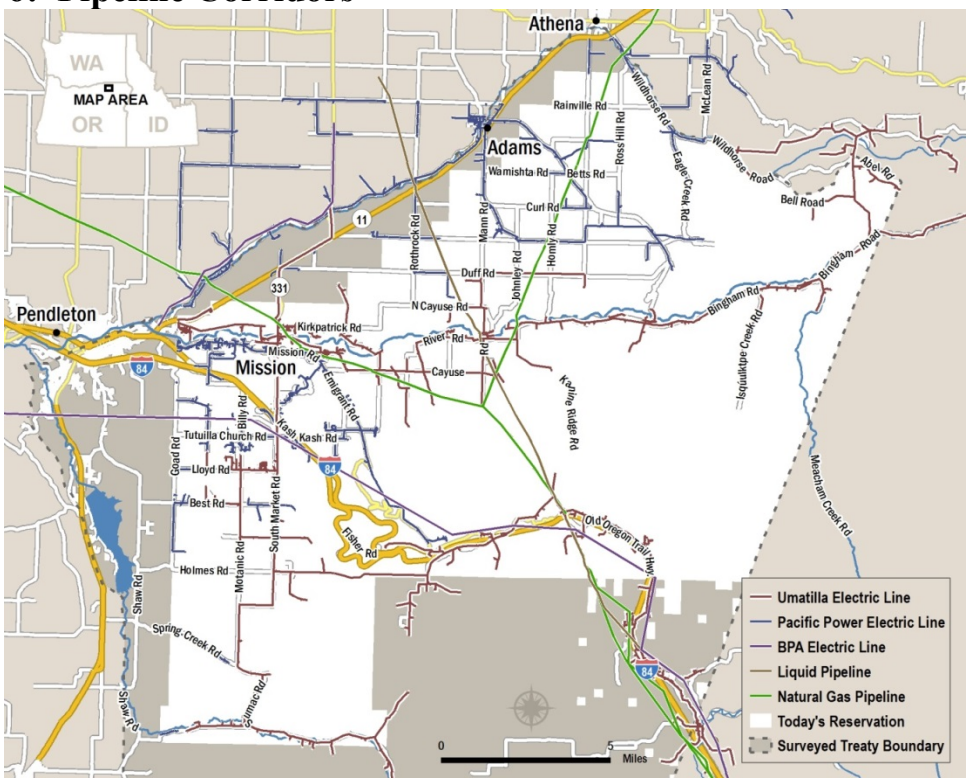


Figure 4-6: Pipeline Corridors



2. - Critical Facilities and Assets Impacted by Hazards

After determining which hazardous events can impact the UIR in Section 3, the Hazard Mitigation Plan Steering Committee inventoried assets located on the Reservation and then, at a regular HMP Committee meeting, made a link between the identified hazards and the critical facilities, Tribal assets, and resources that could be impacted. In making that determination, the Steering Committee considered responses to the following questions:

Identifying Risks to the Umatilla Indian Reservation

- How does the hazard specifically affect tribal assets?
- What type of damage will the hazard most likely cause? To People, physical damage to buildings, infrastructure, tribal economy, agriculture, and forestry? (Eventually, dollar estimates will be needed for each asset)

People

- Which of the hazards are the greatest threat to people? Death, injury, sickness?
- Which hazards will likely disrupt peoples daily routines? Leave work early? Stay home?

Buildings

- Which hazards will likely cause damage to buildings?
- Which hazards, if any, could totally destroy buildings on the reservation?
- Which buildings are most vulnerable to damage from a hazard because of their age, construction materials or location?

Economy

- Which hazards will harm the tribe's economy? Extensive disruption, minor impact?

Infrastructure

- Which hazards could harm infrastructure? Electric power, sewer, water, gas pipelines, telephone, highways? Physical damage? Disruption of Service?

Cultural Resources

- Which hazards could harm the Tribe's cultural resources?

The following two Tables help answer many of these questions. Table 4-1 identifies CTUIR assets and critical facilities that would be impacted by natural or man-made hazards either economically, structurally or culturally. They also identify which facilities are most important to those residents and visitors of the UIR with special needs. Although it is recognized that not all facilities may be completely destroyed as a result of a hazardous event, current replacement costs are used here as a baseline for risk assessment purposes.

Table 4-1: Assets and Critical Facilities

CTUIR Economic Assets	Critical at time of disaster	Special Needs Population	Estimated Replacement Cost	Building Type
Coyote Business Parks			$5,500,000	Commercial
Wildhorse Casino, warehouse, misc.	X		$71,324,466	Commercial
Wildhorse Cineplex			$8,315,888	Commercial
Wildhorse Golf Course-Pro Shop			$1,477,258	Commercial
Wildhorse RV Park			$2,018,097	Commercial
Wildhorse Hotel			$40,234,348	Commercial
Mission Market			$890,520	Commercial
Native Plant Nursery			$656,069	Commercial
Arrowhead Travel Center			$9,101,484	Commercial
Davita Dialysis Center		X	$496,719	Medical
US Forest Service (leased from CTUIR)			$3,000,000	Government
Field Station Laboratory			$4,500,000	Science Research
Kayak Public Transit (fleet maintenance and bus barn)		X	$2,900,000	Public Transportation
Tribal Environmental Recovery Center			$1,077,586	Solid Waste
Commercial Rentals; various sites			$4,763,339	Commercial
Farming Enterprises				Commercial
Cultural & Historic Resources				
Tamastslikt Cultural Institute			$12,279,230	Cultural
Nixyáawii Community School			$267,598	Education
St. Andrews Mission				Historical
Indian cemeteries and burial grounds				Cultural
Veterans Memorial			$216,990	Historical
Identified and unidentified cultural resources and First Foods				Cultural
Infrastructure & Critical Facilities				
Tribal Government Offices	X		$40,939,205	Governmental
Umatilla Tribal Fire Department	X		$1,964,843	Governmental
Yellowhawk Tribal Health Clinic	X	X	$7,061,148	Medical
Public safety building (Police Station, Emergency Management)	X	X	$2,753,990	Governmental
Tribal Housing	X	X	$29,658,668	Governmental
Transportation corridor [I-84, railroad]	X			Infrastructure
Water system; wells, tanks, lines	X	X	$1,534,419	Governmental
Gas transmission pipelines	X			Infrastructure
Sewer system lines	X			Infrastructure
Electric transmission system	X			Infrastructure
Environmental Assets				
Fish hatchery facilities				Cultural
First Foods habitat				Cultural
Wetlands Park			$202,809	Residential/Recreation
Indian Lake				Recreation

Table 4-2 evaluates assets that could be impacted by the hazards listed in Table 4-1. In each column under a specific hazard, the type and level of damage to each asset from each hazard is identified by the following letters:

Possible Impacts
S = Structural Damage
E = Economic Loss
D = Disruption of Services
I = Injury/death
A = Likely Emergency Response from Tribe
C = Cultural Loss
H = Environmental and Habitat Damage
R = Recreational Loss

m = Damage most likely to be major
n = Damage most likely to be minor

Table 4-2: Hazard Impact Evaluation

Possible Hazards ►	Flood	Wildfire	Winter Storm	Summer Storm	Wind	Dust	Earthquake	Drought	Fog	Landslides	Volcano	Extreme Heat	Man Made
Economic Assets ▼													
Coyote Business Park; North, South and East			D-n				S-m						
Wildhorse Casino/ Cineplex/Golf			E, D-n		S-n		S, D-m		E-n				
Wildhorse RV Park			E, D-n									R-n	
Wildhorse Hotel							S-m						
Commercial Rentals			E-n		S, E-n		S-n						
Mission Market			E, D-n										
Davita Dialysis Center							S-n						
Native Plant Nursery		S-n		E,R-n	S-n			E,D,E-n				E, H-n	
Arrowhead Travel Ctr.													
US Forest Service					S-n		S-n						
Field Station Laboratory					S-n		S-n						
Environmental Recovery Center					S-n								
Kayak Public Transit			D-n						D-n				
Farm Enterprises	E-n	E,A,H-m		E-n				E-m					E,H-n
Historic and Cultural													
Tamastslikt Cultural Institute		S, E - n	D-n				S,D,C-m						E,D,C-m
Tribal Longhouse	S,C-n						S-n						
Nixyáawii Community School	D-n		D-n										
St. Andrew Mission/ Crow Shadow Inst,.		S,E,C-n					S,-n						
Indian Cemeteries		C-m											
Veterans Memorial	S, C-n							S,C-n					
Cultural resources and First Foods	H,C,R-n	H,C,R-n						H,C,R-n					H,C,R-n

Possible Hazards ►	Flooding	Wildfire	Winter Storm	Summer Storm	Wind	Dust	Earthquake	Drought	Fog	Landslides	Volcano	Extreme Heat	Man Made
Infrastructure & Critical Facilities													
Umatilla Tribal Fire Department	A, E-n	A-m	A	A	A		A-m		A				A
Yellowhawk Tribal Health Clinic	E-n		D-n				S-n						D-n
Arrowhead Travel Plaza [for fuel supply]			E-n										
Public Safety Building (Police Station, Emergency Mgt)	A	A	A	A	A		A-m		A				A
Tribal Government Offices			E, D-n				S-n						
Tribal Housing	C, S-n				S-n		S-n						A
Water System	D-n			E,D-m			S,E,D-n						E,D-m
Gas Transmission Pipelines							S,E,D-n						A
Transportation Corridor (I-84)		D-n	D-m	D-n	DIA-n		D-m		I-m				D-m
Wastewater System	S,D-m						S,E,D-n						
Elizabethan Manor													
Electric Transmission System					D-n								
Environmental Assets													
Fish facilities	C,H-m	C,H-n	C,H-n				C,H,E-m	C,H,E-m		CHE-n			C,H-m
Wetlands/riparian	CHE-m				CHE-m			C,H,E-m					H-m
First Foods	C,H-n	C,H-n						C,H,E-m					C,H-m
Indian Lake (day use, campground)		SEDHR-n					SEDR-m	EDR-n					

In order to better connect the risks from each hazard with the possible impacts to Umatilla Indian Reservation, the criteria used by the HMP Steering Committee found in Section 3 Table 3-2 to assess the expected impacts were used.

Accompanying this criteria are the classifications for possible hazardous events. There are four hazards classified as “high” risks (more than 20 points); four hazards as “medium” risks (16 to 20 points); and five as “low” risks (15 or less point). The Steering Committee’s assessment from Section 3 is summarized as follows:

Hazards Impact-Risk Assessment for the Umatilla Indian Reservation:

	Deaths	Injuries	Critical Facility	Lifelines	Property Damage	Environ-mental	Econ/Soc Impact	Cultural Impact	Likely to Occur	Total	Rank
1. Winter Storms	3	3	2	3	3	1	3	2	4	24	High
2. Wildfires	1	2	1	1	3	3	4	3	6	23	High
3. Fog	5	5	1	1	1	1	2	1	6	23	High
4. Drought	1	1	1	1	2	4	4	4	5	23	High
5. Flooding	1	1	1	1	3	3	4	1	5	20	Med
6. Dust Storms	1	2	1	1	2	2	2	1	6	18	Med
7. Spring/Summer Storms	1	1	1	2	2	2	1	1	6	17	Med
8. Earthquake	1	1	1	2	3	1	3	1	4	17	Med
9. Wind Storms	1	1	1	2	2	1	2	1	4	15	Low
10. Landslides	1	1	1	1	2	1	1	1	6	15	Low
11. Man-made Disasters	1	1	2	2	1	2	1	1	3	14	Low
12. Volcanoes	1	1	1	1	1	1	1	1	1	9	Low
13. Extreme Heat	1	1	1	1	1	1	1	1	1	9	Low

(3) Overview and Analysis of Potential Losses from Disasters

This section analyzes the possible impacts of damage from identified hazards on the assets and resources of the Umatilla Indian Reservation. This includes a discussion of potential damage and financial losses to the UIR's annual budget, payroll and revenue and to the assets located on the Reservation. Before describing possible impacts and projected losses, the following table provides important information about the Umatilla Indian Reservation[1]:

Table 4-3: CTUIR Governmental Budget Profile

Annual Payroll	$ 22,800,000
Operating Budget (government only)	$ 85,811,064
Gross Revenue from Tribal Enterprises and Gaming	$150.2 million
Tribal government Employees (CTUIR)	715
Yellowhawk Clinic Employees	154
Wildhorse Resort and Casino Employees	1,117
Cayuse Technologies	362
Total Number of Employees on the UIR	2,420

Severe Winter Storm (Snow, Sleet, Freezing Rain, Severe Cold)

The entire Reservation would be vulnerable to a severe winter storm. In most cases, severe winter storms have no or little impact on structures and facilities located on the Reservation. The impacts from severe winter storms would most likely result in the early closure of businesses and sometimes the loss of electric power. The response by the CTUIR to severe winter storms is

early closure of some businesses and facilities on the Reservation. This results in lost revenue and productivity.

Findings about Severe Winter Storms

Umatilla County and the Reservation have snowfall each winter. Besides snowfall, freezing rain or sleet may accompany the cold temperatures associated with winter storms. Occasionally, winter storms are severe enough to cause damage and disrupt activities on the Reservation.

- Winter Storms have closed I-84 for more than a day with multiple closures of shorter duration occurring multiple times throughout the winter season.
- Snowfall, freezing rain and sleet contribute to increases in traffic accidents that in same cases cause deaths or injuries.
- Businesses, schools, and government offices often close or their hours of operation are reduced due to severe winter storms.
- Major winter storms can last for days.
- Winter storms have caused downed power lines leading to power outages.
- Temperatures below freezing can cause crop damage, burst water pipes, livestock and wildlife can perish.
- Closure of I-84 occurs at Exit 216 at the base of Cabbage Hill causing truck traffic to back up. The Casino and Arrowhead parking areas, as well as the shoulders of I-84 and OR331, overflow with traffic congestion causing many safety concerns.

The HMP Steering Committee Assessment of Possible Impacts from Severe Winter Storm

Deaths	**3**	**4 to 5 deaths**
Injuries	**3**	**8 to 11 people injured/ hospitalized**
Critical Facilities	**2**	**Closed 1 to 2 days**
Lifelines	**3**	**Interrupted 3 to 6 days**
Property Damage	**3**	**Widespread repairable**
Environmental Impact	**1**	**Minimal**
Economic and Social Impact	**3**	**Temporary but widespread**
Cultural Impact	**2**	**Localized**
Likelihood of Occurrence	**4**	**Once every 10 to 29 years**
TOTAL	**24**	**HIGH**

Projected Losses from Severe Winter Storms

Based on the Committee's assessment and the findings from the Risk Assessment, the projected losses from severe winter storms are summarized below:

Primary losses to the UIR are economic losses rather than actual damage to critical owned and operated critical facilities and structures. From a three to four day major snow storm, economic losses are estimated to be from the following circumstances:

- Reduced revenue for the casino and hotel with a partial offset from stranded travelers for four days[2] = approximately $484,402.

- Increase in traffic accidents contributing to deaths and injuries: four to five deaths and eight to eleven people hospitalized
- Increase in staff absenteeism for 4 days affecting tribal governmental[3] = $306,884.
- Interruption of power: 4 days – dollar value unknown
- Lost revenue to tribal businesses (1/3 reduction in revenue for 4 days) = $343,744
- Property damage – minor – dollar value unknown

Wildfires

Although there have not been many catastrophic wildfires on the UIR, the risk is great and always present. The more densely populated and developed areas of the Mission community have fire protection from the CTUIR Umatilla Trial Fire Department. A wildfire in this area would most likely occur as a grassland fire rather than a wildland fire.

Wildland fires on forest lands located on or adjacent to the Reservation present a greater risk to the UIR; not only to residents and watersheds but to the First Foods habitat that forests provide. Because the possibility of wildfire occurring in the forested portions of the Reservation is quite great, the HMP Steering Committee decided that this type of wildland fire could easily occur in the future.

Findings about Wildfires

The impacts from wildfires could be devastating. Under certain conditions, wildfires can burn homes, businesses and agriculture land causing economic hardship. This is less likely to occur in the more populated areas of the Reservation because the Umatilla Tribal Fire Department is housed in Mission near the Reservation's populated center. However, a wildfire in the vicinity of Mission would cause a loss of revenue to area businesses and would cost the CTUIR expenses in fighting the fire while protecting area residents. Fighting wildfires in forested lands on the Reservation would also be expensive, but costs for fighting these fires are shared among federal and state firefighting agencies.

Extensive smoke is another by-product of wildfires. Depending on the location of the wildfire and the direction of the winds, acute respiratory problems may also occur to residents and business patrons in relatively close proximity to a wildfire.

- Cayuse, Thornhollow, and Gibbon communities are susceptible to wildfires.
- Wildfires on the Reservation would damage timber and mean lost timber and agricultural revenue to the CTUIR, individual Indian Allottees and non-Indian forest land owners.
- First Foods: wildlife habitat, roots and berries would be significantly disturbed from a wildfire.
- Adverse impacts to the watershed and water quality will result from wildfires.
- Residents may suffer from respiratory conditions from smoke generated from wildfires.
- Houses located in forestland areas area at greatest risk from wildfires.

The HMP Steering Committee Assessment of Possible Impacts from Wildfires

Deaths	**1**	**Zero to 1 death**
Injuries	**2**	**4 to 7 people hospitalized**
Critical Facilities	**1**	**Closed for less than 12 hours**
Lifelines	**1**	**Interrupted for less than 12 hours**
Property Damage	**3**	**Widespread repairable**
Environmental Impact	**3**	**Localized severe**
Economic and Social Impact	**4**	**1 to 2 months**
Cultural Impact	**3**	**Temporary**
Likelihood of Occurrence	**6**	**Once every 1 to 2 years**
TOTAL	**24**	**HIGH**

Projected Losses from Wildfires

Losses from wildfires would be both economic and non-economic impacting natural and cultural resources that are significantly important to the CTUIR and Tribal members in non-monetary ways. Monetary impacts include losses in revenue from destruction of forest and agricultural resources as well as structures.

Fog

The impacts from thick fog are similar to those of dust storms in that driving visibility is threatened. Within the boundaries of the UIR, fog becomes particularly hazardous for freeway travelers using I-84. In some cases, fog also has been a hazard on roads within the Reservation. Fog occurs when there is an inversion. This can cause an increase in respiratory problems, particularly for those living on the Reservation with respiratory problems.

Findings about Fog

- The greatest danger from dense fog occurs to automobile and truck traffic traveling at higher speeds, particularly on I-84.
- Freezing fog and black ice makes driving conditions much worse.
- Fog and freezing fog has contributed to traffic fatalities and remains an annual threat to the UIR.
- Fog traps pollutants making air quality in valleys on the Reservation very poor and the potential for an increase in respiratory illnesses.
- Poor road conditions due to fog and black ice has a negative economic impact on Wildhorse Resort and Casino revenues.

Deaths	**5**	**4-5 deaths**
Injuries	**5**	**16 to 19 injured or hospitalized**
Critical Facilities	**1**	**Closed for less than 12 hours**
Lifelines	**1**	**Interrupted less than 12 hours**
Property Damage	**1**	**Localized repairable**
Environmental Impact	**1**	**Minimal**
Economic and Social Impact	**2**	**Long-term disruption**
Cultural Impact	**1**	**Minimal**
Likelihood of Occurrence	**6**	**Once every 1 to 2 years**
TOTAL	**23**	**HIGH**

Projected Losses from Persistent Fog

Economic losses would be similar in nature to the Severe Winter Storm hazard. Although ranked slightly lower than the Severe Winter Storm hazard, freezing fog is a fairly common occurrence on the UIR in winter months which gives Fog its high ranking.

Drought

When a drought occurs it affects everyone living and working on the Reservation. CTUIR interests beyond the Reservation boundaries can also be affected.

Findings about Droughts

- Droughts cause surface water as well as groundwater declines, both impacting potable and non-potable supplies.
- Surface and groundwater declines directly impact fisheries, the aquatic environment, economic development and long-term rural and urban economic security.
- Drought does not affect buildings or infrastructure.
- People, livestock and First Foods suffer most from droughts.
- Droughts can ruin agricultural crops.
- Droughts can have negative cultural impacts First Foods; berries, roots, fish and wildlife

The HMP Steering Committee Assessment of Possible Impacts from Drought

Deaths	**1**	**0 to 1 death**
Injuries	**1**	**0 to 3 injuries**
Critical Facilities	**1**	**Closed for less than 12 hours**
Lifelines	**1**	**Interrupted less than 12 hours**
Property Damage	**2**	**Widespread repairable**
Environmental Impact	**4**	**Localized severe**
Economic and Social Impact	**4**	**1 to 2 months**
Cultural Impact	**4**	**Substantial (First Foods)**
Likelihood of Occurrence	**5**	**3 to 9 years**
TOTAL	**23**	**HIGH**

Projected Losses from Drought

Economic losses due to Drought are difficult to estimate since its impact would principally be felt in the agricultural community and is generally more short term in nature. Potable water to the Mission Community Planning area is dependent on ground water wells to provide service to its citizens and enterprises. Ground water travels slowly and originates in the Blue Mountains located on the eastern side of the Reservation. Although Drought may not have an immediate impact on domestic alluvial ground water wells, a sustained drought period could cause more declines in the availability of ground water long term. The CTUIR community water system is

completely dependent on multiple deep wells to supply the water necessary to the sustainability of Reservation residents and economy.

In 2014 the Tribal Farming Enterprise managed 10,859 acres including: 2,458 acres of dry land wheat, 491 acres barley, 215 acres canola, 348 acres alfalfa/hay, 2,622 acres fallow and 4,463 acres in the Crop Reserve Program.

Flooding

Flooding on the UIR has occurred primarily impacting lands and properties closest to the Umatilla River. However, tributaries and areas beyond the immediate area near the Umatilla River are also vulnerable to flooding when conditions are extreme.

Findings about Flooding

- Kirkpatrick Road, Cayuse Road, McKay Creek Road, and Short Mile road continue to be impacted by flooding.
- The Mission Community has been affected by flooding from the Umatilla River, Spring Creek (from a rising water table), McKay Creek and Mission Creek (off Short Mile Road).
- Flooding in the Mission Community in the recent past can be characterized as *limited.*
- There are three sites upstream of McKay Creek where the creek eroded McKay Creek Road, closing it.
- **Mission –** flooded homes located close to the Umatilla River and in Tribal Housing are due to Spring Creek and high water table.
- **Cayuse –** flooded homes located close to the Umatilla River, water had broken through sandbags
- **Thornhollow and Gibbon areas –** flooded homes possibly as many as 8 homes, the area roads were closed to traffic for several days, stranded families needed rescuing.
- **Upper McKay Creek -** 15 homes cut-off from road access by flood waters. Stranded families needed rescuing, eroded roadways forced closures.
- **Iskuulptka Creek** – road closures occurred when the railroad bridge was too low to allow flood waters to pass. The Union Pacific Railroad is currently upgrading their rail line to include a second set of tracks requiring the construction of a second bridge. At the request of CTUIR, UPRR is elevating the existing and new railroad bridges to meet federal and local flood plain Base Flood Elevation requirements.
- **Buckaroo Creek –** water over road

The HMP Steering Committee Assessment of Possible Impacts from Flooding

Deaths	**1**	**0 to 1 death**
Injuries	**1**	**0 to 3 injuries**
Critical Facilities	**1**	**Closed for less than 12 hours**
Lifelines	**1**	**Interrupted less than 12 hours**
Property Damage	**3**	**Widespread repairable**
Environmental Impact	**3**	**Widespread minor**
Economic and Social Impact	**4**	**1 to 2 months**
Cultural Impact	**1**	**Minimal**
Likelihood of Occurrence	**5**	**3 to 9 years**
TOTAL	**20**	**MEDIUM**

Projected Losses from Flooding

Based on the HMP Steering Committee's assessment and the findings from the Risk Assessment, the projected losses from a major flood occurring are summarized below:

If past flood events foretell future costs, there will be social and economic costs associated with rescuing and sheltering people who are victims of flooding or have been surrounded by flooding waters. In 1996, approximately 12 people were housed in the school gymnasium in the 1996 flood[4]. Although, the cost for rescuing and sheltering victims of the flood is not known, it is presumed that it did not exceed $100,000. Social costs will also include the destruction and temporary loss of habitat for certain "First Foods" as discussed below under "environmental damage."

Property damages associated with flooding will occur primarily to homes and buildings located within the Umatilla River floodplain. Also, some public facilities (e.g., roads, bridges, sewer system, wells, fish facilities, etc.) may be vulnerable to flooding as well.

- There are three sites upstream of the Upper McKay Creek where the creek eroded the county road, closing it **Thornhollow and Gibbon areas –** flooded homes possibly as many as 8 homes, the area roads were closed to traffic for several days, stranded families needed rescuing
- **Upper McKay Creek -** 15 homes cut-off from road access by flood waters. Stranded families needed rescuing, eroded roadways forced closures.
- **Iskkulpa Creek** – road closures have occurred when the railroad bridge was too low to allow flood waters to pass
- **Buckaroo Creek –** water over road
- **Mission –** flooded homes located close to the Umatilla River
- **Cayuse –** flooded homes, possibly as many as 4 homes, water had broken through sandbags;

There are approximately 49 addressed buildings located within the Umatilla River floodway and approximately 74 addressed buildings within the 100-year floodplain (Flood Hazard Overlay Zone). These homes have an estimated average assessed valuation of $130,000. There are 49 homes located within the designated Floodway portion of the Flood Hazard Overlay Zone. If a major flood occurred, and these 49 homes were "substantially damaged," the estimated loss would be approximately $6,370,000. If the 74 homes, located within the Umatilla River floodplain but outside the designated floodway, were damaged but less than 50% of their value, the estimated losses could reach as high as $4,800,000[5].

Environmental damages. Flooding is a natural event and areas not significantly contaminated by flood waters will recover. However, First Foods such as roots and berries that grow in flood prone areas may be harmed during a major flood. Flooding could also impact other First Foods (fish, deer/elk) essential to the sacred cultural traditions of Tribal members. The protection of these foods from habitat loss and contamination is very important to the Tribe and is a mitigation priority. A value cannot be placed on these losses.

Dust Storms

Like fog, dust storms present a major obstacle to safe travel to and around the reservation. Unlike fog, dust storms historically do not last very long. However, dust storms remain a hazard that can cause harm to residents of and travelers to the UIR.

Findings about Dust Storms

- Dust storms impair visibility which contributes to traffic accidents particularly on I-84 where normal driving speeds are over 60 miles per hour.
- Air quality is negatively impacted as high concentrations of particulate matter occur during dust storms.
- Dust storms contribute to an increase in respiratory illnesses.
- Dust find its way into homes, barns, other buildings and vehicles which requires extra expenses for cleaning.
- Dust storms cause the loss of topsoil.

The Steering Committee Assessment of Possible Impacts from Dust Storms

Deaths	**1**	**0 to 1 death**
Injuries	**2**	**4 to 7 people injured**
Critical Facilities	**1**	**Closed for less than 12 hours**
Lifelines	**1**	**Interrupted less than 12 hours**
Property Damage	**2**	**Localized repairable**
Environmental Impact	**2**	**Localized minor**
Economic and Social Impact	**2**	**Temporary localized**
Cultural Impact	**1**	**Minimal**
Likelihood of Occurrence	**6**	**Once every 1 to 2 years**
TOTAL	**18**	**MEDIUM**

Projected Losses from Dust Storms

Losses from Dust Storms are not monetary in nature. Due to the frequency of occurrence and vehicular accidents with fatalities this hazard this hazard is ranked with a medium risk.

Severe Spring and Summer Storms

Hail, flooding and wind are the most likely hazards associated with spring and summer storms. They have produced hail from over ¾ of an inch to almost 2 inches in size and winds over 100 miles per hour.

Findings about Severe Spring and Summer Storms

- Hail can cause economic damage to agricultural crops. Damage to property and possible injuries can also occur but are not as likely.

- Spring and summer storms have produced flash floods. (The impacts from flooding are described in Section 3.1).
- High winds are also produced from spring and summer storms (The impacts from winds are described in Section 3.5).

The Steering Committee Assessment of Impacts from Spring & Summer Storms

Deaths	**1**	**0 to 1 death**
Injuries	**1**	**0 to 3 injuries**
Critical Facilities	**1**	**Closed for less than 12 hours**
Lifelines	**2**	**1 to 2 days loss of service**
Property Damage	**2**	**Minimal**
Environmental Impact	**2**	**Localized minor**
Economic and Social Impact	**1**	**Minimal**
Cultural Impact	**1**	**Minimal**
Likelihood of Occurrence	**6**	**Once every 1 to 2 years**
TOTAL	**17**	**MEDIUM**

Projected Losses from Severe Summer Storms

Based on historical occurrences losses from storms have involved crop damage, structural and property damage from flooding and loss of commercial timber from windfall. Cumulative damage reports are not available so projected monitory losses have not been determined.

Earthquakes

Earthquakes have occurred in Umatilla County and within the UIR. Although not frequent, earthquakes pose a unique threat to the Reservation because of roads, bridges, pipelines, a dam and structures. Most of the Tribe's major assets constructed on the UIR are relatively new and built to International Building Codes standards. Therefore, the likelihood that they would be able to withstand damage from earthquakes is pretty good. For this reason, the Steering Committee concluded that earthquakes pose a moderate threat to the UIR.

Findings about Earthquakes

In 2007, the Department of Geology and Mineral Industries (DOGAMI) prepared two scenarios for Umatilla County using HAZUS, FEMA's program for estimating damage from earthquakes. These scenarios continue to be relevant to the UIR:

- The Umatilla Indian Reservation has a moderate to high susceptibility to ground shaking during an earthquake.

- Relative liquefaction susceptibility map for Umatilla County indicates that the Mission area and lowlands immediately below the Blue Mountains has a moderated susceptibility to liquefaction

- The UIR has a moderate susceptibility to earthquake induced landslides for most of developed portions of the reservation. The mountainous areas of the Reservation are rated as even more susceptible to earthquake induced landslides.

- A main concern about earthquakes is possible injuries to the elderly and disabled from falling objects.

- Another concern is possible damage to older buildings and modular buildings on the UIR.

- A relatively severe earthquake could result in breakage to sewer and water lines, natural gas and oil pipelines.

The Steering Committee Assessment of Possible Damage from Earthquakes

Deaths	**1**	**0 to 1 death**
Injuries	**1**	**0 to 3 injuries**
Critical Facilities	**1**	**Closed for less than 12 hours**
Lifelines	**2**	**1 to 2 days loss of service**
Property Damage	**3**	**Widespread repairable**
Environmental Impact	**1**	**Minimal**
Economic and Social Impact	**3**	**Temporary but widespread disruption**
Cultural Impact	**1**	**Minimal**
Likelihood of Occurrence	**4**	**Once every 30 to 99 years**
TOTAL	**17**	**MEDIUM**

Projected Losses from Earthquakes

In order to estimate possible damages to the UIR from earthquakes, an extrapolation of DOGAMI's HAZUS findings for Umatilla County was prepared. The Tribal population and their total number of households as a portion of Umatilla County's population and households is about 4%. Applying that percentage to DOGAMI's results reveals that some damage can be expected on the UIR if a major earthquake were to occur. The results of applying the 4% estimate to the total damage for Umatilla County, as estimated by DOGAMI's HAZUS analysis, are described below:

DOGAMI has prepared two HAZUS analyses for earthquakes affecting Umatilla County: the *2500yr Probable Scenario M6.5 Driving* and *the 2500 year Umatilla Arbitrary Crustal*.

Earthquake Damage

A summary of findings from the ***2500yr Probable Scenario M6.5 Driving*** and ***the 2500 year Umatilla Arbitrary Crustal*** are as follows:

Highways

- Damage is not expected to occur to most of the transportation systems in Umatilla County including those on the UIR.
- The only transportation systems in the analysis that are found on the UIR are highways and bridges.
- No major damage is expected to occur to highways from earthquakes in the county including those on the reservation.

Bridges

- There are 20 bridges located on or connecting to the Umatilla Indian Reservation.
- Only 22 out of 280 bridge segments in the entire county are expected to receive moderate damage from an earthquake in the *2500yr Probable Scenario M6.5 Driving* and 6 bridges in the *2500 year Umatilla Arbitrary Crustal* scenario.
- Applying the 4% factor to the DOGAMI HAZUS analysis for the two scenarios, only one bridge on the UIR would incur damage in *2500yr Probable Scenario M6.5 Driving* and no bridges would incur damage from the *2500 year Umatilla Arbitrary Crustal* scenario.

Utilities and Pipelines

The HAZUS 2500-year Probable Scenario M6.5 Driving Analysis indicates the following:

System	Number of Leaks-County	Number of Breaks-County	Number of Leaks - UIR	Number of Breaks - UIR
Potable Water	343	648	14	26
Waste Water	271	512	11	20
Natural Gas*	290	547	12	22
Oil	0	0	0	0

The HAZUS 2500-year Umatilla Arbitrary Crustal analysis indicates the following:

System	Number of Leaks-County	Number of Breaks-County	Number of Leaks - UIR	Number of Breaks - UIR
Potable Water	89	131	4	5
Waste Water	70	103	3	4
Natural Gas*	75	111	3	4
Oil	0	0	0	0

*Note: Because the UIR has major gas and liquefied natural gas pipelines crossing the Reservation at several locations, the actual risks associated with earthquake damage to natural gas pipelines may be greater than the extrapolated figure (4%) used to estimate overall damage from an earthquake.

Building Damage

- The HAZUS M6.5 Driving analysis indicated that 2,663 would likely be damaged in Umatilla County with 925 damaged beyond repair. Four percent of the county total would mean 107 buildings on the UIR would likely receive moderate damage from an earthquake with 37 damaged beyond repair.

- The HAZUS 2500 year Umatilla Arbitrary Crustal analysis indicated that 6,809 buildings would likely suffer damage in Umatilla County with 2600 damaged beyond repair. Four percent of the county total would mean 272 buildings on the UIR could be moderately damaged with 104 damaged beyond repair.

People Needing Shelter

- The HAZUS M6.5 Driving analysis indicated that 2,957 would likely be displaced and 740 people in Umatilla County would need shelter as a result of this type of earthquake. Four percent of the county total would mean 118 people from the UIR would likely be displaced and 30 people would seek shelter.

- The HAZUS 2500 year Umatilla Arbitrary Crustal analysis indicated that 1,048 would likely be displaced and 42 people in Umatilla County would need shelter as a result of this type of earthquake. Four percent of the county total would mean 118 people from the UIR would likely be displaced and five people would seek shelter.

TABLE 4-4: Projected Economic Losses

System	2500 yr Driving-County	2500 yr Crustal-County	2500 yr Driving - **UIR**	2500 yr Crustal - **UIR**
Potable Water	12,190,000	5,340,000	487,600	21,360
Waste Water	64,460,000	32,880,000	2,578,400	1,315,200
Natural Gas	6,290,000	1,410,000	251,600	56,400
Electrical Power	52,300,000	10,140,000	2,092,000	405,600
Communications	240,000	5,000	9,600	200
Transportation	200,600,000	96,800,000	7,168,000	3,392,000
Income Losses	61,590,000	19,890,000	2,463,600	795,600
Capital Stock Losses	675,050,000	228,800,000	27,000,200	9,152,000
UIR Projected Losses			**42,051,000**	**15,138,360**

Wind Storms

Wind blowing across the UIR is a common phenomenon. Major wind storms occur less frequent but often cause varying amounts of damage. The Steering Committee found that such storms can cause damage to structures, fell trees, disrupt power and telephone service and require the expenditure of Tribal resources for clean-up.

Findings about Wind Storms

- Severe wind storms can cause roof damages to homes such as broken shingles and sometimes structural damage.
- Where trees are present, severe wind storms can cause trees to blow down or tree limbs to break and fall on power lines or structures and block roads.
- High winds have blown trailers over and have broken windows.
- Power outages have occurred as a result of major wind storms.
- Major wind storms can also create disaster-related debris requiring hours of costly overtime pay for public agencies and private entities involved in clean-up.

The Steering Committee Assessment of Possible Impacts from Wind Storms

Deaths	**1**	**0 to 1 death**
Injuries	**1**	**0 to 3 injuries**
Critical Facilities	**1**	**Closed for less than 12 hours**
Lifelines	**2**	**1 to 2 days loss of service**
Property Damage	**2**	**Localized repairable**
Environmental Impact	**1**	**Minimal**
Economic and Social Impact	**2**	**Temporary localized**
Cultural Impact	**1**	**Minimal**
Likelihood of Occurrence	**4**	**Once every 10 to 29 years**
TOTAL	**15**	**LOW**

Projected Losses from Wind Storms

The following is a summary of damage from wind storms to properties within the UIR. The damage occurred from a January 8, 2008 wind storm with reported winds of 67 miles per hour. The damage from this wind storm is representative of the type of damage that can occur from most major wind storms. Of course, more intense winds will likely cause more damage, but there occurrence is less frequent than the 67 mile an hour wind storm described below:

Table 4-5: Damage from January 8, 2008 Wind Storm

Number of Reports	Type of Damage	Total Cost of Damage
26	Roof Damage	$ 48,555
12	Structural Damage	$122,747
6	Damaged Trees	$ 4,400
2	Damaged Windows	$ 600
	Other	$ 8,679
Total		**$184,981**

There were 54 reports of damage. Most damage (26 reports) involved lost shingles and general damage to roofs. However, the greatest expense came from the 12 reports involving damage to buildings. Six reports identified damage to trees. Two reports identified damage to windows. One report indicated that a trailer had been turned over. The total cost for damage was $184,981.

The January 8, 2008 wind storm was a major wind storm. Storms with greater intensity are likely to cause more damage than this particular wind storm while less intense storms will likely cause less damage.

Landslides

As the elevation rises from the Umatilla River Valley to the Blue Mountains, the possibilities of landslides on the UIR increase. Landslides occur most frequently in the forested regions of the reservation.

Findings about Landslides from Section 3 – Risk Assessment

Landslides on the reservation could damage roads, block traffic, damage timber, streams and fisheries. Because the location of development on the reservation is primarily in valleys some distance from higher elevations (where the greatest potential for most landslides exist), the impacts from landslides on the UIR are generally negligible.

The Steering Committee Assessment of Possible Impacts from Landslides

Deaths	**1**	**0 to 1 deaths**
Injuries	**1**	**0 to 3 injuries**
Critical Facilities	**1**	**Closed for less than 12 hours**
Lifelines	**1**	**Interrupted less than 12 hours**
Property Damage	**2**	**Localized repairable**
Environmental Impact	**1**	**Minimal**
Economic and Social Impact	**1**	**Minimal**
Cultural Impact	**1**	**Minimal**
Likelihood of Occurrence	**6**	**Once every 1 to 2 years**
TOTAL	**15**	**LOW**

Projected Losses from Landslides

Based on the Steering Committee assessment and the findings from the Risk Assessment, the projected losses from landslides will be minimal.

MAN-MADE Hazards

Hazardous Material Spills, Natural Gas Pipeline Breaks and Dam Failure

Findings about Hazardous Material Spills

Spills are more likely to occur within transportation corridors that cross the UIR. Railroad derailments, increased rail traffic with a double tracking expansion currently underway, and anticipated increases in oil tank cars coming through the UIR are concerns expressed by the Steering Committee. Although there have been railroad derailments, crossing incidents and fatalities involving trains on the UIR there have been no documented incidents involving hazardous materials.

Interstate 84 and Oregon Highway 331 are the primary road corridors crossing the UIR where hazardous materials spills are most likely to occur. Since the occurrences of spills in the transportation corridors have not historically happened on a regular basis, the risk assessment for this hazard is determined by the Steering Committee to be low.

Findings about Natural Gas Pipeline Breaks

Both liquid and gaseous pipelines cross the UIR. Although these lines are monitored and maintained, there is no way to predict when or where a pipeline break may occur. Since the majority of the three pipeline facilities crossing the UIR are located in unpopulated areas and there have been few historical incidents, this hazard is ranked low risk.

Findings about Dam Failure

A failure of Indian Lake Dam would have a minor impact on Reservation lands and no direct impact on the populated areas within the Reservation. The dam holds 1,214 acre-feet of water. This volume of water, if released from a dam failure, would drain within the Grande Ronda River watershed and be a nuisance to the city of La Grande, Oregon. A dam failure could lead to major damage to I-84 and would impact the traveling public using I-84 and disrupt freight delivery using I-84 and the rail line located in the same narrow corridor. With the development and implementation of the Indian Lake Dam Emergency Operations Plan and structural improvements to the dam completed this hazard is ranked low risk.

The Steering Committee Assessment of Possible Impacts of Man-Made Hazards on the UIR

Deaths	**1**	**0 to 1 death**
Injuries	**1**	**0 to 3 injuries**
Critical Facilities	**2**	**Closed for 3 to 6 days**
Lifelines	**2**	**1 to 2 days loss of service**
Property Damage	**1**	**Widespread repairable**
Environmental Impact	**2**	**Localized repairable**
Economic and Social Impact	**1**	**Temporary localized**
Cultural Impact	**1**	**Minimal**
Likelihood of Occurrence	**3**	**Once every 10 to 29 years**
TOTAL	**14**	**LOW**

Projected Losses from Man-Made Hazards

Minimal losses are expected as impacts from the man-made hazards considered for inclusion in this pre-disaster Mitigation Plan would be short term and localized.

Volcanic Events

The impacts from future volcanic events on Umatilla County and the UIR would be relatively minor.[6] The biggest impact from a Cascade Mountain volcanic event would likely be from volcanic ash that would be carried by the prevailing western winds from an erupting volcano.

Findings about Volcanic Events

Particles of volcanic ash are so small that people and animals may need protection to ensure that breathing does not become impaired.

- Volcanic ash can short-circuit power lines.
- Ash can damage painted surfaces due to its abrasive nature.
- Volcanic ash can harm combustible engines.
- Businesses on the Reservation could be impacted if volcanic ash became a problem.
- Ash fall can create serious traffic problems as well as road damage.
- Ash filling roadside ditches and culverts can prevent proper drainage and cause shoulder erosion and road damage.

The Steering Committee Assessment of Possible Impacts from Volcanic Events to the UIR

Deaths	**1**	**0 to 1 death**
Injuries	**1**	**0 to 3 injuries**
Critical Facilities	**1**	**Closed for less than 12 hours**
Lifelines	**1**	**Interrupted for than 12 hours**
Property Damage	**1**	**Minimal**
Environmental Impact	**1**	**Minimal**
Economic and Social Impact	**1**	**Long-term disruption**
Cultural Impact	**1**	**Minimal**
Likelihood of Occurrence	**1**	**Once every 200+ years**
TOTAL	**9**	**LOW**

Projected Losses from Volcanic Events

Based on the Steering Committee assessment and the findings from the Risk Assessment, the projected losses from a volcanic event will be minimal.

Extreme Heat

Extreme heat conditions don't normally occur in the Oregon. High temperatures do occur normally during the summer or early fall. Hot, dry conditions can be detrimental to crops if it occurs during late May and June. Also, extreme heat can increase fire danger in the forest and grassland areas during late summer and early fall.

Findings about Extreme Heat

- Heat exhaustion which affects people by dizziness, fatigue, headache, nausea and lightheadedness can occur.
- Dehydration is common particularly where extreme heat and low humidity are combined. However, the UIR has not experienced this type of dangerous extreme heat conditions that occur in other parts of the country.
- Extreme heat can cause crop damage.
- Extreme heat can exacerbate the likely hood of wildland fires.

The Steering Committee Assessment of Possible Impacts from Extreme Heat

Deaths	**1**	**0 to 1 death**
Injuries	**1**	**0 to 3 injuries**
Critical Facilities	**1**	**Closed for less than 12 hours**
Lifelines	**1**	**Interrupted for than 12 hours**
Property Damage	**1**	**Minimal**
Environmental Impact	**1**	**Minimal**
Economic and Social Impact	**1**	**Long-term disruption**
Cultural Impact	**1**	**Minimal**
Likelihood of Occurrence	**1**	**Once every 200+ years**
TOTAL	**9**	**LOW**

Projected Losses from Extreme Heat

Based on Steering Committee assessment and the findings from the Risk Assessment, the projected losses from extreme heat would be very minimal.

[1] 2014 Figures provided by CTUIR Finance Department
[2] ¾ revenue loss with ¼ offset from stranded truck drivers and travelers staying at Wildhorse Resort and Casino for 4 days based on gross operating revenue reported on the Audited Proprietary Fund Statement of Revenue, Expenses, and Changes for year ended 12/31/2014.
[3] 7/8 of government employees are off work for 4 days based on 12/31/2014 governmental gross annual payroll divided by 260 annual work days.
[4] Discussion at the December 20, 2014 HMP Steering Committee Meeting.
[5] Information and figures provided by the CTUIR Planning Office.
[6] Umatilla County Natural Hazard Mitigation Plan 2014, Figure 5-13: Volcano Impact Probability, p. 174

Section 5 – Hazard Mitigation Goals and Measures

This section of the plan contains the plan's mission statement and goals along with mitigation measures and their implementation. The plan's mission, goals and mitigation measures are the heart of a hazard mitigation plan.

Hazard mitigation is "*any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards*."

Hazard mitigation goals are the guiding principles of the plan that provide the "vision" for success for all actions taken under the plan. The goals help align mitigation measures to ensure that efforts are focused and coordinated toward the desired outcome.

Hazard mitigation measures are specific actions that, if implemented, will (1) reduce the chances of damage from one or more hazardous events; (2) protect people living and working on the Reservation from the effects of hazardous events; and (3) make the Reservation more resilient and able to recover more quickly from the effects of hazardous events.

There are a number of different mitigation strategies that can be used to help mitigate the effects of hazards on both existing and new buildings and infrastructure. FEMA has described six categories of mitigation measures that can be used to reduce the impacts from a number of hazards. Table 5-1 below provides a prioritized list of measures for UIR lands based on these categories:

Types of Mitigation Actions

1. **Public Education and Awareness**– are actions to inform and educate citizens, property owners, renters, businesses, tribal officials and other stakeholders about potential risks from hazards and potential ways to mitigate them.
2. **Prevention –** regulatory actions or processes that influence the way land and buildings are developed and built; such as acquisition, elevation, relocation, flood proofing.
3. **Structural Projects –**actions that involve the construction of new structures to reduce the impact of a hazard; such as storm water detention reservoirs, levees and floodwalls, channel modifications, drainage and storm sewer improvements, and improvements to designated community shelters.
4. **Property Protection –** actions to existing buildings or infrastructure to protect them from a hazard or remove them from the hazard area.
5. **Emergency Services –** include preparedness information, threat recognition, warning signs, response, critical facilities protection, and mitigation.
6. **Natural Resources Protection –** actions minimize hazard losses, and preserve or restore the functions of natural systems. These actions may include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management and wetland restoration and preservation.

Projects that fall under one of the preceding categories **may** qualify for funding from the Federal Emergency Management Agency (FEMA) or other funding sources. Generally, projects should:

- Be compatible with goals and objectives of this Plan;
- Be compatible with goals, objectives and mitigation strategies of adjacent or other regional hazard mitigation plans;
- Consider the affect the action would have on other jurisdictions within the region;
- Consider the cost/benefit of potential actions.

1. - Hazard Mitigation Plan Mission Statement

It is the mission of this hazard mitigation plan to substantially reduce the risks and impacts of natural and man-made hazards on the UIR. This plan is designed to help protect man-made and natural resource assets located on the Reservation from all natural and man-made hazards. Implementation of this plan will help the Reservation become more resistant to disasters and enable it to "rebound" more quickly after a hazardous event.

2. - Hazard Mitigation Goals

The Umatilla Indian Reservation Hazard Mitigation Plan has four goals which are as follows:

Goal 1 – Reduce the impact of hazardous events on people living and working on the reservation, to travelers, on assets located on the reservation, and on the reservation's natural resources.

Goal 2 – Promote resilience, as an ethic of the UIR, to ensure the tribal government, economy and health care system can withstand the effects of hazardous events.

Goal 3 – Increase the level of coordination within the Tribal government and between the Tribe and federal, state, nearby jurisdictions, and private service providers to promote joint natural hazard mitigation programs.

Goal 4 – Enhance public awareness about hazardous events and activities that reduce the impact of natural and man-made hazards.

3. - Hazard Mitigation Measures

The mitigation measures identified in this section will help reduce the effects from all of the high and medium risk hazardous events and some of the low risk hazardous events identified in the risk analysis. Some of the mitigation measures are multi-hazard measures that address more than one hazard. Some of the mitigation measures are designed to reduce the effects of hazards on new and existing structures and infrastructure. For example, planning, zoning and building code mitigation measures will help reduce or eliminate the impacts from hazards on **new** structures and infrastructure. Other mitigation measures, such as raising or removing homes in the flood plain, fixing culverts to reduce flooding and strengthening power lines, are focused on reducing damage to **existing** structures and infrastructure.

A. - Mitigation Measures

The following table, Table 5-1, identifies action items/measures specific to the UIR that have been identified and prioritized by the HMSC. If completed, these items would minimize the impact of natural and man-made hazards to the CTUIR government, Reservation residents, visitors, and natural and cultural resources. Many of the Public Education and Awareness measures could be considered multi-hazard as they could be applied to more than one identified hazard.

Recognizing that many of the action items from the 2008 CTUIR Hazard Mitigation Plan have either been completed or continue to apply in 2016 and beyond as long-range ongoing actions, the HMSC chose to retain some items from the 2008 Plan, deleted action items that were completed or were no longer relevant, amended or added new items. Table 5-2 contains a summary of items/measures from the 2008 Plan that were not carried forward into this plan.

The new list of mitigation measures contained in Table 5-1 below were re-categorized according to the types of measures as recommended in the FEMA Tribal Multi-Hazard Mitigation Planning Guidance (March 2010) and re-prioritized utilizing the process as outlined within this Section. Each Measure and/or Action Item was reviewed for how it implemented the established Goals and assigned a lead CTUIR Department or Program for implementation. Internal and external collaborative entities were also identified.

Table 5-1: Prioritized Mitigation Strategies

MITIGATION MEASURES (multi-hazard and hazard)			Action Items	RESPONSIBLE TO IMPLEMENT	COORDINATION WITH OTHER ORGANIZATIONS		TIMELINE	PRIORITY RANK	PLAN GOALS THAT APPLY			
					INSIDE CTUIR	OUTSIDE CTUIR			1	2		4
PUBLIC EDUCATION and AWARENESS												
	New to plan											
PE-1		**INFORMATION.** Prepare and distribute hazard and safety preparedness information	Use website, brochures, events and public announcements to disseminate information	CTUIR Public Safety	CTUIR Police, Fire, public works, Tiichum SWCD	Umatilla County, cities, State of Oregon, FEMA, NRCS	Short and Long Term	1	✔		✔	
PE-2		**BUSINESS CONTINUITY PLAN.** Prepare a business continuity plan that helps maintain the Tribe's economy during and after a disaster	Assign task to a department or hire a consultant	CTUIR-Economic & Community Dev.	WRC, Mission Market, Arrowhead	-----	Long	8	✔	✔		
PE-3		**GOVERNMENT CONTINUITY PLAN.** Prepare a government continuity plan that details how core governmental operations will be maintained during an emergency	Assign task to a department or hire a consultant	CTUIR Executive Director and Administrative Team	All Tribal Departments	-----	Long	19		✔		
PE-4		**HAZARDOUS EVENTS ON WEBSITE.** Maintain a hazardous events section on the CTUIR website	Identify and describe the types of hazards that have an impact on the UIR and how to report	Public Safety	CTUIR Public Safety, DNR, Yellowhawk, BIA	ODOT, Pacific Power, Umatilla Electric, Williams Gas Pipeline, OEM	Short	33				✔
PE-5		**PARTNER TO SHARE RESOURCES.** Identify opportunities for partnering with citizens, private contractors and other jurisdictions to increase availability of equipment, manpower and other resources for efficient responses to hazardous events	Identify equipment needs and agencies/companies that have this equipment. Contact and create agreements for resource sharing during hazardous events.	Public Safety	CTUIR public safety, public works, CNR, Water Resources, Finance and DOJ	City of Pendleton, Umatilla County, USFS, ODFW	Short	13	✔		✔	

MITIGATION MEASURES (multi-hazard and hazard)			Action Items	RESPONSIBLE TO IMPLEMENT	COORDINATION WITH OTHER ORGANIZATIONS		TIMELINE	PRIORITY RANK	PLAN GOALS THAT APPLY			
					INSIDE CTUIR	OUTSIDE CTUIR			1	2		4
	New to plan											
PE-6		**REGIONAL E.M. AND INFO HUB.** Collaborate with neighboring jurisdictions to create a regional emergency management and information hub.	Allows for coordinated response to hazardous events and cost sharing in maintaining a single emergency management center.	Public Safety	CTUIR Public Safety	Umatilla County, possibly Union and Morrow Counties and neighboring cities	Long	51			✔	
PE-7		**"STORM-READY".** Work with the National Weather Service to make the Umatilla Indian Reservation "Storm-Ready."	Establish a warning system and EOC; have multiple ways to receive severe weather warnings and alert the public; develop a hazardous weather plan that includes trainings and exercises	Public Safety	CTUIR Public Safety	NOAA, City of Pendleton, County	Long	21	✔			✔
PE-8		**EMERGENCY ALERT SYSTEM.** Establish a system of mass communication (Reverse 911, Code Red, etc.) to alert Reservation residents of eminent or existing hazards to minimize loss of life and property.	A. Research products, costs and methods; coordinate with neighboring jurisdictions; B. Expand and use the EAS to provide information to the traveling public about blowing dust conditions.	Public Safety Public Safety	Police, Fire, Public Works, YHTC Police, Fire	City of Pendleton, Umatilla County ODOT, State Police	Short Short	32 35	✔ ✔		✔	
PE-9		**COMMUNITY RATING SYSTEM.** Consider entering FEMA Program that rewards jurisdictions that are pro-active in public awareness and pre-hazard mitigation.	Develop application meeting Program requirements and implement	Public Safety, Planning		OEM, FEMA	Long	42		✔		✔
PE-10		**EMERGENCY OPERATIONS PLAN.** Internal distribution and training	Develop and implement a curriculum and training session to ensure coordination and understanding of the responsibilities of all participants	Public Safety	All CTUIR Depts. and Programs	OEM, City of Pendleton, Umatilla County	Short	4		✔	✔	✔
	New											

MITIGATION MEASURES (multi-hazard and hazard)			Action Items	RESPONSIBLE TO IMPLEMENT	COORDINATION WITH OTHER ORGANIZATIONS		TIMELINE	PRIORITY RANK	PLAN GOALS THAT APPLY			
					INSIDE CTUIR	OUTSIDE CTUIR			1	2		4
	to plan											
PE-11		**EDUCATE.** Promote awareness of local hazards and mitigation.	Make presentations in local schools on the types of hazards predominant to the UIR and ways to mitigate.	Public Safety	Fire Department, Police	State Police	Short	3		✔		✔
PE-12		**FLOODING.**	A. Assist home owners that have previously flooded to protect their structures from future damage; B. Maintain compliance with current NFIP regulations to make flood insurance available to property owners in the UIR;	Planning, Public Safety Planning	DNR, Communication GIS Planning	FEMA FEMA	Long Short	62 28	✔ ✔		✔ ✔	 ✔
PE-13	✔	**EARTHQUAKE.**	Participate in the "Great Shake Out" to educate and remind residents how to prepare for and respond to an earthquake event	Public Safety	Education, CTUIR Admin.	OEM	Short	16	✔			✔
PE-14		**FOG.**	Expand the radio frequency traveler's information program to inform the public of road conditions on I-84;	Public Safety	Tribal Fire Dept.	Oregon Dept. of Transportation	Short	22				✔
PE-15	A ✔	**WILDFIRES.**	A. Coordinate with and support prevention and education efforts identified in the BIA WFPP; B. Identify and inform property owners about bridges that cannot support weight of emergency vehicles; C. Promote retrofitting of homes in WUI areas with noncombustible materials.	Public Safety Public Safety Public Safety	Tribal Fire Dept. Tribal Fire Dept. Tribal Fire Dept.	BIA, ODF BIA, ODF BIA, ODF	Long Long Long	2 54 48	✔ ✔ ✔			✔ ✔
	New to plan											

MITIGATION MEASURES (multi-hazard and hazard)			Action Items	RESPONSIBLE TO IMPLEMENT	COORDINATION WITH OTHER ORGANIZATIONS		TIMELINE	PRIORITY RANK	PLAN GOALS THAT APPLY			
					INSIDE CTUIR	OUTSIDE CTUIR			1	2		4
PE-16	✔	**NATURAL GAS PIPELINE BREAK.**	Coordinate with the pipeline company operators to provide pipeline safety education forums.	Public Safety	Education, Admin., Fire Dept.	Tesoro, NW Pipeline	Short	9			✔	
PREVENTION MEASURES												
P-1		**COMPREHENSIVE PLAN.** Amend the CTUIR Comprehensive Plan to include objectives that recognize and encourage hazard mitigation measures that will make the reservation more disaster resistant.	Ensure all CTUIR functional plans adopted consider mitigation measures to address relevant hazards	Tribal Planning Office	Board of Trustees, Police, Fire, Public Works		Short	5	✔	✔	✔	
P-2		**LAND DEVELOPMENT CODE -** Update the CTUIR LDC as necessary to include development standards to minimize risk to structures from natural hazards.	Help protect future development from hazardous events	Tribal Planning Office	Board of Trustees	FEMA	Short	6	✔			
P-3		**LAND DEVELOPMENT CODE - Landslides and Wildfires**. Consider measures to ensure future development is protected from landslides and is defensible from wildfires	Help protect existing and future development from hazardous events	Tribal Planning Office	CUIR GIS, Range, Ag. & Forestry Program	Umatilla county, ODF, USFS	Long	11	✔			
P-4		**INTERNATIONAL BUILDING CODE (IBC).** Ensure new development complies with the most current IBC.	Help make new or renovated structures more disaster resistant.	Tribal Planning Office	CTUIR Planning; Inspection Services		Short	26	✔			
	New to plan											

MITIGATION MEASURES (multi-hazard and hazard)			Action Items	RESPONSIBLE TO IMPLEMENT	COORDINATION WITH OTHER ORGANIZATIONS		TIMELINE	PRIORITY RANK	PLAN GOALS THAT APPLY			
					INSIDE CTUIR	OUTSIDE CTUIR			1	2		4
P-5		**FLOODING.**	A. Purchase and remove existing structures in flood hazard areas as funding and willing sellers allow;	Land Acquisition, Planning	DNR, Public Safety	FEMA	Short	56	✔			✔
			B. Pursue vegetation and restoration practices that assist in enhancing and restoring the natural and beneficial functions of the flood plain and watershed;	Public Works	Public Safety, Planning	FEMA	Long	36	✔			
	C ✔		C. Include properties located within the Flood Hazard Overlay Zone as a priority in the CTUIR Land Acquisition Strategy Plan as funding and willing sellers allow;	Dept. of Economic & Community Dev.	Planning	FEMA	Long	49	✔	✔		
			D. Work with local, state and federal jurisdictions to install, maintain and operate stream gauging stations on the UIR;	DNR-Water Resources	DNR Programs,	USF&W, Oregon F&W	Short	27	✔		✔	
P-6		**EARTHQUAKE.**	A. Conduct a study to determine which buildings and infrastructure on the UIR face a risk from earthquakes;	Public Safety	Planning	FEMA	Short	60	✔		✔	
	B ✔		B. Monitor earthquake activity; establish and implement an infrastructure inspection process for the Community water and sewer system; retrofit as needed;	Public Works	Public Safety	USGS, FEMA	Long	55	✔	✔	✔	
	C ✔		C. Update the 2006 CTUIR Water and Wastewater Master Plan;	Public Works	Planning, Water Resources	City of Pendleton	Short	20	✔		✔	
	New to plan											

MITIGATION MEASURES (multi-hazard and hazard)			Action Items	RESPONSIBLE TO IMPLEMENT	COORDINATION WITH OTHER ORGANIZATIONS		TIMELINE	PRIORITY RANK	PLAN GOALS THAT APPLY			
					INSIDE CTUIR	OUTSIDE CTUIR			1	2		4
P-7		**FOG.**	A. Provide additional cameras on I-84 and OR 331; B. Work with ODOT and State Police to provide a lead car to guide vehicles on Cabbage Hill during times of dense and freezing fog.	Public Safety Public Safety	- -	Oregon Dept. of Transportation ODOT, State Police	Short Short	42 24	✔ ✔		✔ ✔	 ✔
P--8		**SEVERE WINTER STORMS.**	Expand the NOAA emergency management signal covering the UIR	Public Safety	Police, Fire	Nat'l Weather Service, ODOT	Short	44	✔			✔
P-9		**WILDFIRE.**	A. Evaluate all new development within the designated high and medium wildland-urban interface (WUI) areas for fire hazard. B. Within designated WUI and at risk WFPP areas ensure adequate access/egress for fire-fighting vehicles	Public Safety, Fire Department Public Safety	Planning, Range, Ag & Forestry DNR-RAF, Public Works	BIA, OR Dept. of Forestry BIA, OR Dept. of Forestry	Short Short	12 30	✔ ✔		✔	 ✔
P-10		**DROUGHT.**	A. Develop/Update Water Conservation Plan; B. Provide technical assistance and low-interest loans to farmers and ranchers to develop livestock watering systems;	Public Works DNR- Range, Ag & Forestry	DNR-Water Resources DNR Water Resources	NRCS NCRS, Tiichum Conservation Dist.,	Long Long	14 63	✔ ✔	✔	 ✔	✔
	New to plan											

MITIGATION MEASURES (multi-hazard and hazard)			Action Items	RESPONSIBLE TO IMPLEMENT	COORDINATION WITH OTHER ORGANIZATIONS		TIMELINE	PRIORITY RANK	PLAN GOALS THAT APPLY			
					INSIDE CTUIR	OUTSIDE CTUIR			1	2		4
P-11		**DUST STORMS.**	A. Provide technical assistance and low-interest loans to farmers and ranchers to develop livestock watering systems;	DNR-Range, Ag & Forestry	Economic & Community Dev. Dept., CTUIR Farming	Tiichum Conservation Dist. NRCS, ODOT	Long	64		✔	✔	
			B. Develop an Agricultural Management Plan for the UIR to include soil retention best management practices.	DNR-Range, Ag & Forestry	CTUIR Farming	BIA, NRCS	Long	25	✔		✔	
			C. Explore methods of improving communication of hazardous blowing dust conditions with local public safety and law enforcement agencies.	Public Safety	Fire Dept., Tribal Police	ODOT, State Police,	Long	18	✔		✔	✔
P-12		**DAM FAILURE.**	Implement and update the Indian Lake Dam EOP	DNR Water Resources	DECD	BIA	Short	29			✔	
STRUCTURAL PROJECTS												
S-1		**FLOODING.**	A. Identify and implement measures to mitigate erosion of the county road serving Upper McKay Creek;	Public Works	Planning, DNR	-	Short	50	✔		✔	
	B ✔		B. Flood-proof existing homes in the "July Grounds" area to mitigate for mold and rot associated with the high water table hazard.	Public Works	Planning, DNR	Umatilla County Public Works	Short	58		✔		
	New to plan											

MITIGATION MEASURES (multi-hazard and hazard)			Action Items	RESPONSIBLE TO IMPLEMENT	COORDINATION WITH OTHER ORGANIZATIONS		TIMELINE	PRIORITY RANK	PLAN GOALS THAT APPLY			
					INSIDE CTUIR	OUTSIDE CTUIR			1	2		4
S-2		**SEVERE WINTER STORMS**	A. Replace existing power lines with heavier T-2 line, shorter spans, and heavier poles and crossbars;	Public Works	Planning, Economic & Community Dev	Umatilla Electric, Pacific Power	Long	47	✔	✔	✔	
			B. Bury power utility lines to remove the risk of power outages due to ice;	Public Works	SAA	Umatilla Electric, Pacific Power	Long	41	✔	✔	✔	
	C ✔		C. Install a second substation to provide a secondary service route to the power grid system;	Dept. of Economic & Community Dev.	Planning	Umatilla Electric, Pacific Power ODOT	Long	37	✔	✔	✔	
	D ✔		D. Develop additional semi-truck parking near Arrowhead to address safety issues with I-84 winter closures.	Wildhorse Resort & Casino/Arrowhead	Planning, Public Works		Short	57	✔		✔	
S-3		**DROUGHT**	A. Increase storage of water, especially off stream storage for beneficial use by Farming Enterprise and First Foods;	DNR-Range Ag & Forestry	DNR Water Resources	NCRS, Tiichum Conservation Dist.,	Short	40	✔	✔		
	B ✔		B. Increase storage capacity and supply of potable water to the CTUIR Community Water System which is at capacity.	Public Works	DNR Water Resources	Pendleton Public Works	Short	45		✔	✔	
PROPERTY PROTECTION MEASURES												
PP-1		**WILDFIRES.**	A. Develop a Reservation slash pickup, chipping and reuse program in WUI designated areas for homeowners;	Dept. of Economic & Community Dev./TERF	Public Safety, DNR-RAF	ODF	Long	46	✔	✔		
			B. Inventory existing water supplies within the UIR suitable for use in fighting wildland fires;	Public Safety/Tribal Fire Dept.	Public Works, DNR-RAF	ODF	Short	38	✔			
	New to plan											

MITIGATION MEASURES (multi-hazard and hazard)			Action Items	RESPONSIBLE TO IMPLEMENT	COORDINATION WITH OTHER ORGANIZATIONS		TIMELINE	PRIORITY RANK	PLAN GOALS THAT APPLY			
					INSIDE CTUIR	OUTSIDE CTUIR			1	2		4
PP-2	 B ✔	**HAZARDOUS MATERIALS SPILLS**	A. Provide an enclosed and "haz mat ready" safety facility for trucks with leaking loads near the most accident-prone area of I-84 within the Reservation boundaries; B. Increase inspection of Casino and Arrowhead parking areas for leaking materials or when I-84 is closed.	Public Safety/Fire Dept. Wildhorse Security	Planning, DNR Public Safety/Police	ODOT, Oregon Hazard Materials Response ODOT	Long Long	61 53	✔ ✔		✔	
PP-3		**FLOODING.**	Move the affected people out of danger by relocating or elevating threatened homes.	Public Safety	Planning, DNR	FEMA, BIA	Long	62	✔			
EMERGENCY SERVICES MEASURES												
ES-1	A ✔ B ✔	**EMERGENCY OPERATIONS PLAN.** Maintain an up-to-date Plan	A. Annually review the Plan with individuals and agencies responsible for implementation; B. Amend all as necessary to keep current.	CTUIR Public Safety	Police, Public Works, Wildhorse Resort	OEM, City of Pendleton, Umatilla County, Resort & Casino	Short	7 10	✔ ✔		✔	
ES-2		**SEVERE WINTER STORMS.**	Work with existing utility companies providing services within the UIR to coordinate emergency response to address power outages.	CTUIR Public Safety	Police, Public Works, Wildhorse Resort	Umatilla Electric, Pacific Power	Short	23		✔	✔	
ES-3		**WILDFIRES.**	A. Within designated WUI and at risk WFPP areas provide emergency access/egress road signs and maps for homeowners; B. Develop a process to encourage private property owners to upgrade their bridges to support the weight of fire trucks and emergency vehicles.	CTUIR Public Safety CTUIR Public Safety, Fire	Police, Public Works Planning, DNR-Water Resources	ODF, BIA -	Short Long	34 59	✔ ✔	✔		✔ ✔

MITIGATION MEASURES (multi-hazard and hazard)			Action Items	RESPONSIBLE TO IMPLEMENT	COORDINATION WITH OTHER ORGANIZATIONS		TIMELINE	PRIORITY RANK	PLAN GOALS THAT APPLY			
					INSIDE CTUIR	OUTSIDE CTUIR			1	2		4
ES-4		**DUST STORMS.** Emergency Alert System **(**EAS)	Expand and use the EAS to provide timely information to the traveling public about hazardous blowing dust conditions.	CTUIR Public Safety	Police, Fire	ODOT	Short	31	✔			
ES-5	A ✔	**HAZARDOUS MATERIALS SPILLS**	A. Coordinate with the Union Pacific Railroad for local response to derailments and spills;	CTUIR Public Safety	Police, Fire	EPA, USFS	Short	17	✔		✔	
	B ✔		B. Develop a response training program with UPRR and Umatilla County for use of specialized equipment.	CTUIR Public Safety	Police, Fire	Umatilla County Emergency Mgt., UPRR	Short	15	✔		✔	
ES-6	✔	**CRITICAL FACILITIES PROTECTION**	Ensure all critical facilities are equipped with emergency backup generators and fuel supply.	CTUIR Public Safety	Public Works	OEM, public utility companies	Short	39	✔			
NATURAL RESOURCE PROTECTION MEASURES												
NR-1		**FLOODING.**	Pursue vegetation and restoration practices that assist in enhancing and restoring the natural and beneficial functions of the flood plain and watershed.	DNR-Cultural Resources, Water Resources, Fisheries	Planning,	USF&W, Oregon F&W	Long	35	✔		✔	

Table 5-2 Review of 2008 Action Items/Measures

2008 Measure	Action	Reason	2016 Measure
MH-6. Require real estate disclosures for properties where past hazard damage has occurred.	Deleted	Unenforceable	
Zoning. Update Land Dev. Code for NFIP regulations	Completed	2016 Plan amended to maintain compliance	PE-12B
FL-1 Assist homeowners previously flooded With options to protect from future damage.	Amended	2016 Plan split into two actions	PE-12A, P-5A
FL-4 Replace Shortmile Rd culvert	Deleted	Completed	
FL-5 Berm at Cayuse	Deleted	Completed	
FL-6 Move affected people in flood plane by relocation or elevation	Deleted	Redundant	PE-12A, P-5A
FL-8 Construct berms and culvert Iskuulpa Creek, remove gravel	Deleted	Completed (railroad replaced, elevated bridge)	
EP-1 Health system continuity plan for YTHC for epidemiological crisis	Deleted	Epidemiological Disaster no longer in plan as a hazard	
PE-2 Strategy to address epidemiological disasters at Wildhorse Resort & Casino	Deleted	Epidemiological Disaster no longer in plan as a hazard	
WS-3 Pruning trees away from power lines	Deleted	Unenforceable, replaced	S-2A, B, C
WF-2 Implement Umatilla County Wildfire Protection Plan	Deleted	Replaced with BIA WFPP omitted from 2008 Plan	PE-15A
DS-1 Develop erosion control plan for blowing dust	Deleted	Replaced with Ag Management Plan	P-11B
HM-2 Increase patrol of truck parking for hazardous materials during I-84 closures	Deleted	Replaced	S-2D
DS-1 Complete dam safety measures	Deleted	Completed	

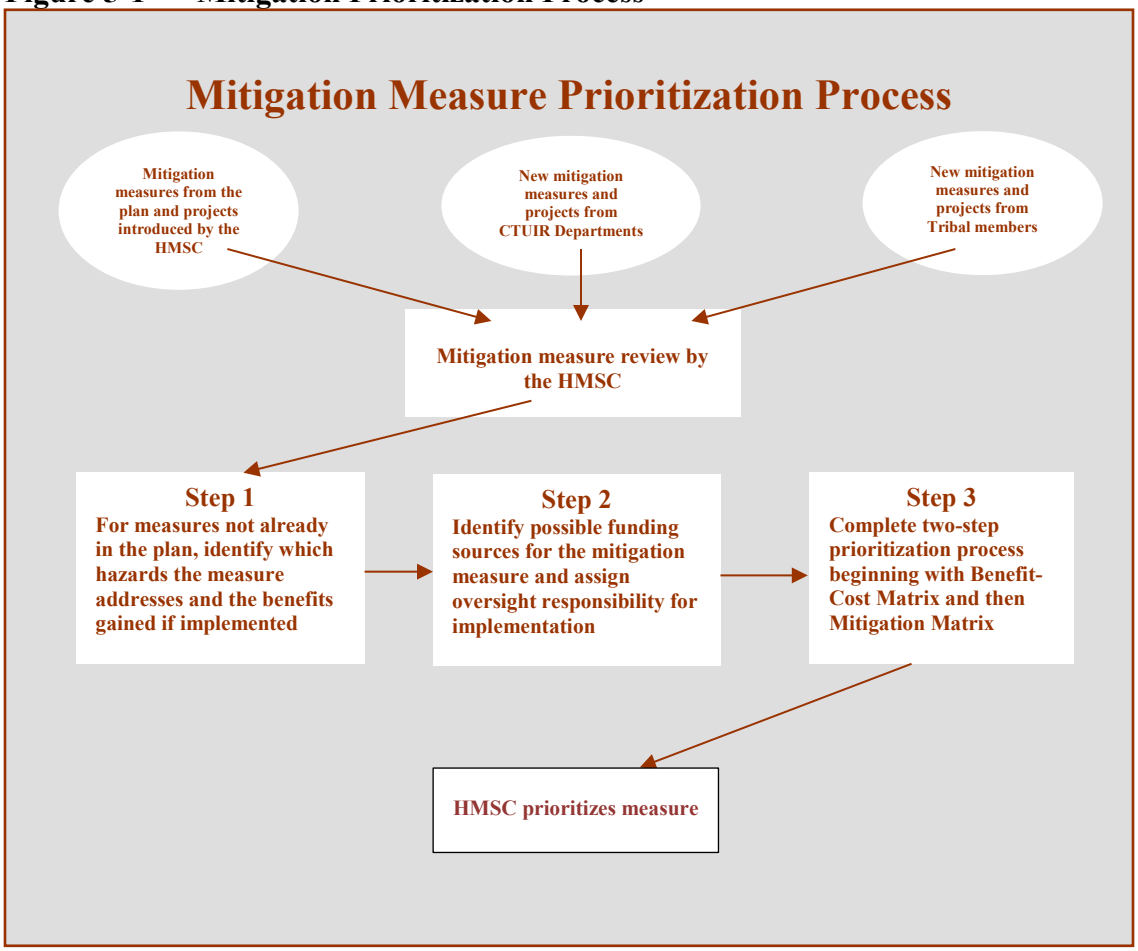
4. - Mitigation Measure Prioritization Process[1]

Because the opportunity to implement mitigation measures hinges on a number of factors, a flexible prioritization process works best for the UIR due to the numerous diverse CTUIR departments and programs capable of implementing the mitigation measures identified. This process will provide the ability to add a mitigation component to other projects that may not be identified in this plan. The key to success for the UIR Hazard Mitigation Plan is to make hazard mitigation an "ethic" to be considered in all future CTUIR projects and planning efforts. The development of a "rigid" prioritization process could serve to reduce possible mitigation opportunities.

Future mitigation measures/action items in the UIR Hazard Mitigation Plan may be suggested or requested by any UIR citizen; CTUIR staff, committee/commission member or elected official; or local, state or federal agency in writing along with a proposed funding source. The proposed item shall be submitted to the CTUIR Public Safety Department Director who will schedule the proposed measure for review by the CTUIR Law and Order Committee at a regular meeting.

Depending on the proposed project's purpose and the possible methods for implementation, more than one funding source may be considered. Several of the possible funding sources are identified in Section 7.

Figure 5-1 Mitigation Prioritization Process



Step 1

This first step is the initial screen for new mitigation measures that may be identified after adoption of this 2015 Hazard Mitigation Plan. For mitigation measures already listed in the current adopted Plan, skip Step 1 and move directly to Step 2. Measures in the adopted Plan have been reviewed by the HMSC and CTUIR Law and Order Committee and have been approved by the CTUIR Board of Trustees. This approval signifies that the new measures are consistent with the Plan's purpose and goals and, if implemented, will make the Reservation more disaster resistant for the people living, visiting or working on the Reservation and more prepared to respond to a hazardous event.

New hazard mitigation measures proposed for inclusion in the UIR Hazard Mitigation Plan will undergo a review by the Law and Order Committee. As projects to benefit the Reservation are proposed, opportunities should be taken to ensure that such projects are located and designed to resist damage from possible hazards. In some cases, additional mitigation grant dollars may be available to help reduce risks associated with various hazards.

Future mitigation measures or projects should be submitted to the Public Safety Director. The Public Safety Director will schedule a review by the CTUIR Law and Order Committee to

determine which hazard or hazards are involved, which measure category the project falls under and whether the proposed mitigation measure or project is consistent with the plan's goals. Those measures or projects that will help reduce risks from high and medium hazardous events will be identified and move on to Step 2.

Step 2

The Public Safety Director in consultation with the CTUIR Finance Office will compose the "funding team." The funding team will identify one or more possible funding sources that could be used to help fund each hazard mitigation project. A list of possible funding sources is contained in Section 7. However, grant funds from other sources may also be used. The funding team will obtain the grant criteria from the agencies administering the grants (NOTE: Most grant criteria can be found on the specific agency's website). The funding team will review the grant criteria and determine if the mitigation measure is eligible for one or more grants.

Step 3

Prioritization of mitigation measures occurs when the Law and Order Committee members evaluate each mitigation measure using the Benefit-Cost Assessment form. The results from Form 2 (completed by staff), which assigns an overall value to each of the Measures/Action Items based on specific criterion, is combined with the result of Form 1and then averaged resulting in the prioritization number. The following explains how the two forms work:

Explanation of the Benefit-Cost Assessment (Form 1 see Appendix D)
The Benefit-Cost Assessment Form is part of a two-step prioritization process. This form is the first step. It is designed to evaluate and prioritize mitigation measures using criteria which allow comparisons among various types of proposed mitigation actions. This form or table has a place to list the mitigation actions or projects, a scale for measuring estimated benefits and estimated costs, and two categories for concluding whether the participant believes the projects benefits are greater than its costs and if the project is eligible for a FEMA grant.

Estimated Benefits

Under the Estimated Benefits category, the form provides for a quick assessment of whether the proposed mitigation measure will prevent or reduce the following:

- Injuries/Deaths
- Displacement Costs
- Disruption Costs
- Loss of Service
- Business Closure
- Bridge/Road Closure
- Recovery Costs
- Replacement Costs

Based on the perceived ability of the mitigation measures value in preventing or reducing losses from hazardous events, the user of this form will circle a 50 if the benefits from the mitigation action are very high, a 40 if the benefits are high, a 30 if a medium level of benefits are derived, a 20 if the benefits are low and a 10 if they are very low.

Estimated Costs

A similar process as used to assess benefits is used for assessing project costs. Because mitigation measures were not analyzed for their actual costs, five categories of costs were provided to help compare project benefits with project costs. The five categories are as follows:
< $10,000
$10,000 to $25,000
$25,001 to $100,000
$100,001 to $ 250,000
> $250,000
If a project is less than $10,000, it falls into the "very low" category for cost, and a 50 is circled; if a projects costs between $10,000 and $25,000, it has "low" costs and a 40 is circled. "Medium" costs are $25,001 to $100,000 and receive a 30. Between $100,001 and $250,000 are considered "high" costs and receive a 20. Costs greater than $250,000 was considered "very high" and receives a 10. By completing this form in this manner, an emphasis of the benefits and costs has been incorporated into the prioritization process as required by FEMA.

B>C

The "benefit greater than cost" category gives those assessing proposed mitigation measures the opportunity to conclude whether they believe the proposed mitigation measure provides greater benefits in mitigating against future hazardous events than the costs associated with implementing the proposed measures.

Mitigation Measure Prioritization (Form 2, see Appendix D)

Once the Benefit-Cost assessment is complete, assessing how the proposed mitigation projects satisfy FEMA and local objectives and whether they can or cannot easily obtain funding are considerations helpful in prioritizing proposed mitigation actions. Like the previous benefit-cost assessment form, assessing points using the following criteria will help in determining which proposed mitigation actions are high, medium and low priority projects.

The criteria and the possible points under each criterion are as follows:
Eliminates Repetitive Loss (0-10 pts)
Greatest Economic Impact (0-10)
Greatest Good for Most People (0-10)
Least Expensive Option (0-10)
Funding Is Secure or Easy to Obtain (0-5)
Can Fund Sooner (0-5)
Has Greater Public and Political Support (0-5)
Benefits More Than One Jurisdiction (0-5)
Addresses Two or More Goals (0-5)

Local Ability to Perform Project (0-5)

The first four criteria can be awarded up to 10 points because these criteria address major mitigation objectives and save tax dollars. The remaining criteria can be awarded up to 5 points because these criteria focus primarily on the ability to implement the mitigation measure or the execution of the plan.

Once the Benefit-Cost Assessment and Mitigation Measure Prioritization forms are completed, the scores should be totaled for each mitigation project to determine their overall priority.

Step 4

Based on the steps above, the Public Safety Director and CTUIR Law and Order Committee will recommend whether or not the mitigation activity(s) should move forward. If the Committee decides to move forward with the mitigation measure, the department or program responsible for implementing the measure will be responsible for taking further action. If the mitigation grant is from the FEMA, a full benefit-cost analysis that meets FEMA's requirements may be necessary. The coordinating department or program will be responsible for documenting the success of the grant project upon its completion and providing the Committee with periodic progress reports. The coordinating department or program will also be responsible for closing out the grant and satisfying all grant requirements. A copy of the report prepared to close out the grant will also be sent to the Public Safety Director in order to be scheduled for review by the Committee. The Committee will review the issues surrounding grant applications at one of their regularly scheduled meetings. A representative of the coordinating department or program will be invited to attend the Committee meeting to share knowledge and/or experiences. This process will afford greater coordination and make the CTUIR's grant process more efficient. The Committee will review and make a determination of support or non-support by a majority of members present at the meeting and provide a written recommendation to the Board of Trustees. This letter can be utilized in grant applications to show community support for the mitigation action.

The Law and Order Committee and the CTUIR's leadership have the option to implement any of the mitigation measures at any time, (regardless of the prioritized order). This allows for the consideration of mitigation strategies as new opportunities arise, such as funding for mitigation measures that may not be of the highest priority rank. This methodology will be used to prioritize the plan's action items during the annual review and update process.

[1] Based on the system developed by the University of Oregon's Community Service Center's Oregon Natural Hazards Workgroup

Section 6 - Mitigation Measure Implementation

Mitigation measures that reduce impacts of hazardous events are described and categorized in the previous Section, Table 5-1. Describing how the CTUIR has the ability to implement these measures is the next step. The Hazard Mitigation Steering Committee (HMSC) began this process by aligning each mitigation measure/action item with one more of the plan's goals and then describing what each measure is intended to accomplish. The principle CTUIR departments or programs that would be applicable to implement each item were identified. Other collateral CTUIR departments and programs as well as other local, state or federal agencies associated with the item for collaboration were identified.

The next step was to describe one or more strategies that could be used to successfully implement the mitigation measure or action item. Although not specifically identified for each measure, obtaining grant funds is one of the main objectives of this plan and should be presumed to be a part of the mitigation strategy for those mitigation measures requiring funding.

The HMSC then determined whether the mitigation measure/action item could be implemented in the "short term" (0-2 years) or in the "long term" (more than 2 years) and prioritized each based on the methodology previously described.

FEMA requires the evaluation of existing hazard management policies, programs and capabilities that exist and could be used to implement the identified mitigation measures. There are a number of CTUIR Departments and Programs that help reduce losses from hazardous events on the Reservation and have the capacity for contributing to the implementation of the measures. This section identifies existing plans, programs and procedures employed by the CTUIR that help make the Reservation more disaster resistant. This section also describes the CTUIR's ability to manage governmental affairs and its capacity to pursue and manage grant funds in support of this hazard mitigation plan.

1. Pre-Disaster Policies, Programs and Procedures

A. CTUIR Planning Program

All lands within the UIR have assigned zoning which is implemented through the CTUIR Tribal Planning Office Land Development Code (LDC) along with a permitting and building inspection program. CTUIR-owned trust lands outside the UIR boundaries are also managed for land use through the CTUIR Department of Economic and Community Development and the Tribal Planning Office. The Tribal Planning Office implements the International Building Codes inspection program on both the UIR and on off-Reservation CTUIR-owned trust lands through the permitting process. The CTUIR planning program can: (1) help direct future development away from certain hazard areas where a hazardous event could damage structures; or (2) require that certain standards be met to reduce or prevent damage from future hazards. For example, the CTUIR has incorporated FEMA's National Flood Insurance Program (NFIP) floodplain development standards into its LDC requiring structures located in the Flood Hazard Overlay Zone to be elevated above the base flood elevation. The CTUIR is recognized as a Community in the NFIP (Community ID# 410012).

The CTUIR has adopted a Comprehensive Plan (2010) and the "Confederated Tribes of the Umatilla Indian Reservation Land Development Code" (1983 as amended through March 10, 2014).

The Mission Community Plan (1998) is the long-term land use functional plan which includes land use policies for agricultural, general rural, rural residential, community residential, commercial, industrial, open space, cultural, water and sewer service area, fire protection and emergency services, police protection, solid waste management, roads and transportation, parks and recreation, environmentally sensitive areas and on land acquisition. The Community Plan also identifies existing and future zoning for Reservation lands within the Mission Community Planning Area (see Figure 2-1; Section 2, Page 8).

The Tribal Planning Office provides long-range planning assistance to multiple "agencies" (Departments) within the CTUIR governmental structure and developed this Natural Hazard Mitigation Plan in coordination with the Department of Public Safety. The Tribal Planning Office will be the lead CTUIR agency to initiate and process future Plan updates. The Public Safety Director and Hazard Mitigation Steering Committee will oversee the implementation of the identified mitigation measures/action items and the specific Department/Program responsible for the measure will develop the funding mechanisms necessary to accomplish the measure/action item.

B. Building Codes

The CTUIR Tribal Planning Office houses a building permit and inspection program applying International Building Codes; electrical, plumbing, structural, mechanical and fire.

The CTUIR Board of Trustees has increased the level of protection from hazards that can damage buildings by changing from using the Uniform Building Code standards to the current International Building Code (IBC). In its resolution adopting the IBC, the CTUIR Board of Trustees amended Chapter 4 of the LDC to require that:

> "All buildings and facilities constructed on the Umatilla Indian Reservation and on off-reservation trust lands owned by the CTUIR shall comply with the latest edition of the following codes and standards, including any amendments thereto:
>
> 1. Building Codes:
> a. International Building Code;
> b. International Fire Code;
> c. International Plumbing Code;
> d. International Mechanical Code;
> e. National Electric Code;
> f. International Residential Code;
> g. Oregon Manufactured Dwelling and Park Specialty Code;
> h. Oregon Department of Energy Conservation Code;
> i. NFPA National Fire Sprinkler Code;
> j. National Fire and Safety Sprinkler Code;
> k. International Fuel Gas Code.
>
> 2. Tribal Supplement to the International Building Code:
> a. Wind standard: 105 mph 3 second gust, wind speed 90 mph; exposure B or C;
> b. Snow load standard: 25 pounds per square foot for roof;
> c. Frost depth standard: 24 inches;
> d. Earthquake design data shall be shown as indicated in Sec. 1603.1.5 IBC;
> e. Building envelopes, heating and cooling ducts shall meet the requirements of the Oregon Department of Energy Conservation Code. The reservation land is in Climate Zone 2;
> f. Parking spaces shall be constructed to the Oregon Department of Transportation Disabled Parking Standards;
> g. Mobile homes shall be set up and installed to the requirements of the current Oregon Manufactured Dwelling Specialty Code;
> h. In residential dwellings constructed under the International Residential Code, Automatic Fire Sprinkler Systems (IRC Section R313) shall not be required".

C. Hazardous Material Transport

Trucks carrying hazardous materials are prohibited from parking on the Wildhorse Casino and Resort property, which is the highest occupancy facility on the Reservation. Trucks carrying hazardous materials are allowed to park at the Arrowhead Travel Plaza. The Oregon Department of Transportation (ODOT) oversees the transportation of hazardous materials by railcar under authority of Oregon Administrative Rules, Division 510 Oregon Railroad Hazardous Materials Transportation **(OAR** 741-510-0010) adopted under authority 824.080 through 824.092. ODOT adopted the US Department of Transportation Rules as they apply to railroads and railroad shippers in Title 49 CFR, parts 107 through 180 Hazardous Materials Regulations.

D. Climate Change

The CTUIR is in the process of completing a climate adaption vulnerability and resiliency assessment in preparation for the development of an Adaptation Plan. The completion and adoption of the Adaptation Plan is expected by the next update of this Hazard Mitigation Plan. As the Adaptation Plan is developed,

E. Energy Policy

In 2009, the CTUIR Tribal government adopted an Energy Policy and formed an Energy Policy Staff Team to implements its goals. The goals also contain action items that address the development of alternative fuels, transportation of hazardous (and radiological) materials through the Reservation, climate change and energy self-sufficiency.

F. CTUIR Emergency Operations Plan (EOP)

The EOP was adopted in 2009 (with 2011 amendments) and describes how various agencies and organizations within the CTUIR will coordinate resources and activities with other Federal, State local and private-sector partners. It is an all-hazard plan that is based on Tribal authorities and Federal law and designed to be consistent with State of Oregon, CTUIR Statutes and other applicable regulations, plans and policies. The EOP is in the process of another update in 2015.

2. Post-Disaster Policies, Programs and Procedures

A. Inclement Weather Policy

The CTUIR has policies in place directing governmental operations during times of bad weather. These policies save lives and reduce property damage by allowing people to delay traveling to work or excusing them from coming to work during inclement weather.

Fog, ice and snow storms are covered under the CTUIR Inclement Weather Policy which is as follows:

> CTUIR Personnel Policies Manual, Section 4.16 (A)(1), CTUIR employees may be granted Administrative Leave by the Executive Director due to the *"inability to travel to work safely because of unusually severe weather or natural disaster..."*

B. Emergency Response Leave and Administrative Leave Policies

The CTUIR Emergency Response Leave Policy within the Personnel Policies Manual encourages and supports those employees able to assist those in need during a disaster or hazardous event. This policy is as follows:

4.16.1 EMERGENCY RESPONSE LEAVE

CTUIR Employee Volunteers. In order to help accommodate the emergency response capabilities of the Tribe, any Tribal employee who is a volunteer member of the Tribal Fire Department, or any other Tribal emergency response group, may immediately and without question leave their duty station when called to respond to an emergency situation during their normal working hours. Such calls may be direct verbal communication or by electronic means, (i.e. beeper, radio, etc.). The employee will receive their normal compensation and benefits as if they were at their duty station during the time they are responding. In no event will a Tribal employee who is a volunteer member of the Tribal Fire Department receive compensation in excess of their normal working hours or be eligible for compensatory time for the time spent responding to the emergency, unless authorized by the Executive Director.

CTUIR Employees. In the event of a Reservation declared emergency (fire, flood, etc.) the Incident Commander, with concurrence of the Executive Director, may direct a Tribal employee to assist in an emergency response based on their expertise and skills. This could include everything from basic tasks such as answering phones in an emergency operation center to more technical tasks such as engineering a flood levy. An emergency response situation will take precedent over the employee's normal day-to-day work. Also, the Incident Commander, with concurrence of the Executive Director, may direct a department to release the use of special equipment needed in emergency response situations. If authorized by the Executive Director or his designee, an employee may receive compensation in excess of their normal working hours or eligible for compensatory time for the time spent responding to the declared emergency.

C. Tribal Repair Fund

The Tribe has a fund for maintenance and replacement of most houses owned by the CTUIR that are leased or rented to Tribal members. Funds from this program were used to patch roofs after the January 2008 wind storm.

D. The Cultural Response to Disasters

Although not a formal policy, program or procedure, the enrolled Tribal members of the CTUIR have cultural ties to one another that bring members of the Reservation together to assist during times of need. Caring for one another is a cultural ethic that needs to be recognized as a "post-disaster" response.

3. Other Programs, Plans and Studies Supporting Hazard Mitigation

Upper Umatilla River Flood Study: CTUIR and Corps of Engineers, U.S. Army (1999) formed the foundation for the development of Flood Insurance Rate Maps which have been adopted by the CTUIR with development regulations incorporated into the CTUIR Land Development Code Flood Hazard Overlay Zone.

CTUIR Administrative Rules And Standards To The Water Code(2004), Water Quality Standards (surface waters) to implement the CTUIR Water Code (2003 as amended).

Report of Flood Fight Potential Sites in the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) (UMATILLA COUNTY, OREGON) *Prepared By: Jerry R. Gardenhire CENWP-EC-DC 7/3/01 Rev. 1 10/31/03*

CTUIR Emergency Operations Plan 2009. Originally adopted in 2009 and updated in 2011, this all-hazard plan describes how the CTUIR organizes and responds to emergencies and disasters on the Reservation.

CTUIR Water and Wastewater System Master Plan 2006. This plan consists of an evaluation of the existing infrastructure, systems' analysis for capacity and need, operations and maintenance processes, and emergency preparedness. The water system portion of this Master Plan is implemented through the Mission Community Water System Code (1999). Both the Master Plan and Water System Code are in need of updating to current systems and standards. Additional plans developed and referenced in the Master Plan are the Water system Emergency Response Plan (2004) and the Drinking Water Assessment and Protection Plan.

CTUIR Environmental Health and Safety Code Chapter 6.065 (1999 as amended).

Other Emergency Operations Plan(s) that apply to the UIR:

BIA Wildland Fire and Aviation Program Management and Operations Guide

CTUIR Indian Lake Dam, Emergency Action Plan, June 2014

CTUIR Transit Plan, Safety, Security and Emergency Preparedness Plan (SSEPP), April 2014

Hanford Emergency Management Plan, DOE

Northwest Area Contingency Plan, Oil Spill and Hazardous substance release response, July 1, 2006

ODOT Emergency Operations Plan, Volume 1 & 2, July 2014

State of Oregon Emergency Operations Plan, Last Revision March 2014

Umatilla County Emergency Operations Plan, Last Revision January, 2012

Umatilla County Community Wildfire Protection Plan, Blue Mountains and Foothills Region, June 16, 2005

USDI Bureau of Indian Affairs, Umatilla Agency, Wildland Fire Prevention Plan 2012-2016

Wildhorse Resort and Casino Emergency Response Plan, August 2012

Yellowhawk Tribal Health Center, Emergency Preparedness Plan, Revised August 2013

CTUIR Water system Emergency Response Plan 2004

CTUIR Mutual Aid Agreement(s)

450 MHz User Subscriber Agreement, October 2011

BIA Deputization Agreement between the Office of Law Enforcement Services and Security and the confederated Tribes of the Umatilla Indian Reservation, November 14, 2005

Fire Response Mobilization Agreement, Oregon Fire Defense Board, 2015

Intergovernmental Agreement for Mutual Aid and Interagency Cooperation among Law Enforcement Agencies location in Umatilla County, Oregon

Umatilla Agency Standard Operation Procedure Law Enforcement Wildland Fire Investigation

4. CTUIR Grant and Program Management Capacity

The CTUIR is a sovereign legal entity that governs all activities within the boundaries of the UIR. Its governmental structure consists of multiple departments employing more than 715. The CTUIR has been managing grants since the 1970's and has an excellent rating for its fiscal management. During 2014, the CTUIR managed $51,556, 156 in grant funds along with matching shares of its own funds in support of a number of federal, state, local government and other initiatives. The varied nature of these programs can be seen in the following list agencies that have partnered with CTUIR in 2014:[i]

A. - Federal Grants and Programs

US Department of Interior – Bureau of Indian Affairs
US Fish and Wildlife Service
National Park Service
Bureau of Reclamation
Bureau of Land Management
US Department of Energy
Bonneville Power Administration
US Department of Health and Human Services – Indian Health Service
US Department of Health and Human Services – Administration for Children and Families
US Department of Health and Human - Department of Human Resources
US Department of Commerce
US Department of Agriculture – Natural Resource Conservation Service
US Department of Agriculture - Forest Service
US Department of Labor
Equal Employment Opportunity Commission
Environmental Protection Agency
US Department of Commerce
US Department of Justice
US Department of Housing and Urban Development
US Department of Defense – Department of the Army
US Department of Defense – Army Corps of Engineers
US Department of Education
US Department of Transportation
US Army Corps of Engineers

US Department of Homeland Security – Federal Emergency Management Agency
Institute of Museum and Library Services

B. - State of Oregon

Department of Transportation
Department of Human Services
Department of Education
Economic and Community Development Department
Oregon Arts Commission
Parks and Recreation Department
Watershed Enhancement Board
Department of Agriculture
Criminal Justice Commission
Department of Environmental Quality

C. - State of Washington

Office of Interagency Committee
Recreation and Conservation
Parks and Recreation

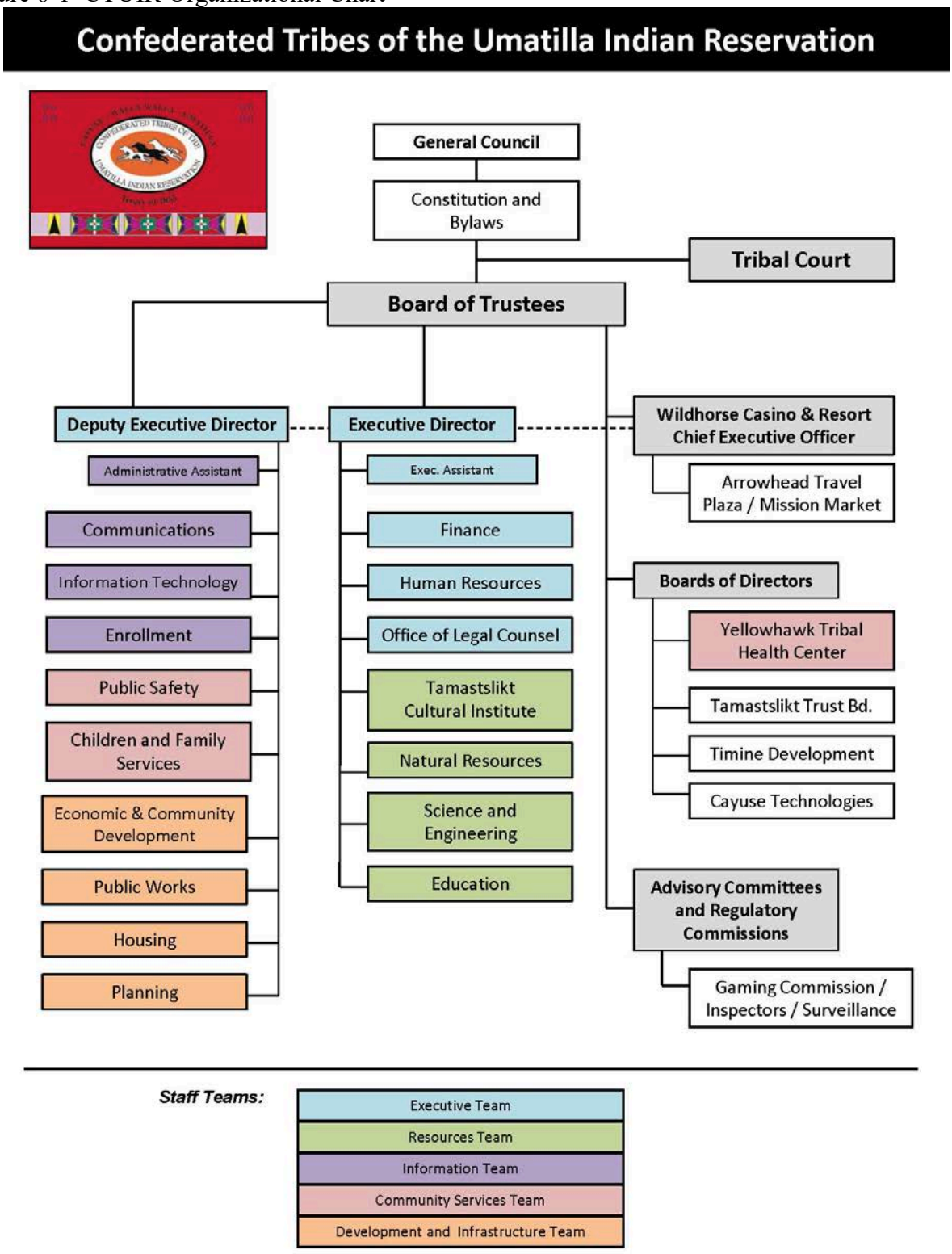
From this list of agencies, foundations and local governments that have funded programs and coordinated with the CTUIR, it is apparent that the CTUIR is an active participant in a wide range of programs and has the administrative and fiscal capacity to successfully manage grants and programs.

5. CTUIR Government

The following organizational chart outlines the overall governmental structure, including Departments and Boards. Each Department has its own organizational chart outlining its various Program functions. For example, the Public Safety Department has four Programs; Umatilla Tribal Police, Umatilla Tribal Fire Department, Emergency Management and Domestic Violence.

The CTUIR has contracted all programs that were once managed by the US Department of Interior, Bureau of Indian Affairs and now manages its own affairs. However, the Umatilla Agency Superintendent maintains a presence on the UIR to provide oversight of activities to ensure the federal trust responsibilities to Native Americans is achieved.

Figure 6-1 CTUIR Organizational Chart



[i] December 31, 2014 year end Schedule of Expenditures of Federal and Nonfederal Awards provided by CTUIR Finance Department

Section 7 – Hazard Mitigation Funding

There are a number of current and potential grant programs that help jurisdictions implement hazard mitigation measures. Because of their mission to reduce damage from hazardous events, the Federal Emergency Management Agency (FEMA) administers many of the grant programs listed below.

FEMA is not the only source of funding for mitigation assistance. There are other agencies involved in funding projects that can also serve to reduce risks from hazardous events. These agencies include but are not limited to the Department of Homeland Security, the US Army Corps of Engineers, the Environmental Protection Agency, and the US Department of Agriculture. Many of the potential sources of funds that can be used for mitigating hazards are identified below.

Many of the grants require the receiving jurisdiction to provide a certain percentage of "match" which is usually dollars or in-kind services. For example, a grant from FEMA usually requires a 25 per cent match. In very few cases, grant money may be used as match. The CTUIR are eligible for Bureau of Indian Affairs and the Federal Department of Transportation funds that can be used for matching other federal grant dollars under appropriate circumstances[1].

1. - Federal Emergency Management Agency Grant Programs

Stafford Act Grant Programs[2]

Pre-Disaster Mitigation Program (PDM)

Pre-Disaster Mitigation (PDM) Program funding is provided through the National Pre-Disaster Mitigation Fund. This fund is designed to assist states and local governments (to include Indian Tribal governments) in implementing cost-effective hazard mitigation activities that complement a comprehensive mitigation program. All applicants must be participating in the National Flood Insurance Program (NFIP) if they have been identified through the NFIP as having a Special Flood Hazard Area (a Flood Hazard Boundary Map or Flood Insurance Rate Map has been issued). In addition, the community must not be suspended or on probation from the NFIP. The PDM program will likely be exclusively offered on a nationally competitive basis. PDM grants are offered on a 75% federal share with a required 25% non-federal match.

Hazard Mitigation Grant Program (HMGP)

FEMA's Hazard Mitigation Grant Program (HMGP) was created in November 1988 under the authority of the Stafford Act, Section 404. The HMGP assists states and local governments to implement long-term hazard mitigation measures following a Presidential major disaster declaration. Initially, the federal cost share for projects 75% of a project's total eligible costs. Objectives of HMGP include:

- preventing loss of lives and property due to disasters;
- implementing state and local hazard mitigation plans;
- enabling mitigation measures to be implemented during immediate recovery from a disaster; and
- providing funding for previously identified mitigation measures that benefit the disaster area.

Public Assistance (PA)

The objective of the Federal Emergency Management Agency's (FEMA) Public Assistance (PA) Grant Program is to provide assistance to States, Native American Tribes, local governments, and certain Non-Profit organizations to alleviate suffering and hardship resulting from major disasters or emergencies declared by the President. Through the PA Program, FEMA provides supplemental Federal disaster grant assistance for the repair, replacement, or restoration of disaster-damaged, publicly owned facilities and the facilities of certain Private Non-Profit (PNP) organizations. The Federal share of assistance is not less than 75% of the eligible cost for emergency measures and permanent restoration.

2. - National Flood Insurance Act Grant Programs[3]

Flood Mitigation Assistance Program –

The overall goal of the Flood Mitigation Assistance (FMA) Program is to fund cost-effective measures that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other National Flood Insurance Program (NFIP) insurable structures. This specifically includes:

- reducing the number of repetitively or substantially damaged structures and the associated flood insurance claims;
- encouraging long-term, comprehensive hazard mitigation planning;
- responding to the needs of communities participating in the NFIP to expand their mitigation activities beyond floodplain development activities and permitting; and
- complementing other federal and state mitigation programs with similar, long-term mitigation goals.

There are three types of FMA Program grants:

- planning grants to assist the state and communities in developing flood mitigation plans;
- project grants to fund eligible flood mitigation projects that will greatly reduce or eliminate the risk of flood damage - “non-structural” hazard mitigation measures such as the elevation, relocation, or acquisition of flood-prone structures are encouraged; and
- technical assistance grants provide guidance to applicants in applying for the program or in implementing approved projects.

All FMA Program grants are offered on a cost-share basis requiring 25% non-federal match.

Repetitive Flood Claims (RFC)

The Repetitive Flood Claims (RFC) grant program was authorized by the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004 (P.L. 108–264), which amended the National Flood Insurance Act (NFIA) of 1968 (42 U.S.C. 4001, et al). Up to $10 million is available annually for FEMA to provide RFC funds to assist States and communities reduce flood damages to insured properties that have had one or more claims to the National Flood Insurance Program (NFIP).

Severe Repetitive Loss (SRL)

The Severe Repetitive Loss (SRL) grant program was authorized by the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004, which amended the National Flood Insurance Act of 1968 to provide funding to reduce or eliminate the long-term risk of flood damage to severe repetitive loss (SRL) structures insured under the National Flood Insurance Program (NFIP). SRL properties are residential properties:

a. That have at least four NFIP claim payments over $5,000 each, when at least two such claims have occurred within any ten-year period, and the cumulative amount of such claims payments exceeds $20,000; or
b. For which at least two separate claims payments have been made with the cumulative amount of the building portion of such claims exceeding the value of the property, when two such claims have occurred within any ten-year period.

The Severe Repetitive Loss Program. Aspects of the SRL program are as follows:

- **Purpose**: To reduce or eliminate claims under the NFIP through project activities that will result in the greatest savings to the National Flood Insurance Fund (NFIF).
- **Eligible flood mitigation project activities:** Floodproofing (historical properties only); Relocation; Elevation; Acquisition; Mitigation reconstruction (demolition rebuild); and Minor physical localized flood control projects.
- **Federal / Non-Federal cost share:** 75 / 25 %; up to 90 % Federal cost-share funding for projects approved in States, Territories, and Federally-recognized Indian tribes with FEMA-approved Standard or Enhanced Mitigation Plans or Indian tribal plans that include a strategy for mitigating existing and future SRL properties.

3. - U.S. Army Corps of Engineers[4]

Eligible projects include levee rehabilitation and repair of flood control works damaged by floods. Technical engineering assistance is also available.

4. - U.S. Environmental Protection Agency[5]

State/Tribal Wetland Planning Grants - Assists states and tribes to develop watershed based comprehensive land use plans and technical tools that can be applied to integrate protection and restoration of wetlands and other water resources.

Wetland Protection, Restoration, and Stewardship Discretionary Funding Program - This program provides support for studies and activities related to implementation of Section 404 of the Clean Water Act for both wetlands and sediment management. Projects can support regulatory, planning, restoration or outreach issues.

5. - USDA - Rural Development Agency[6]

Develop essential public facilities in rural areas and towns of less than 20,000 people. Construct, enlarge, or improve community facilities for health care, public safety, and public service.

6. - USDA - Natural Resources Conservation Service[7]

Wetlands Reserve Program - This program offers landowners the opportunity to receive payments for restoring and protecting wetlands on their property. Landowners are provided cost-share funds to restore wetlands.

Wildlife Habitat Incentives Program – This program is a voluntary program for people who want to develop and improve wildlife habitat primarily on private lands. It provides both technical assistance and cost-share payments to help establish and improve fish and wildlife habitat.

7. - U.S. Small Business Administration[8]

Loan Program - Through its Office of Disaster Assistance (ODA), the SBA is responsible for providing affordable, timely and accessible financial assistance to homeowners, renters and businesses following a disaster. Financial assistance is available in the form of low-interest, long-term loans.

SBA's disaster loans are the primary form of federal assistance for the repair and rebuilding of non-farm, private sector disaster losses. For this reason, the disaster loan program is the only form of SBA assistance not limited to small businesses.

Other agencies to contact regarding possible grants to help implement hazard mitigation plans are the Bureau of Indian Affairs, Department of Homeland Security, U.S. Fire Administration, and the Indian Health Service.

Federal agencies are not the only sources for funds. The states of Oregon and Washington and other nongovernmental organizations may also be able to assist in the implementation of hazard mitigation measures by providing technical assistance, grants or additional resources. It may be possible to add a mitigation component to specific projects or complete a grant project the also proves to help reduce the impacts from the identified hazards even if that is not the project's main objective.

[1] December 31, 2014 year end Schedule of Expenditures of Federal and Nonfederal Awards provided by CTUIR Finance Department
[2] http://www.fema.gov/plan/mitplanning/#3
[3] Ibid
[4] http://www.infrafunding.wa.gov/
[5] Ibid
[6] Ibid
[7] Ibid
[8] http://www.sba.gov/services/disasterassistance/basics/index.html

This page intentionally blank

Section 8 – Monitoring, Review and Evaluation

Effective planning does not stop with the creation and adoption of an initial plan. Successful plans are monitored, reviewed, and re-evaluated periodically by policy and decision-makers to be sure they continue to provide the guidance envisioned when the plan was created. The following plan maintenance process provides that the UIR Hazard Mitigation Plan will continue to effectively reduce the risks associated with potential natural and man-made hazards.

1. - Plan Maintenance Process

The plan maintenance process involves the monitoring, reviewing and evaluating the UIR Hazard Mitigation Plan by the CTUIR Public Safety Director with the CTUIR Law and Order Committee. The Law and Order Committee members are appointed by the Board of Trustees and act in an advisory capacity for the Board.

Monitoring the plan will allow the CTUIR to assess the progress made in implementing the plan's mitigation measures and fulfilling grant funding obligations through review of grant "closeouts." Periodic reviews of the plan will allow the CTUIR to make "mid-course" corrections to the plan and consider additional funding opportunities. Evaluation of the plan provides the opportunity to: (1) incorporate new information and updated scientific data about hazards that can affect the Reservation; (2) coordinate mitigation efforts with local, state and federal agencies as well as internal CTUIR Departments/Programs; (3) modify the plan's goals; and (4) devise new hazard mitigation measures that more effectively address the identified risks.

The CTUIR Public Safety Director is the contact for any agency or individual seeking hazard mitigation assistance. The Law and Order Committee will review the UIR Hazard Mitigation Plan at least annually or at a meeting as initiated by the Public Safety Director as necessary to provide oversight and review if any amendments, technical review of grant applications and to monitor grant "closeouts."

As part of the Federal Emergency Management Agency (FEMA) hazard mitigation planning process, FEMA expects plans to be monitored, evaluated and re-submitted to FEMA for review and approval. Updates or amendments to this Plan must be submitted to FEMA for review and approval. This entire Plan must be updated and reapproved **within 5 years** from the plan's original adoption date. The tasks involved in the UIR Hazard Mitigation Plan's plan maintenance process and those responsible for conducting the various tasks are described below.

2. - Department of Public Safety Responsibilities

The CTUIR Department of Public Safety Director is responsible for monitoring the grant processes of FEMA and other funding sources and directing the CTUIR effort to secure funds for implementing the plan's mitigation measures. The Public Safety Director will contact those responsible for administering hazard mitigation grants and will monitor the progress of all hazard mitigation projects and grant closeout requirements. The Director will report on the progress of implementing mitigation projects on a regular basis to the Law and Order Committee. The Director will schedule with the Law and Order Committee for the Plan's annual review to occur in August of each year. The Director will schedule the plan's "evaluation" at least six months before the fifth anniversary of the FEMA approved plan's date of adoption by the Board of Trustees. This schedule should give the CTUIR time to make changes to the plan in order to maintain FEMA program eligibility pursuant to 44 CFR, Part 201.7.

Citizen Involvement

Citizen involvement will be continued during the plan update and evaluation process. The CTUIR Department of Public Safety Director is responsible for continuing the ongoing citizen involvement process by providing opportunities for citizens living and working on the Reservation to be involved in plan updates and the evaluation of the UIR Hazard Mitigation Plan. The Director will inform citizens about hazard mitigation activities by: (1) coordinating with other CTUIR departments and commissions; (2) preparing articles for publication in the Confederated Umatilla Journal that inform citizens about upcoming meetings where the hazard mitigation plan will be reviewed or evaluated; and (3) updating information about the UIR Hazard Mitigation Plan on the Public Safety Department section of the CTUIR website so interested citizens can be informed about changes made to the plan.

During the "evaluation" of the UIR Hazard Mitigation Plan, the Director in conjunction with the Law and Order Committee will advise the General Council and the Board of Trustees about any proposed changes to the plan and the overall status of the evaluation. The Director may hold one or more "open houses" to: (1) obtain additional input from those living and working on the Reservation regarding the effectiveness of the plan; (2) receive suggestions for amending the plan; and (3) receive proposed mitigation measures.

3. - The Public Safety Director Responsibilities

The Public Safety Director and Law and Order Committee provides oversight for the purpose of monitoring, reviewing and evaluating all activities associated with the UIR Hazard Mitigation Plan. The Law and Order Committee will be able to provide input at meetings initiated by the Director as necessary throughout the calendar year and will conduct an annual review of the plan every August in time to be eligible for new grant programs that become available during the new fiscal year. The Law and Order Committee will be the lead committee during the plan's evaluation which is to occur several months before the plan must be re-submitted to FEMA for their review and approval.

Evaluation

The evaluation process for this plan provides an opportunity to determine the success of the CTUIR hazard mitigation planning effort. During the evaluation, the Public Safety Director prepares a written review of proposed updates to the Law and Order Committee for review. The Committee then makes a recommendation to the Board of Trustees before its re-submittal to FEMA and re-adoption by the Board of Trustees.

Evaluating the plan requires the Public Safety Director to address the standards established by FEMA for updating Tribal hazard mitigation plans. As part of the evaluation, the Director will review new studies and information regarding hazardous events since the plan was adopted. This review should include information about damage to Reservation assets associated with hazardous events. The Director may consider amendments to the plan's goals and may devise new hazard mitigation measures to address specific issues raised during the evaluation. The Public Safety Director will be responsible for prioritizing the hazard mitigation measures before submitting them to the Law and Order Committee and Board of Trustees for their consideration.

The following questions[i] are for use in evaluating the UIR Hazard Mitigation Plan. Answers to these questions will help the Public Safety Director identify the initial hazard mitigation plan's strengths and weakness and help in focusing on the portions of the plan needing to be amended.

Citizen Involvement

Has an article been printed in the Confederated Umatilla Journal describing the plan evaluation process for the UIR Hazard Mitigation Plan?

Does the article invite citizens to participate in the UIR Hazard Mitigation Plan evaluation process?

Has the CTUIR website been updated to indicate that the Director is preparing to evaluate the UIR Hazard Mitigation Plan and that citizens are invited to participate in either of these processes?

Has the General Council been notified that the UIR Hazard Mitigation Plan will be evaluated by the Public Safety Director and that citizens are welcome to participate in the review and evaluation of the UIR Hazard Mitigation Plan?

Coordination

Have the applicable local, state and federal agencies been invited to participate in the evaluation of the Umatilla Indian Reservation Hazard Mitigation Plan?

Are there other jurisdictions, agencies, and interested persons that should be invited to participate in the hazard mitigation plan's evaluation?

Have the Oregon State Hazard Mitigation Plan or the Umatilla County Hazard Mitigation Plan been amended since the UIR Hazard Mitigation Plan was adopted? If yes, how do those amendments affect the UIR Hazard Mitigation Plan?

Pre-Evaluation Information Update

Have the Federal Emergency Management Agency's hazard mitigation planning requirements changed since the UIR Hazard Mitigation Plan's adoption?

Have any laws changed that would affect the hazard mitigation plan, goals and mitigation projects?

Are there new local, regional, state or federal policies addressing natural hazards that should be addressed?

Risk Assessment

Have new issues or hazard-related problems been identified that would cause the hazard mitigation plan's risk assessment (Section 3) to be revised?

Have there been any changes in development patterns that could influence the effects of hazards?

Are there new studies or data available that would enhance the risk assessment?

Has the community been affected by any disasters since the plan was adopted?

If yes, did the hazard mitigation plan accurately anticipate the impacts from this event?

Is information available to update the vulnerability of **existing** types and numbers of buildings, infrastructure, and critical facilities located in identified hazard areas?

Is information available to update the vulnerability of **future** types and numbers of buildings, infrastructure, and critical facilities located in identified hazard areas?

Is information available to estimate potential dollar losses in structures and infrastructure that are vulnerable to identified hazards?

Can it be determined (in estimated dollars saved) whether implemented mitigation measures have reduced possible damage from hazardous events?

Goal and Mitigation Measure Implementation

Are the goals of the plan being achieved through successful mitigation measure implementation?

Is each of the hazard mitigation plan's goals still relevant and consistent with the policies of the CTUIR?

Do the hazard mitigation plan's goals provide adequate guidance for future actions?

How many of the mitigation measures have been implemented since the plan was adopted?

Have implemented mitigation measures achieved the desired results?

How many of the mitigation measures have been implemented through other tribal commissions or programs?

How successful have the implemented mitigation measures been at preventing disasters? -at minimizing disaster-related damage?

Are there any Tribal programs or practices that have hindered or limited the effective mitigation of hazards?

Are the existing mitigation measures still appropriate, given current resources and changes made to the risk assessment?

Do any of the remaining mitigation measures need to be reprioritized?

Grant Administration

How many mitigation measures were funded through federal grants or other grant sources?

Was the grant closeout process successfully completed for each grant?

Responses to these questions will help the Public Safety Director, Planning staff and the Law and Order Committee determine which components of the hazard mitigation plan need updating and will help identify the adequacy of citizen and agency involvement in the evaluation process. The Public Safety Director and Planning staff will be responsible for updating any deficiencies found in the plan based on the evaluation and input from the Law and Order Committee.

4. - Plan Maintenance Schedule

Plan Monitoring – The Law and Order Committee will meet as initiated by the Public Safety Director to address any proposed amendments but at least once a year. Since the Law and Order Committee is not a technical advisory committee, the Public Safety Director may reconvene the Hazard Mitigation steering Committee, consisting of members representing various local jurisdictions, federal and state agencies, to coordinate and review proposed amendments. This annual process provides not only an opportunity to monitor progress made in implementing the UIR Plan's mitigation measures and to review hazard mitigation planning grants but to coordinate mitigation measures with other hazard planning entities in the region.

Plan Review - The Law and Order Committee will conduct a review annually in August to: (1) review progress toward implementing mitigation measures and achieving the plan's goals; (2) determine whether new opportunities exist to join with other federal, state, local or other tribal agencies in implementing mitigation measures; (3) develop new or revise existing mitigation measures; as necessary; and (4) review funding programs and possible grant applications that could be used to fund hazard mitigation measures. Periodic reviews of the UIR Hazard Mitigation Plan will allow the CTUIR to make any "mid-course" corrections to the plan.

Through the plan review process, the Public Safety Director, may find it necessary to request amendments to CTUIR Statutes or other CTUIR functional plans to implement mitigation measures from the UIR Hazard Mitigation Plan. The CTUIR government contains several departments within its organizational structure that are responsible for administering Statutes and plans respective to their purpose.

Corrections or amendments to this plan shall be reviewed by the Law and Order Committee for a recommendation to the Board of Trustees. The Board of Trustees is the formal

decision making body to approve any corrections or amendments to this plan. Should the Law and Order Committee recommend amendments to any CTUIR Statute to implement this plan, application shall be made to the appropriate Department or Commission that administers that Statute. For example, proposed changes to policies identified in the CTUIR Comprehensive Plan or to provisions of the Tribal Planning Office Land Development Code, the Public Safety Director shall submit an amendment application to the Tribal Planning Office or request the Tribal Planning Office to initiate the amendment. Comprehensive plan or Land Development Code amendments shall follow the process as prescribed in the UIR Land Development Code Chapter 9 which includes a public hearing before the Natural Resources Commission and final approval by the Board of Trustees.

Plan Evaluation – The Law and Order Committee will begin the UIR Hazard Mitigation Plan evaluation process at least 6 months before the plan is five-years old from the original adoption date.

[1] Many of these questions were adapted from questions created by the University of Oregon's Hazard Mitigation Workgroup for use in the 2008 UIR Hazard Mitigation Plan

APPENDIX A

CTUIR BOARD OF TRUSTEES ADOPTION RESOLUTION

(to be included here upon preliminary FEMA approval)

APPENDIX B

PUBLIC INVOLVEMENT

RETURN SURVEY TO: Tribal Planning Office, 46411 Timíne Way, Pendleton, OR 97801
Attn: Patty Perry

Disaster Prevention Survey

The CTUIR Tribal Planning Office, in conjunction with the Public Safety Department, is preparing a plan that tries to anticipate damage from possible natural and man-made hazards, and then, identifies activities or projects that will prevent or reduce damage and make the Reservation more disaster resistant. Once completed, this Hazard Mitigation Plan will make the Tribe eligible for federal grants through the Federal Emergency Management Agency (FEMA). **WE NEED YOUR HELP!**

Please help us make the Reservation a safer place to live by providing your input.
The purpose of this survey is two-fold:

1) To identify places on or near the Reservation that if damaged or destroyed would be detrimental to the Tribe's economy, culture, environmental well-being, health, safety and welfare.
2) To determine which hazardous events present the greatest threat to the Reservation.
Information from this survey will help in preparing protection strategies and specific hazard mitigation measures where they will do the most good.

1. The following places have been identified as important to the Reservation's economy, culture, environment, health, safety and welfare. Are there <u>other</u> important assets within the reservation that should be added to this list?

Human Population Centers and Gathering Places
- Tourist Facilities [Wildhorse Resort & Casino, hotel, RV park, golf course, etc]
- Elizabethan Manor [adult care facility]
- Mission residential areas
- Community School, preschool and daycare
- Yellowhawk Tribal Health Clinic

Cultural & Historic Resources
- Tamastslikt Cultural Institute
- St. Andrews Mission
- Indian Cemeteries (4) [1 is off the Reservation near McKay Reservoir]
- Veterans Memorial
- Longhouse
- First Foods
- Celilo & Cascade Locks in-lieu fishing sites off reservation
- Frenchtown Historical Site [State of Washington]

Environmental Assets
- Golf course
- Fish facilities
- Wetlands
- Wanaket Wildlife Refuge
- Rainwater Wildlife Refuge [State of Washington]
- Indian Lake

Economic Assets
- Coyote Business Park
- Wildhorse Resort & Casino
- Grain Elevator
- Mission Market
- Tribal Government Offices
- Arrowhead Travel Plaza
- Mid Columbia Bus Company
- Wanapa [off-Reservation Industrial Park]

Infrastructure & Critical Facilities
- Government Complex, including police and fire stations
- Yellowhawk Tribal Health Clinic
- Arrowhead Travel Plaza [for fuel supply]
- Bureau of Indian Affairs office building
- Senior Center
- Mission Seventh-day Adventist School
- Main transportation corridors [I-84, railroad, State Hwy 331]
- Community water system wells and lines
- Sewer lines
- Gas transmission pipelines
- Electrical transmission lines and substations

RETURN SURVEY TO: Tribal Planning Office, 46411 Timíne Way, Pendleton, OR 97801
Attn: Patty Perry

Please list any places, buildings, facilities, and other cultural or environmental assets that you believe should be added to this list:

_____ _____

_____ _____

_____ _____

2. Which of the following hazardous events have you known to have caused severe injuries or damage to property on the reservation? (circle one or more)

Flooding	Wildfires	Winter Storms	Earthquake
Drought	Landslides	High Winds	Fog
Hazardous Material Spill	Hail/Tornadoes Lightning/Dust Storms	Severe Cold	Severe Heat
		Railroad Accident	Freeway-Highway Accident

Other types of hazardous events not listed (please identify):

_____ About when did it occur? _____

_____ About when did it occur? _____

3. Which of the following hazards do you believe presents the greatest threat to Reservation citizens, properties and the local economy? (Identify the top five beginning with the number 1 as the greatest threat, 2 the second greatest and so on)

Flooding ___	Wildfires ___	Winter Storms ___	Earthquake ___
Drought ___	Landslides ___	High Winds ___	Fog ___
Accidental Hazardous Material Spill ___	Hail/Tornado/ Dust Storms ___	Central Oregon Volcanic Eruption ___	Biological ___ Epidemic (example- Bird Flu)
Severe Cold ___	Severe Heat ___		

Other types of hazardous events not listed (please identify):

_____ The threat ranking ____

_____ The threat ranking ____

Any additional comments:

_____

_____

If you would like to discuss this survey further or have additional questions please contact Patty Perry in the Tribal Planning Office at 541-429-7518.

Thank you very much for your participation.

Confederated Tribes *of the*
Umatilla Indian Reservation
Tribal Planning Office

Zoning, Development Permits
Environmental Health & Public Transit

46411 Timíne Way
Pendleton, OR 97801

www.ctuir.org
Phone 541-276-3099
email: info@ctuir.org
Fax: 541-276-3099

Planning Forum Scheduled for September 15 – 18

The Tribal Planning Office will be hosting an informational Forum about updates to several plans -

- The Mission Community Plan
- The Comprehensive Plan
- The Hazard Mitigation Plan
- Incorporation of First Foods protection into the zoning code
- Environmental Health & safety Code updates

Come learn about these plans and how you can become involved. We'll also be demonstrating some new applications for involvement and have a few activities that expand our thinking about the future of the Reservation. Find us at the Governance Center during the following times:

Information and Activities

- Monday, September 15 10:00 AM – 4:00PM - Umatilla Conference Room 102
- Tuesday, September 16 10:00 AM – 4:00 - PM – Waluula Conference Room 202

Informational Table

- Wednesday, September 17 – Lobby
- Thursday, September 18 – Lobby

Planning staff will also be able to answer questions about other functions of the Tribal Planning Office, such as Kayak Public Transit, zoning and land use permitting as well as Environmental Health and Safety.

Please call the Tribal Planning Office at (541) 429-7519 if you have questions about the upcoming Forum, or the plan updates that are in process.

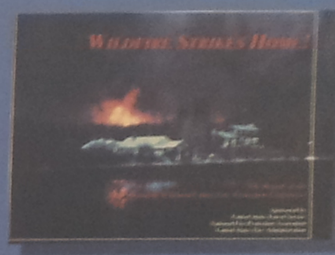
Hazard Mitigation Plan

What is the Hazard Mitigation Plan?

This plan is intended to make the Umatilla Indian Reservation more resistant to natural and man-made hazards and more resilient in recovering from the effects of natural or man-made disasters.

What is in the Hazard Mitigation Plan?

1. CTUIR Social and Physical Profile
2. Hazards Identification and Risk Assessment
3. Projected Impacts
4. Mitigation Measure Goals
5. Mitigation Measure Implementation
6. Existing Policies
7. Coordination with Neighbors
8. Funding and Grant Seeking
9. Monitoring
10. Cultural Resources



How does it function?

The Plan identifies potential disasters that could affect the CTUIR, the level of their threats, and options for mitigating or heading off those disasters.

This plan is what we as a tribe can do BEFORE a disaster while the Emergency Response Manual outlines what we do AFTER a disaster happens.

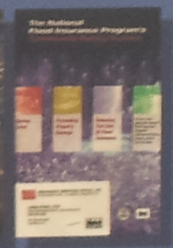
The plan is required by FEMA to be eligible for disaster relief and for grants to support mitigation.

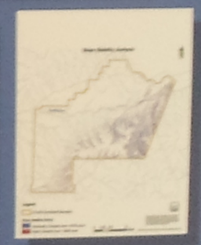
The Plan is updated every 5 years (2015, 2020, etc.)

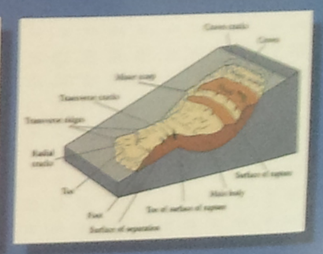
Hazards:

Natural Hazards
- Flood
- Wildfires
- Wind
- Dust Storms
- Severe Winter Storm
- Spring/Summer Storms
- Drought
- Fog
- Earthquakes
- Volcanic Events
- Landslides
- Extreme Heat
- Disease Outbreak

Man-made Hazards
- Hazardous Material Spill
- Natural Gas Pipeline Break
- Dam Failure
- Terrorism

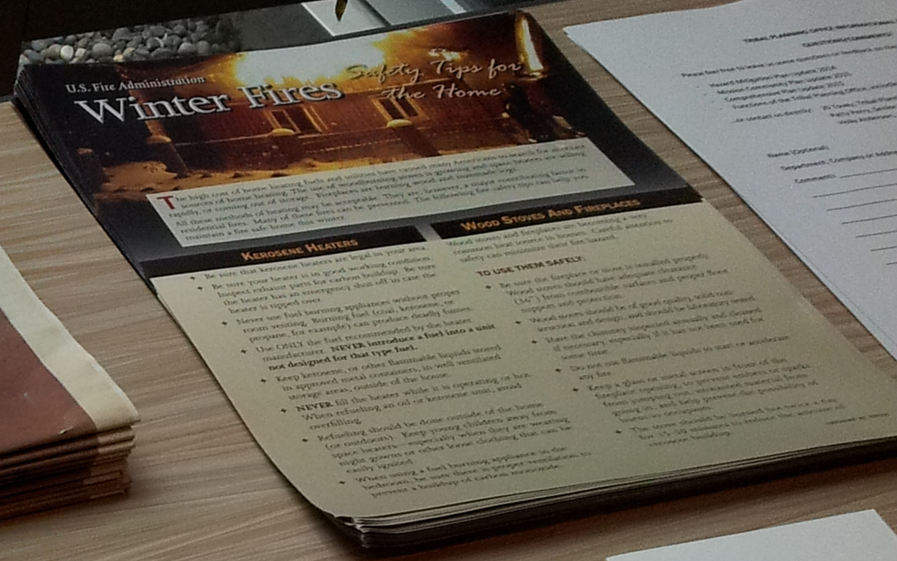






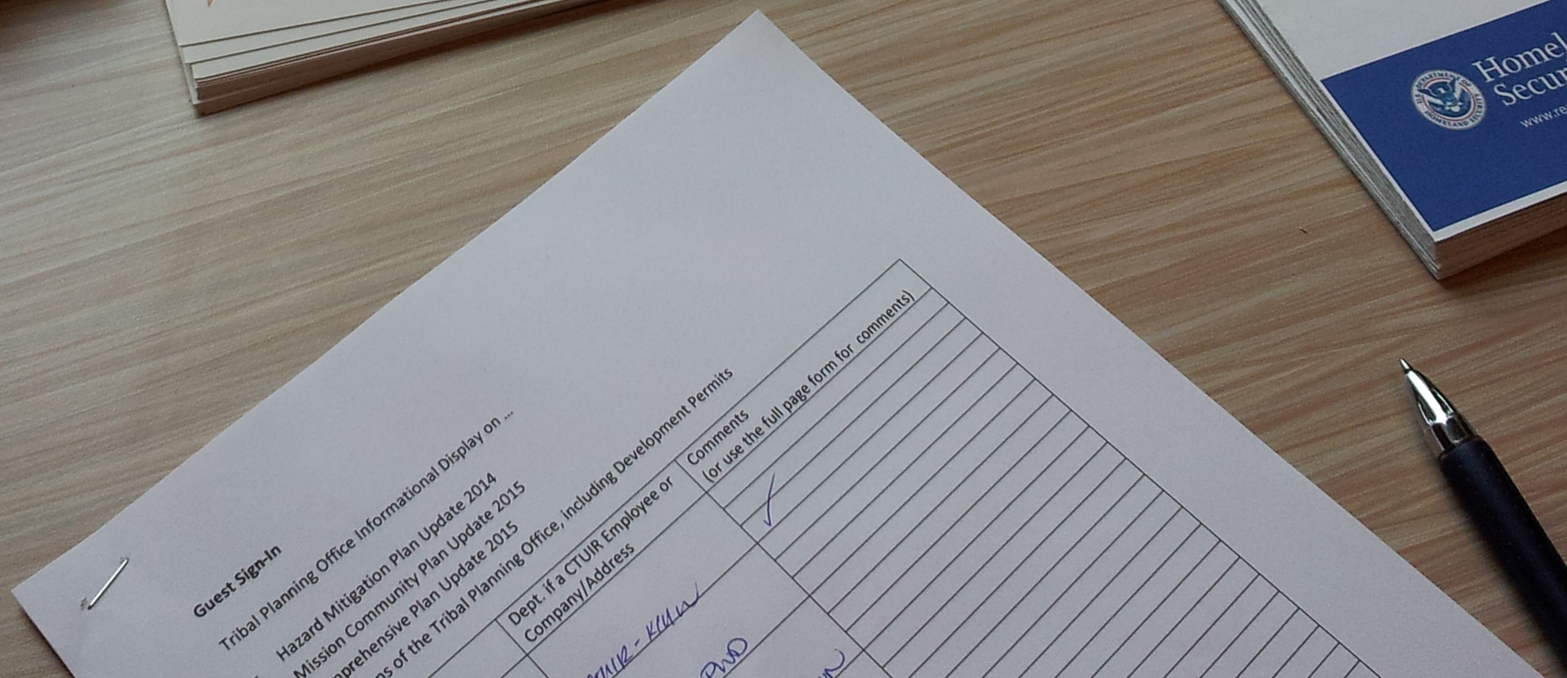
Treaty of 1855


LIVING WITH FIRE
A GUIDE FOR THE HOMEOWNER


U.S. Fire Administration
Winter Fires
Safety Tips for the Home
Kerosene Heaters
Wood Stoves And Fireplaces
To Use Them Safely:


Did you know?
Smoking is a leading cause of fire deaths, even though 83% of Oregon adults do not smoke.
72% of cigarette fires on home properties started outside.
One out of every five cigarette fire deaths involves smoking while using medical oxygen.
It takes only one cigarette discarded in landscaping or potted plants to start a fire.
SMOKE FREE FIRE SAFE


Preparing Makes Sense. Get Ready Now.
Homeland Security
www.ready.gov


Guest Sign-In
Tribal Planning Office Informational Display on ...
- Hazard Mitigation Plan Update 2014
- Mission Community Plan Update 2014
Comprehensive Plan Update 2015
nctions of the Tribal Planning Office, including Development Permits
Dept. if a CTUIR Employee or Company/Address
Comments (or use the full page form for comments)

Hazard Mitigation Plan

What is the Hazard Mitigation Plan?

This plan is intended to make the Umatilla Indian Reservation more resistant to natural and man-made hazards and more resilient in recovering from the effects of natural or man-made disasters.

How does it function?

The Plan identifies potential disasters that could affect the CTUIR, the level of their threats, and options for mitigating or heading off those disasters.

This plan is what we as a tribe can do BEFORE a disaster while the Emergency Response Manual outlines what we do AFTER a disaster happens.

The plan is required by FEMA to be eligible for disaster relief and for grants to support mitigation.

The Plan is updated every 5 years (2015, 2020, etc.)

What is in the Hazard Mitigation Plan?

1. CTUIR Social and Physical Profile
2. Hazards Identification and Risk Assessment
3. Projected Impacts
4. Mitigation Measure Goals
5. Mitigation Measure Implementation
6. Existing Policies
7. Coordination with Neighbors
8. Funding and Grant Seeking
9. Monitoring
10. Cultural Resources

Hazards:

Natural Hazards
- Flood
- Wildfires
- Wind
- Dust Storms
- Severe Winter Storm
- Spring/Summer Storms
- Drought
- Fog
- Earthquakes
- Volcanic Events
- Landslides
- Extreme Heat
- Disease Outbreak

Man-made Hazards
- Hazardous Material Spill
- Natural Gas Pipeline Break
- Dam Failure
- Terrorism

The Tribal Planning Office

Treaty of 1855

The Tribal Planning Office

What is Planning?

Planning: def. Planning guides and ensures the orderly development of settlements including infrastructure, transportation, housing, business development, and considers environmental factors such as air water and land; ultimately for better human physical and mental health. As a profession it concerns itself with research, analysis, strategic thinking, architecture, urban design, public consultation, policy recommendation implementation and project management.

Who's in the office:

J.D. Tovey
Planning Director

Susan Johnson
Office Manager

Patty Perry, AICP
Senior Planner

Jeanine Gordon
Transit Manager

Building Inspector
Vacant

Byron Morris
Environmental Health & Safety Technician

Holly Anderson
Associate Planner

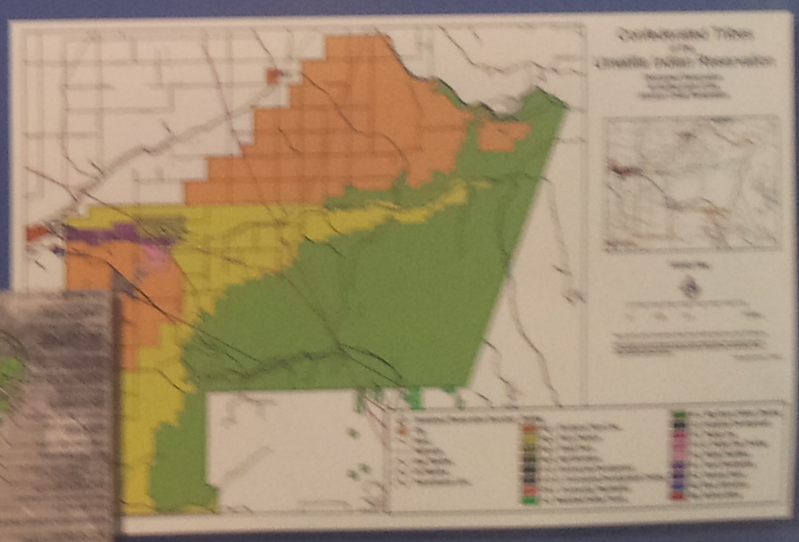
Rob Johnson
Transit Facility Manager

Chelsey Dick
Transit Clerk

Associate Planner
vacant

What we do:

Comprehensive Plan monitoring
Land Development Code
Zoning and Land Use
Building permits
Kitchen Inspections
Occupancy permits
Septic Tank inspections
Coordinate water connections
Assist other departments in planning
Staff the Natural Resources Commission
Provide counsel and findings to BOT
Staff the Capital Improvements Team
Numerous internal staff committees
Manage public transit system
Identify and pursue grants and other funding that support CTUIR goals.



Treaty of 1855

The Tribal Planning Office

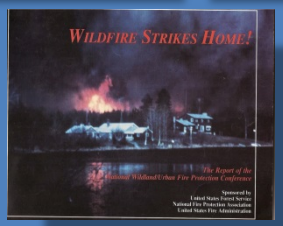
Hazard Mitigation Plan

What is the Hazard Mitigation Plan?

This plan is intended to make the Umatilla Indian Reservation more resistant to natural and man-made hazards and more resilient in recovering from the effects of natural or man-made disasters.

What is in the Hazard Mitigation Plan?

1. CTUIR Social and Physical Profile
2. Hazards Identified and Risk Assessment
3. Projected Impacts
4. Mitigation Measure Goals
5. Mitigation Measure Implementation
6. Existing Policies
7. Coordination with Neighbors
8. Funding and Grant Seeking
9. Monitoring
10. Cultural Resources



How does it function?

The Plan identifies potential disasters that could affect the CTUIR, the level of their threats, and options for mitigating or heading off those disasters.

This plan is what we as a tribe can do BEFORE a disaster where the Emergency Response Manual outlines what we do AFTER a disaster happens.

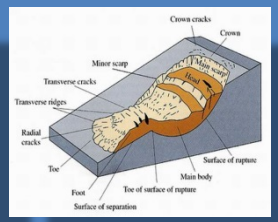
The plan is required by FEMA to be eligeble for disaster relief and for grants to support mitigation.

The Plan is updated every 5 years (2015, 2020, etc.)

Hazards:

Natural Hazards
Flood
Wildfires
Wind
Dust Storms
Severe Winter Storm
Spring/Summer Storms
Drought
Fog
Earthquakes
Volcanic Events
Landslides
Extreme Heat
Disease Outbreak

Man-made Hazards
Hazardous Material Spill
Natural Gas Pipeline Break
Dam Failure
Terrorism



Treaty of 1855

The Tribal Planning Office

Sign-In Sheet Sept 15

Planning Forum

Toni Cordell - Wildhorse 541-966-1986
Tom Hebert - CTUIR
377-1518
Bill Tovey. CTUIR ~~DOGAMI~~ DEQ
Dave Tovey - CTUIR Admin
Frank Anderson - CTUIR Public Works
Lloyd Barclay -
- DNR
Eric Quaempts - DNR
Andre Huber - DNR
Kate Ely - DNR-WRP

Tuesday, Sept 16

Planning Forum

Name	Department/Affiliation
Jami Rochelle	DECD
Koko Hufford	DECD
Rachel Matamoros	DECD
Leigh Pinkham Johnston	DECD
Andrea Hall	DECD
Ryan DeGroff	DECD
CLARISSA ALEXANDER	
Daisy Minthorn	DECD
Carl Merkle	DNR

Confederated Tribes of the Umatilla Indian Reservation

46411 Timine Way
Pendleton, OR 97801

DEPT. OF PUBLIC SAFETY

Phone/Fax: 541-429-7606

To: Michael Jackson, BIA Superintendent

From: Ray Denny, Public Safety Director

CC: Patty Perry, CTUIR Senior Planner

Date: 11/19/2015

Re: 2014 Five Year Review of CTUIR Natural Hazard Mitigation Plan

CTUIR Public Safety will begin updating the Umatilla Indian Reservation Natural Hazard Mitigation Plan this fall 2014. This letter is an invitation to BIA to participate for the working group.

The Umatilla Indian Reservation Hazard Mitigation Plan is a document intended to make the Umatilla Indian Reservation more resistant to natural and man-made hazards and more resilient in recovering from the effects of natural or man-made disasters. The review will include updating the list of pre-disaster mitigation projects that the CTUIR could apply to FEMA for cost share funding.

The CTUIR is required by Federal Emergency Management Agency (FEMA) to review and update the Natural Hazard Mitigation Plan every five years. The plan has to be updated to FEMA standards in order to participate in FEMA hazard mitigation programs.

Meetings will be held 1-2 times per month at the Public Safety Building. At the meetings the working group will review each section of the plan and determine if the information is still current or if it needs updated.

Thank you for your time and consideration of this request. I am scheduling the first kick off meeting on August 28, 1:00 at the CTUIR Public Safety Building. If you have more questions regarding the process please contact me.

Ray Denny

429-7606

August 28, 2014 – CTUIR Hazard Mitigation Plan – Kick-off meeting

AGENDA: 1:00p.m. CTUIR Public Safety Building

1. Introductions/meeting sign-in (round table) – Ray Denny
   (Handouts: Agenda, copies of 2008 Plan, summary of required content)

2. CTUIR Hazard Mitigation Planning Background – Patty Perry

3. Plan Development Process/Schedule – Handout

4. Comments from attendees on Process and Schedule

5. Next meeting and assignments – September 15, 2014 1:00p.m. proposed

   A Planning public forum is to be held Sept. 15 and 16 in NGC. The forum is to provide information on the Hazard Mitigation Plan and update process, contact information and requesting public input regarding community hazards. Suggestions for materials or content for Haz. Mit. would be welcomed.

August 28, 2014 HAZARD MITIGATION PLAN AGENDA TALKING POINTS

1. Ray : Meeting invitation letters were initiated by Ray so Ray to open the meeting to do round table introductions then introduces Patty as Plan development lead. Please indicate on the Sign-in Sheet whether you or your agency wants to be on the steering committee providing input on the Plan development.

   Patty: Hand out copies of 2008 Plan and current Crosswalk

2. Patty: CTUIR Hazard Mitigation Planning Background

   In 2007, the CTUIR Public Safety Department was awarded a planning grant from FEMA to develop a Hazard Mitigation Plan. The Plan was developed under the oversight of the CTUIR Emergency Management Coordinator and Tribal Emergency Response Committee (TERC, a CTUIR staff committee) by contracted consultants. The Plan was adopted by the Board of Trustees in November 2008 and approved by FEMA in February 2009; effective for five years and is now expired. Utilizing some of the background work from the previous plan, we will be developing another plan that will contain elements that meet current FEMA requirements for approval and will benefit the CTUIR by making the Reservation hazard resistant. Having this approved Plan is necessary for the CTUIR to obtain federal disaster assistance and grant funding for pre-disaster mitigation projects. The Plan is also intended to satisfy the National Flood Insurance Program requirement as our Flood Hazard Mitigation Plan. After reviewing the Plan, there are some sections where assistance from agencies to update data may be needed:

   Section 3.2 – Wildfire data (ODF, BIA, USFS, DNR, UTFD)

   Section 3.3 – Severe weather data (Weather Service)

   Section 3.13 – Epidemiological (YTHC) Plan adopted after 2008?

   Section 3.14 – State/Fed Hwy stats (ODOT)

   *Since 2008 the CTUIR has adopted new plans (*NFIP, 2010 Comprehensive Plan, etc.) *that need to be incorporated into the new Haz. Mit. Plan. Please review*

the 2008 plan for your respective areas of expertise and provide Patty with copies of any new plans or updated data that you can provide or bring to the next meeting.

Hand out Plan Development Process

3. Patty: Plan Development Process/Schedule

All stakeholders, CTUIR staff and representatives from applicable Tribal member committees and commissions were invited to this kick-off meeting. Is there anyone that should have been invited but isn't listed on the sign-in sheet?

As we move forward with this effort, invitees willing to be on the steering committee will continue to attend meetings as necessary and to provide input either from a Tribal/cultural perspective or from a technical perspective as the Planning process advances.

There will be two public meetings, one during the drafting stage and one after the plan is developed but prior to adoption. I will be coordinating and documenting the public meetings and TAC/Steering Committee meetings, putting the Plan together by pooling comments and data and coordinating with FEMA to ensure the Plan meet Federal requirements. The goal is to complete the Plan and the adoption process by the end of 2014.

4. Patty: Comments from attendees on Process and Schedule

5. Patty: Next meeting announcement and Planning forum announcement.

September 15th – Next meeting

September 15th – 16th Planning Forum at NGC

Confederated Tribes *of the*
Umatilla Indian Reservation

46411 Timíne Way
Pendleton, OR 97801

www.ctuir.org
Phone 541-276-3099

email: info@ctuir.org
Fax: 541-276-3099

HAZARD MITIGATION PLAN SIGN-IN SHEET

AUGUST 28, 2014

Attendees/Agency/Dept./ Comm. or Commission	Signature (legible)	EMAIL ADDRESS	Do you want to be on the steering committee? Yes/No
CTUIR – Planning Office		jdtovey@CTUIR.ORG	
CTUIR – Public Works		frankanderson@ctuir.org	
CTUIR – Natural Resources		audie huber@CTUIR.org	
CTUIR – DOSE		PatrickMills@ctuir.org	No
Yellowhawk	Eric G	ericgabriel@yellowhawk.org	Yes
Cultural Resources Comm.			
Natural Resources Comm.	Gerald Reed (see others below)		
Science & Tech. Comm.			
Fish & Wildlife Comm.			
Tribal Water Comm.	Mitchell L. Pond	ollokut2005@yahoo.com	Yes
Law & Order Comm.			
Tiicham Cons. Dist.			
CTUIR General Council			
ODOT			
BIA-Superintendent			
City of Pendleton			
FEMA - Mitigation			
NOAA – Weather Service			
NRCS	Terry Johnson	terry.johnson@or.usda.gov	Yes
OR Dept. of Forestry			
US Corps of Engineers	Les Miller	d.les.miller@usace.army.mil	Yes
US Forest Service			
Umatilla County	Jack Remillard	jackremillard@umatillacounty.NET	
Others:	Gerald Reed	ofgwreed@gmail.com	
CTUIR Public Safety – Ray Denny			
CTUIR Planning – Holly Anderson / Patty Perry			

CTUIR Hazard Mitigation Plan – August 28, 2014

MEETING SUMMARY:

Attendance: see attached sign-in sheet

AGENDA:

1. Introductions – Ray Denny

   Round table introductions of all present, handouts were distributed and copies of the 2008 HMP were made available. Ray introduced Patty Perry, Senior Planner with Tribal Planning Office as lead coordinator for the development of the new plan.

2. CTUIR Hazard Mitigation Plan background – Patty Perry

   Patty provided a summary of how the 2008 Plan was developed:

   In 2007, the CTUIR Public Safety Department was awarded a planning grant from FEMA to develop a Hazard Mitigation Plan. The Plan was developed by consultants under the oversight of the previous CTUIR Emergency Management Coordinator and a CTUIR staff committee, the Tribal Emergency Response Committee (TERC). The Plan was adopted by the Board of Trustees in November 2008 and approved by FEMA in February 2009; it was effective for five years and is now expired. Utilizing some of the background work from the previous plan, we will be developing another plan that will meet current FEMA requirements and will benefit the CTUIR by making the Reservation hazard resistant. Having this approved Plan is necessary for the CTUIR to obtain Federal disaster assistance and grant funding for pre-disaster mitigation projects. The Plan is also intended to satisfy the National Flood Insurance Program requirement as our Flood Hazard Mitigation Plan.

   Since the 2008 Plan, the CTUIR has adopted other functional plans that will need to be incorporated into the new Plan.

3. Plan Development Process/Schedule

   Patty noted that all stakeholders, applicable CTUIR staff and Tribal committee/ commission representatives were invited to send a representative to be on this Steering Committee. She requested attendees identify if there is an agency or someone that isn't on the sign in list that needs to be invited. She outlined responsibilities of the Steering Committee- attend meetings and review draft documents to provide input

from either a Tribal/cultural perspective or from a technical perspective as the Planning process progresses.

Patty outlined the Plan Development Process from the handout presented and asked attendees for comments.

4. Comments from attendees:

- A question about how this plan fits in with the Emergency Operations Plan was answered by Ray Denny who responded that the EOP is for when an emergency/disaster is happening and the Mitigation Plan is a pre-emergency/disaster plan used to lessen or prevent disasters and to identify projects. Projects identified in the HMP are eligible for grant funds.
- The Plan needs to make sure Treaty rights are sustained.
- Les Miller, USACOE, suggested a Flood Fight Training event for the community and brought up various mitigation considerations; protecting the gathering places (schools, longhouse, Casino, etc.), grazing and forestry practices that retain water, USDA Conservation Stewardship Program.

September 15, 2014 – CTUIR Hazard Mitigation Plan

Steering Committee

AGENDA: 1:00p.m. CTUIR Public Safety Building

1. Review Draft Section 1
2. Review Draft Section 2 – collection of data contributions from committee
3. Comments from committee on Process and Schedule
4. Disaster Prevention survey
5. Next meeting– October 13, 2014 1:00p.m. proposed

A Planning public forum is to be held Sept. 15 and 16 in NGC from 10-4. The forum is to provide information on the Hazard Mitigation Plan and update process, contact information and requesting public input regarding community hazards (survey).

Patty Perry contact info: (541) 429-7518; pattyperry@ctuir.org

Confederated Tribes *of the*
Umatilla Indian Reservation

46411 Timíne Way
Pendleton, OR 97801

www.ctuir.org
Phone 541-276-3099

email: info@ctuir.org
Fax: 541-276-3099

HAZARD MITIGATION PLAN SIGN-IN SHEET

September 15, 2014

Attendees/Agency/Dept./ Comm. or Commission	Signature (legible)	EMAIL ADDRESS	Yes/No
CTUIR – Planning Office	Patty Perry		
CTUIR – Public Works			
CTUIR – Natural Resources	NORMAN R. BATON	NormanBaton@ctuir.org	
CTUIR – DOSE			
Yellowhawk	Eric Gabriel	ericgabriel@yellowhawk.org	
Cultural Resources Comm.			
Natural Resources Comm.			
Science & Tech. Comm.			
Fish & Wildlife Comm.			
Tribal Water Comm.			
Law & Order Comm.	Mike Greet		
Tiicham Cons. Dist.			
CTUIR General Council			
ODOT			
BIA-Superintendent			
City of Pendleton			
FEMA - Mitigation			
NOAA – Weather Service			
NRCS	Terry Johnson		
OR Dept. of Forestry			
US Corps of Engineers	Les Miller by phone		
US Forest Service			
Umatilla County			
Others:	Tom HEBERT		
	Tiffany Falcon-Johnson		
	Toni Cordell, Wildhorse Resort & Casino		
	Ray Denny, CTUIR Public Safety		

HAZARD MITIGATION PLAN SIGN-IN SHEET

CTUIR Hazard Mitigation Plan – September 15, 2014

1:00p.m. CTUIR Public Safety Building Conference Room

Steering Committee MEETING SUMMARY:

Attendance: see attached sign-in sheet

AGENDA: Round-table introductions

1. **Review Draft Section 1**: Patty Perry reviewed the red-lined draft with the Committee via wall projected image. The 2008 document was used as a template with changes to the Introduction to reflect current Federal regulations and CFR citations. The Purpose of the Plan was also changed to add specific statements about the Public Safety Element of the 2010 Comprehensive Plan and that this Plan will serve to meet the federal requirement as the CTUIR's Flood Mitigation Plan.

   A non-committee member attendee, Tom Herbert, made a comment that the Plan was not following the most current Guidelines for emergency preparedness and discussed documents he brought to the meeting with Ray Denny. Staff explained the purpose of this steering committee meeting was to update the Hazard Mitigation Plan. Mr. Herbert decided to attend the Planning Department public forum next door in the Governance Center.

(*Note: Les Miller called in on the speaker phone from Portland and due to poor quality of reception, speaker and/or microphone; had difficulty hearing what was said throughout the meeting and likewise, attendees had difficulty hearing him)*

   Continuing with the review, Patty Perry noted the Scope of the Plan includes the diminished Reservation as well as off-Reservation CTUIR-owned trust lands that are Aboriginal Title lands. The Scope section discussion generated several questions:

- Does the US Forest Service or other federal land owners have a hazard plan to mitigate natural hazards that could threaten Tribal hunting and fishing rights on off-Reservation federal lands or should those rights be covered under this Plan?
- If federal dollars through grants are used for mitigation projects what role does the National Environmental Policy Act (NEPA) play? Does this Plan have to address NEPA?
- How does the CTUIR Emergency Operations Plan fit into this Hazard Mitigation Plan?

Patty Perry will research these questions and get back to the Committee.

The remaining portions of Section 1 were reviewed without comment.

2. **Review Draft Section 2**

Patty Perry noted that only the first seven pages of this section were ready for review and that this section provides the profile description of the Reservation. History and location have not changed from the 2008 Plan but these sections were updated. A current climate table that shows mean temperatures, precipitation and average snowfall was added. Soils are the same and the population and demographics section contains all new data based on the 2010 census. Patty summarized the projections with the committee members concurring on the reduction in the growth percentage used. The Special Needs and Poverty Comparisons sections and data were extrapolated from the recent CTUIR Coordinated Human Services Public Transportation Plan.

3. Committee members in attendance had no further comments or questions regarding these Sections.

4. **Disaster Prevention Survey**

Copies of the survey were passed out for completion by the Committee. Patty Perry reminded attendees about the Planning Forum being held and the surveys are being distributed to those that attend.

5. **Next meeting: October 20, 2014 1:00p.m. CTUIR Public Safety Building**

Next Agenda:

Complete review of Section 2 and start on Section 3:

Follow-up:

Patty to research questions under Agenda item #1 above, complete Section 2 and 3.

Ray Denny to obtain information on use of old Emergency Management Website that appears to be still active and prepare inventory of mitigation actions and hazard events that have occurred on or near the Reservation since 2007.

Section 2 - Profile of the Umatilla Indian Reservation (UIR)

1 - Brief History

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) is comp~~o~~rised of members of the Cayuse, Umatilla and Walla Walla Indian Tribes. These three tribes have intermingled economically, socially, and in language, to the point that tribal distinctions are less pronounced. The Walla Walla Treaty of 1855 was negotiated at Fort Walla Walla between the government and the three tribes. The Treaty contained 11 articles and established the Umatilla Indian Reservation.

Rather than accept the provisions of the Indian Reorganization Act of 1934, the tribes adopted a written Constitution and By -Laws which were approved by the Secretary of the Interior on December 7, 1949. This Constitution established the present tribal government. The day-to-day work of the Tribal government is carried out by a staff of 520 employees and includes departments such as Administration, Health and Human Services, Natural Resources, Economic and Community Development, Planning, Education, Umatilla Tribal Fire and Public Safety. An additional 800 employees are employed at the Wildhorse Casino and Resort and another 300 at Cayuse Technologies (CTUIR-owned business). The CTUIR is the largest employer in Umatilla County.[1]

2 - Location

The Umatilla Indian Reservation (UIR) is located in Umatilla County, Oregon in the northeast Oregon. -The UIR~~It~~ borders the jurisdictions of Umatilla County, the city of Pendleton and federal lands managed by the Umatilla National Forest. -Other cities in close proximity to the UIR are Adams, Athena, Weston, and Pilot Rock. -The reservation is situated primarily within the Umatilla River Basin and the Blue Mountains. -The ~~t~~Tribal ~~headquarters~~ Governance Center is located in the unincorporated community of Mission. Both the Umatilla River and Interstate 84 run through the reservation. -Three much smaller unincorporated communities~~,~~ located on the reservation are Cayuse, Thornhollow and Gibbon.~~-~~ These rural residential communities are also located on the Umatilla River upriver from Mission.

3 - Climate and Geography [2]

Umatilla County has a semi-arid climate and is located in Climate Division 6, as established by the National Climatic Data Center. ~~Under normal conditions, moderate a~~Air masses from the Pacific Ocean move across the Cascades which serve as an effective moisture barrier leaving areas to the east, including the Reservation, in a "rain shadow." This region is Oregon's major wheat producing area.~~ or through the Columbia Gorge resulting in mild temperatures in the Pendleton area. When air masses from the Pacific are impeded by slow- moving high pressure systems, temperature conditions sometimes become rather severe, hot in summer and cold in winter~~.

This climate supports shrub-steppe plant communities in the undisturbed areas. The topography of the UIR is gently rolling hills and ~~plateaus~~valleys with elevations ranging from 1120 feet above sea level at the western boundary to 4000 at the eastern boundary in the Blue Mountains. Due to the elevation differences, ~~T~~the soil types vary from ~~is~~ sandy loam~~, is generally free from alkali, and has little hardpan. It is~~ well suited to growing alfalfa, ~~asparagus, beans, corn, grass hay, melons, mint, onions, peas, potatoes,~~ and winter wheat to silt loam suitable for timber production.~~, and produces excellent pasture.~~

Precipitation in the ~~Pendleton~~ geographical area is seasonal. ~~Only about~~ Approximately 10 percent of the annual precipitation comes in the months of July–September. Most precipitation comes from intense Pacific storms occurring from October through April. ~~The Cascade Range west of the Columbia Basin reduces the amount of precipitation received in this area. This mountain influence is felt, particularly, in the desert area of the central part of the Columbia Basin. A gradual rise in elevation from the Columbia River to the foothills of the Blue Mountains again results in increased precipitation.~~ This ~~increase~~weather pattern supplies sufficient moisture for productive crops such as wheat, vegetables, and livestock and develops a snow pack in higher elevation areas.

When years with higher precipitation levels occur during the winter months resulting in a thicker snow pack at the higher elevation, sudden warming events have the potential to cause rapid melting of the pack and flooding in lower elevations.

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
	Mean Daily Maximum	39.5	46.3	53.7	61.5	70.1	78.5	87.7	85.9	76.9	63.4	48.9	40.9	62.8
	Mean Daily Minimum	26.7	31.0	34.8	39.5	46.0	52.4	57.9	57.3	50.2	41.0	33.7	28.5	41.6
Temperature	Heavy Fog – Visibility 1/4 Mile	7.4	4.9	1.9	0.3	0.2	0.1	0.0	0.0	0.2	1.0	6.1	8.4	30.5
	Thunderstorms	0.0	0.0	0.9	1.8	2.0	2.0	2.1	1.2	0.3	0.1	0.0	10.6	
Precipitation	Normal (Inches)	1.51	1.14	1.16	1.04	0.99	0.64	0.35	0.53	0.59	0.86	1.58	1.63	12.02
	Normal (Inches)	6.1	2.1	1.0	0.1	T	0.0	0.0	0.0	0.0	0.2	2.2	5.2	16.9
	Max. Monthly (Inches)	41.6	16.8	4.9	2.2	T	T	T	0.0	0.0	3.2	14.9	26.6	41.6
	Year of Occurrence	1950	1994	1971	1975	1993	1994	1993			1973	1985	1983	JAN 1950
– Snowfall	Maximum Inches in 24 Hours	13.3	16.1	4.0	2.2	T	T	T	0.0	0.0	3.2	8.0	9.9	16.1
	Year of Occurrence	1950	1994	1970	1975	1993	1994	1993			1973	1977	1948	FEB 1994
	Maximum Snow Depth (Inches)	16	12	6	0	0	0	0	0	0	2	8	11	16
	Year of Occurrence	1957	1994	1993							1971	1978	1985	JAN 1957
Source:	Weather Explained													

Period of Record Climate Summary,
The City of Pendleton, OR, Radio KUMA

Month	Mean Maximum Temperature (deg F)	Mean Minimum Temperature (deg F)	Mean Temperature (deg F)	Mean Precipitation (inches)	Average Snowfall (inches)
January	44.5	27.8	36.2	1.6	4
February	49.3	28.9	39.1	1.2	3.1
March	58.5	33.8	46.2	1.4	0.8
April	65	38.5	51.7	1.5	0
May	73.1	45.4	59.2	1.7	0
June	80	51.4	65.7	1.2	0
July	89.9	55.9	72.9	0.4	0
August	89.3	54.4	71.8	0.5	0
September	80.3	46.1	63.2	0.7	0
October	66.6	37	51.8	1.1	0
November	52.2	32.4	42.3	1.9	0.9
December	42.4	26.8	34.6	1.5	2.9
Annual	**62**	**39.9**	**53**	**14.8**	**11.7**

Source: Western Regional Climate Center, Western US Climate Historical Summaries, http://www.wrcc.dri.edu/CLIMATEDATA.html – Temperature and precipitation data (1981-2010), snowfall data (1893-2011)

Comment [PP1]: Copied from Umatilla County NHMP 2014

4 - Soils

Soil types of the Umatilla Indian Reservation vary greatly ranging from wet Xerofluvents along river and stream floodplains to the rocky outcrops of the Blue Mountains. Between these soil extremes are large expanses of silt loam soils, in the lower elevations of the Blue Mountain foothills, which are conducive to the production of grain crops and hay. The higher elevations of the Blue Mountains contain various soil associations which are conducive to Douglas Fir, ponderosa pine and grand fir forest stands. Soils on the UIR were surveyed by the US Department of Agriculture Soil Conservation Service in 1988. This survey, *Soil Survey of Umatilla County Area, Oregon*, includes the UIR and continues to serve as the main source of information for soil identification; crop, rangeland and woodland productivity; building suitability and sanitary facility (septic) evaluation. The data and soil maps from this survey have been digitized into a Geographic Information System format for modern day use.

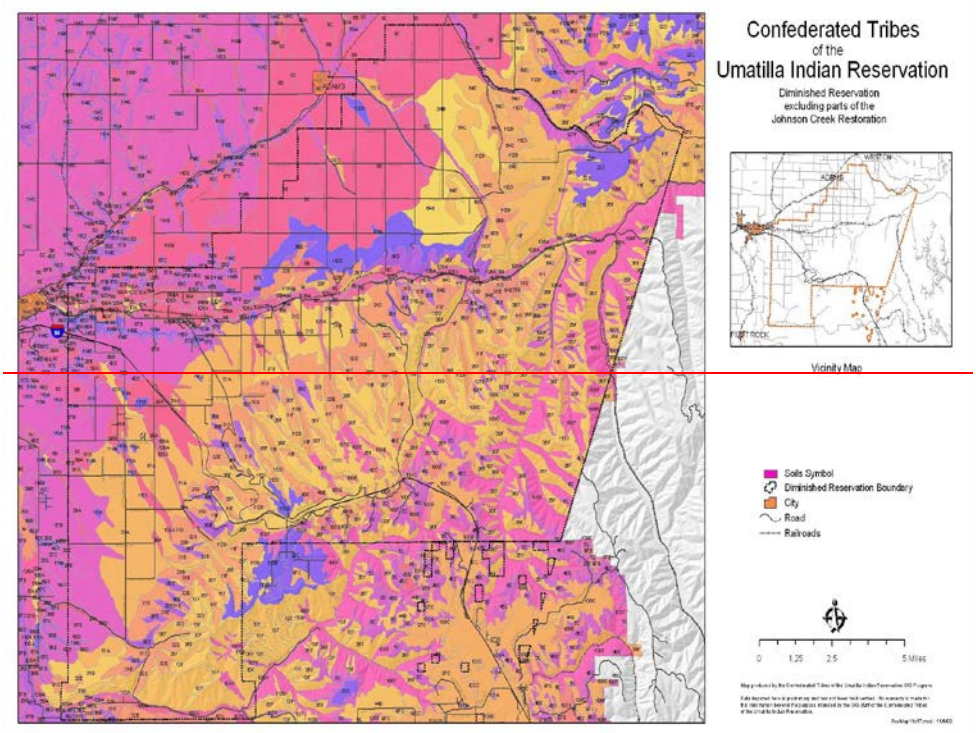
Due to the many specific types of soils occurring on the UIR, too many to list here, a general description is provided. Refer to the survey document for more detail.

The lower elevations of the Reservation, located in the western half, contain two core soil types that formed in loess, lacustrine sediment, and alluvium on hills, terraces and piedmonts. Pilot Rock and McKay are the predominant soil types. Pilot Rock soils are moderately deep, well drained soils that formed in loess overlying cemented alluvium; on fan terraces. Mckay soils are deep and well drained that formed in loess overlying alluvium; on fan piedmonts. These

soils occur at elevations of 1,100 feet to 2,000 feet and are suitable for growing grain crops and hay.

The mid elevations also contain two core soil types that formed in loess, residuum and colluvium on the foothills of the Blue Mountains; Gwin-Gurdane-Rockly and Gurdane-Gwiny. Both soil types are shallow to moderately deep, well-drained soils that formed on ridges and hill slopes at elevations of 2,000 feet to 4,500 feet. These soils are suitable for hay and pasture.

The higher elevation soils, located on the eastern edge of the reservation, include the Umatilla-Kahler-Gwin and Tolo-Klicker associations. These soil types are moderately deep soils that formed in loess, volcanic ash and residuum on plateaus and hills of the Blue Mountains at elevations of 3,000 feet to 5,000 feet. These forest soils are suitable for growing grand fir Douglas fir, ponderosa pine and western larch. The following map depicts the diversity of soils found on the Umatilla Indian Reservation.



Formatted: Centered, Right: 0.13"

5 - Population and Demographics

Based on the 20~~0~~10 US Census, the total population ~~within of~~ the ~~r~~Reservation ~~is 2,927~~was 3,027, a 3.4 percent change from the 2000 US Census. The ~~growth rate~~change in

populationoccurring between 1990 and 2000 was about 17 percent which iswas higher than the state of Oregon's during that same time period and slightly less than Umatilla County's growth rate19 percent change. Umatilla County's growth rate of 19 percent change in population between 1990 and 2000 was consistent with the growth rate for the Mid-Columbia Region, which includes Wasco, Sherman, Morrow and Umatilla CCounties. Population growth for this region is projected to continue at a moderate rate over the next 20 yearsThe percentage of population change occurring between 2000 and 2010 was significantly less than the previous decade for both Umatilla County and the Reservation at 7.6% and 3.4% respectively. Population growth for this region is projected to continue at a moderate rate over the next 20 years.

Table 1. Population Growth

	1990 Population Pop.	2000 Population Pop.	2010 Pop.	Change 1990-2000	Change 2000-2010
UIR	2,502	2,927	3,027	17%	425
				3.4%	100
Umatilla Co.	59,249	70,548	75,889	19%	11,299
				7.6%	5,341
Oregon	2,842,321	3,421,399	3,831,074	1220%	579,078
				12.0%	409,675

Residential Population on the Umatilla Indian Reservation

The CTUIR Tribal membership enrollment as of January 2014 is 2,965. Nearly half of these Tribal members live on or near the UIR. The Reservation is also home to another 300 Indians who are members of other tribes. The total population of the Reservation, both Indian and non-Indian, was home to nearly 3,00027 people in the year 20010. The population on the Reservation was almost evenly divided between Indian and non-Indian residents. The total Reservation population grew by 17 percent during the decade of the 90s after a decline during the decade before; yet the total Native American population on the Reservation grew by 43 percent during the decade of the 80's. The development of Indian gaming enterprises on the Reservation drew more Indians back to their homeland due to the availability of more jobs. The Native American population grew even faster off-Reservation than on-Reservation, due in part to the lack of housing and employment opportunities on the Reservation.[3]

According to U.S. Census Bureau, 2010 Census data 1,458 Indian residents were living on the Reservation in 469 households. The non-Indian population on the Reservation was 1,569.

The projected population in Table 2 was obtained from the "Revised CTUIR Renewable Energy Feasibility Study" (Oct. 2005). Using the 17 % growth rate from the last decade, the "Energy Feasibility Study" projects the Reservation will have over 4000 people residing on the Reservation by the year 2010. Of course, this projection depends on the availability of new housing and infrastructure on the Reservation.The projected population in Table 2 was obtained by analyzing previously developed population projections for the Reservation located in various CTUIR planning documents: *Study of the Population of the Umatilla Reservation, June 1997 Walker Research Group, Ltd.*; CTUIR Comprehensive Plan 2010; CTUIR Renewable Energy Feasibility Study, October 2005. Utilizing

Formatted: Font: (Default) Arial
Formatted: Font: (Default) Arial
Formatted: Font: (Default) Arial
Formatted: Indent: First line: 0.06", Tab stops: 0.88", Left + 1.31", Left + 2.81", Left + Not at 1.75"
Formatted: Font: (Default) Arial
Formatted: Tab stops: 0", Left + 0.88", Left + 2.81", Left + Not at 0.5" + 1.5" + 3"
Formatted: Tab stops: 0.5", Left + 1.5", Left + 3", Left + 4.5", Left
Formatted: Indent: First line: 0.06", Tab stops: 1.19", Left + 2.94", Left + 4.06", Left + Not at 1.75" + 3.25" + 4.88"
Formatted: Tab stops: 0", Left + Not at 0.5" + 1.5" + 3" + 4.5"
Formatted: Tab stops: 2.69", Left + 4.06", Left + Not at 3" + 4.88"

previous projections and 2010 US Census data with consideration given to Reservation housing availability, the percentage of population change from 2010 forward was reduced to 7.5% in Table 2.

Table 2. Projected Umatilla Indian Reservation Population

	1980	1990	2000	2010*	2020*	2030*
Umatilla Indian Reservation Population*	2619	2502	2927	~~3424~~ 3027	~~4007~~ 3254	~~4688~~ 3498
Umatilla County ~~Total~~ Population**	58,861	59,249	70,548	~~82,541~~75,889	~~96,573~~81,656	~~112,990~~ 87,862
Indian	908	1,029	1,469	~~1719~~ 1,458	~~2011~~ 1567	~~2353~~ 1684
Non-Indian	1,711	1,473	1,458	~~1706~~ 1,569	~~1996~~ 1687	~~2335~~ 1814
~~Total~~	2619	2502	2927	~~3424~~ 3027	~~4007~~ 3254	~~4688~~ 3498

* Based on 17% increase for 1980-2000 and 7.5% increase for 2010-2030 with US Census actual for 2010. The same percentages were utilized for both the Indian and non-Indian populations.

** No official updated projections for Umatilla County were available for the preparation of this Plan; ~~per decade.~~ 17% increase was used for 1980-2000, US Census actual for 2010 and 7.6% for 2010-2030.

Formatted: Font: Bold
Formatted: Font: Bold
Formatted: Font: Bold
Formatted: Font: Bold
Formatted Table
Formatted: Font: Bold
Formatted: Font: Bold
Formatted: Font: Bold
Formatted: Right
Formatted: Font: Bold
Formatted: Space After: 0 pt
Formatted: Font: 12 pt
Formatted: Font: 12 pt
Formatted: Default

Population with Special Needs

The ability to respond and recover from a disaster will vary among jurisdictions. One important factor for consideration before a hazardous event occurs is having information abo~~b~~ut the number of people living within a jurisdiction with "special needs." Three segments of the population that have special needs are older citizens, citizens with disabilities, and citizens living below the poverty level. Generally, the "special needs" population of a jurisdiction has a much harder time safely avoiding injury or damage from a hazardous event and recovering from a disaster than the general population. Tables 2, 3 and 4 provide information about UIR's "special needs" population along with comparisons of two of those population segments with Umatilla County's and the state of Oregon's.

Older Population Comparisons[4]

Depending on the type, intensity and the amount of warning before a hazardous event occurs, older citizens may have a greater degree of difficulty relocating before a disaster or keeping safe during a disaster. The time it takes to recover from a disaster may also take much longer as older citizens on fixed incomes do not have the necessary funds or are not physically able to make needed repairs.

Table 2 reveals that the percentage of people living on the Reservation in 20~~0~~10 that were older than 65 is ~~less than~~fairly consistent ~~that of both~~with the Umatilla County and ~~the~~ state of Oregon percentages. ~~However, since 2000, the population over 65 will have grown to a level consistent with the county's and state's.~~ This information reaffirms the trend that the older population segment will continue to increase.

Table 2

	Total Population	0-19	% of Total	20-64	% of Total	65 and over	% of Total
Oregon	3,831,074	972,183	25.4%	2,325,358	60.8%	533,533	13.8%
Umatilla County	75,889	22,398	29.5%	43,834	57.7%	9,657	12.8%
Umatilla Reservation	3,027	858	28.3%	1,711	56,6%	458	15.1%

Formatted: Font: Bold

~~Table 2.~~

~~2000 Population between 62-65 2000 Population over 65 % of Total Population over 62~~

~~UIR 102 319 (10.9%) 14.4%~~
~~Umatilla Co. 1,561 4,392 (12.3%) 14.5%~~
~~Oregon 75,486 438,177 (12.8%) 15%~~

CTUIR Population with Disabilities[5]

In some cases, citizens with disabilities can be even more vulnerable to hazardous events than older citizens. The 2010 Census defines people with disabilities as anyone "with long-lasting physical, mental, or emotional conditions or limitations that affect the ability to perform major life activities."

Table 3 below shows the disabled population on the Reservation as compared to Umatilla County and the State of Oregon, based on the American Community Survey estimates. Disabled status is determined using only those people 5 years of age and over.

Table 3

Area	Population 5 years and over	Number with Disability Status	Percent with Disability Status
USA	262,246,108	49,746,248	19.0%
Oregon	3,831,074	523,018	13.6%
Umatilla County	75,889	11,184	15.2%
Umatilla Reservation	3,027	529	20.0%

~~Table 3.~~

~~Population 5 to 20 years Pop 21 to 64 years Pop 65 and over Total~~

~~Total Population 787 1,595 319 2,701~~
~~Total with Disabilities 46 313 170 529~~
~~Percent 5.8% 19.6 % 53.3% 18%~~

Poverty Comparisons[6]

Table 4 reveals that the ~~Reservation has a higher~~ percentage of citizens living on the Reservation in 2010 that are below the federal poverty level ~~than either~~is fairly consistent with the Umatilla County and state of Oregon ~~or Umatilla County~~percentages. This segment of the population may also have greater difficulty relocating before a disaster or keeping safe during a disaster. Like the older population, the time it takes people with less disposable income to recover from a disaster is usually much longer as they may not have the necessary funds or be able to repay disaster assistance loans often available under a Presidential disaster declaration. Therefore, mitigation measures that help prevent damage or reduce damage from a hazardous event will provide the greatest benefit to this segment of the population.

Table 4

Area	Number of Families Below Poverty Level	Percent of Families Below Poverty Level	Number of Individuals Below Poverty Level	Percent of Individuals Below Poverty Level
USA	**6,620,945**	**9.2%**	**33,899,812**	**12.4%**
Oregon	**70,032**	**7.9%**	**388,740**	**14.0%**
Umatilla County	**1,756**	**9.8%**	**8,524**	**15.8%**
Umatilla Reservation	**92**	**12%**	**458**	**15.8%**

Another measure of economic status is income. The Decennial Census determines the Median Household Income (everyone living in a residence), the Median Family Income (all related people in a residence) and the Per Capita Income.

Table 5[7]

Area	Median Household Income	Median Family Income	Per Capita Income
USA	**$41,994**	**$50,046**	**$21,587**
Oregon	**$49,260**	**$48,680**	**$20,940**
Umatilla County	**$45,861**	**$46,680**	**$16,410**
Umatilla Reservation	**$50,052**	**$55,256**	**$15,158**

Source: U.S. Census Bureau, 2006-2010 American Community Survey

~~**Table 4.**~~

	~~% of Total Population below the poverty level~~	~~% of Children under 18 below the poverty level~~	~~% of People Over 65 below the poverty level~~
~~UIR~~	~~15.8%~~	~~20.2%~~	~~12.3%~~
~~Umatilla Co.~~	~~13.0%~~	~~16.0%~~	~~9.0%~~

Formatted Table
Formatted: Centered
Formatted: Centered
Formatted: Centered
Formatted: Centered
Formatted: Font: Not Bold
Formatted: Font: Not Bold

Oregon	11.6%	12.6%	7.6%

6 - Land Use and Land Ownership[89]

Land ownership on the UIR is a checkerboard of non-Indian and Indian ownerships. Approximately 44% (1195 acres) is comprised of Tribal trust lands held in trust by the US Bureau of Indian Affairs, approximately 49% (1321acres) is owned by non-Indian as "fee" land and approximately 7% (193 acres) is "fee" land owned by the Confederated Tribes of the Umatilla Indian Reservation.

Existing Land Use

The best description for land use ongeneral characteristic of the Umatilla Indian ReservationUIR for land use could be described as is rural. Most of the lands on the Umatilla Indian ReservationUIR are used for agriculture on lower elevation lands andwith forestry and grazing in the upland, mountainous area. However, there is a quasi- The most urban and developed area is located nearwhich begins at the Reservation's western boundary, bordering the city of Pendleton., and ends at the eastern edge of the community of Mission. This area is identified as the Mission Community Planning Area, the primary living urban area onf the rReservation. This Mission Community Area contains residential, commercial and light industrial development. The area closer to the western edge of the Reservation contains some housing, the Elizabethan Manor (a residential care facility) and numerous industries. The community of Mission Community Area (See map below) contains most of the Reservation's housing, schools, and Tribal and Bureau of Indian Affairs administrative office buildings. This area contains the Yellowhawk medical complexTribal Health Clinic, Government complex and CTUIR Fire and Emergency Services, both considered to be critical facilities.

A number of public facilities can be found in Mission such as community wells that serve the community and the city of PendletonCTUIR's public water system, two a water towers located on hills above the community, and an electrical substation. The Mission Market and grain silos are also located in Missionin this area. Portions of Tthe Mission Community area wascre established prior to any flood studies in the area and and areis located within the 500-year floodplain. The CTUIR operates and maintains a community sewer system within the Mission Community Planning Area which is connected with the system that serves and is operated by the City of Pendleton.

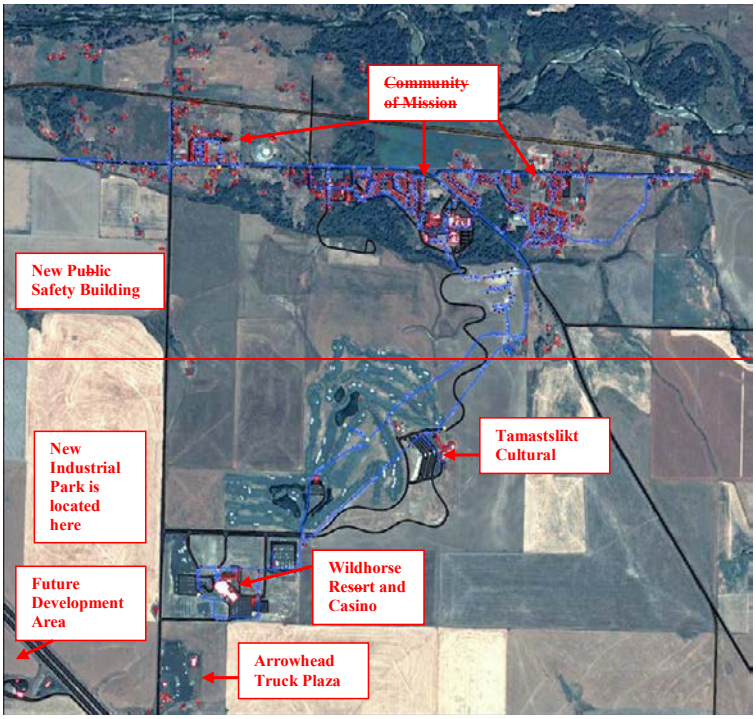
New and Future Development Trends

In the last few years, the CTUIR has ~~increased its economic standing by building~~developed new commercial and industrial ~~development on the plateau above the community of Mission~~shovel-ready development sites that have been partially developed. In 2007, the Tribe completed the construction of the ~~Cayuse Industrial Park~~Coyote Industrial Park South and Coyote Business Park North and East and ~~the~~a Public Safety Building (Umatilla Tribal Police). In 2010, theMuch of this new development is located in the vicinity of the Interstate 84 and State Highway 331 interchange near the Wildhorse Casino and Resort and the Arrowhead Truck Stop A large Tribal Services Center building is being constructed on the east side of Hwy 331 north of the interchange. This new development is occurring away from flood and fog prone areas.

In 2008, the CTUIR has several expansion and construction projects underway including; expansion of the Wildhorse Resort and Casino, the Resort Hotel, Arrowhead Travel Plaza and Tribal Services Building. Future development plans include moving some of the government offices from their existing location in the Mission Community area (floodplain) to the new Tribal Services Building. Some of the old government office buildings would be removed.

Additional development will also continue to occur in the community of Mission. This remains the Tribe's primary housing and community area. There are future plans to build a new medical complex building and to enlarge the school. These buildings will be located in the same Mission Community area but will be built with flood proofing standards and/or elevated for flood damage prevention. Another future construction project is a Tribal Wellness Center. The final location of the new wellness center has not been determined.

The map on the following page identifies existing, new and future development areas in the community of Mission and the Interstate 84 - Highway 331 commercial – industrial area. The remainder of the Reservation is primarily and will continue to be farm and forest lands.



Formatted: Centered

7 - Housing

Where development is located and the type of materials used in building construction are important factors in determining the risks facing a jurisdiction. The housing-type and date of construction are also important factors in assessing the risk from certain hazard. Certain housing types tend to be less disaster resistant and warrant special attention. For example, mobile homes are generally more prone to wind and water damage than standard stick-built homes. Generally, older homes are more at greater risk from earthquakes than new homes where building codes have incorporated earthquake safety into standard building design. For these reasons, having information about the date and type of buildings found on the reservation will be useful in developing and prioritizing hazard mitigation actions.

Table 5 below provides a breakdown of housing types.

Table 5. [10]

	Single-Family	Multi-Family	Mobile Homes	Boat, RV, Van, etc.	Total Units
UIR	73.8%	1.2%	24.4%	0.6%	1,065
Umatilla Co.	61.0%	19.0%	19.0%	1.0%	27,627

Table 6 illustrates the years that housing was constructed within UIR and Umatilla County.

Table 6. Housing -Year Built[11]

	Pre-1939 - 1959	1960-1979	1980 – 2000
UIR	24.4%	41.6%	34.1%
Umatilla Co.	38.0%	38.0%	24.0%

8 - Employment and Industry

An important aspect in making a jurisdiction more resistant to hazardous events and more resilient in its recovery begins with the identification of the key components of a jurisdiction's economy and an understanding of how various hazardous events might disrupt the viability of that economy.

According to the Oregon Employment Department, the Mid-Columbia Region has experienced economic problems due to the downturn in the lumber, wood products and aluminum industries during the 1990s. To some extent, the region has been able to offset the loss of jobs in these industries by the addition of new manufacturing firms and regional distribution and service sector employment. The region's proximity to the Portland area, the Southern Pacific, Union Pacific and Burlington Northern railroad lines that run across the western edge of the region and Interstate 84 provide good opportunities for the transportation of manufactured and agricultural goods. In addition, the region's proximity to the Columbia River, the Cascade Mountains and the high desert terrain provide year-round sporting and tourism activities. Looking towards the future, healthcare services, manufacturing, retail trade, tourism, agriculture and food products, construction, lumber and wood products will continue to grow and develop to provide goods, services and work opportunities for area residents.

The Wildhorse Resort and Casino complex is the largest employer within the UIR and the second largest employer in Umatilla County. Obviously, it is very important to the UIR economy and has helped in improving the median household income of those living on the reservation. The labor force for the UIR is more that 1200 people.

Median household income is one indicator of the strength of a jurisdiction's economy. Median household income can be used to compare economic areas as a whole, but does not reflect how the income is divided among area residents. Table 8 illustrates the median household income for the reservation and county as compared to the entire state of Oregon in the year 2000. All three jurisdictions have median household incomes below the national average, which is $41,433.

Table 7. Median Household Income - Year 2000[12]

UIR	$37,827
Umatilla Co.	$36,249
Oregon	$40,916

The Importance of Energy to the UIR

As of 2000, there are 1,013 occupied homes and 52 vacant homes on the UIR. Most homes are heated by electricity, followed by utility (natural) gas and wood. Wood is a traditional energy source for the people of the UIR, and many still prefer wood heat to other means of heating their homes. The UIR is in close proximity to the Umatilla, Wallowa-Whitman, and Malheur National forests, and many of the tribal members gather their wood supply from these forests.

Residential electrical power needs on the UIR is estimated by utility providers at 5-6 megawatts, 1-2 for households and 3-4 for UIR operations. Peak demand for UIR is reported to be 3 megawatts, reached in both January and August.

Umatilla Indian Reservation 2000 Residential Heating Sources

Wood 21%
Fuel Oil 8%
Natural Gas 23%
Electricity 37%
LPG 10%
Other fuel 1%

Commercial and Industrial Energy Use – Umatilla Indian Reservation

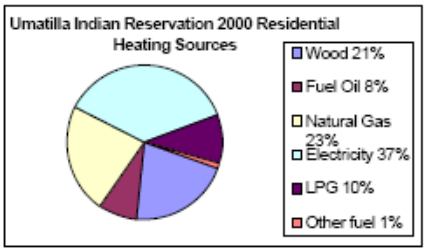
Electrical power service is provided by Umatilla Electrical Cooperative and Pacific Power. Electrical distribution and transmission infrastructure maps are shown in Figure III-2-1. Natural gas service is provided by Cascade Natural Gas distribution system that includes ½ -4" lines.

Wildhorse Resort – is the largest energy user among UIR enterprises. The resort includes golf course, casino, and hotel. The casino and resort uses over 4 million kilowatts of electricity and over 100,000 natural gas therms.

Tamástslikt Cultural Institute – is the second argest energy user among UIR enterprises due to the need for climate control for archival holdings. This facility has undergone an energy efficiency study through Energy Trust of Oregon. The electric load has been significantly reduced.

Tribal Government Complex - Preliminary Design includes energy efficiency and conservation. Site located near substation.

Source: US Census Bureau, Census 2000. T, Therm = 100,000 Btu Wood assumes 2 cord/home/y with heating value of 17.1 MM Btu/cord LPG, liquefied petroleum gas



9 - Infrastructure on the Umatilla Indian Reservation

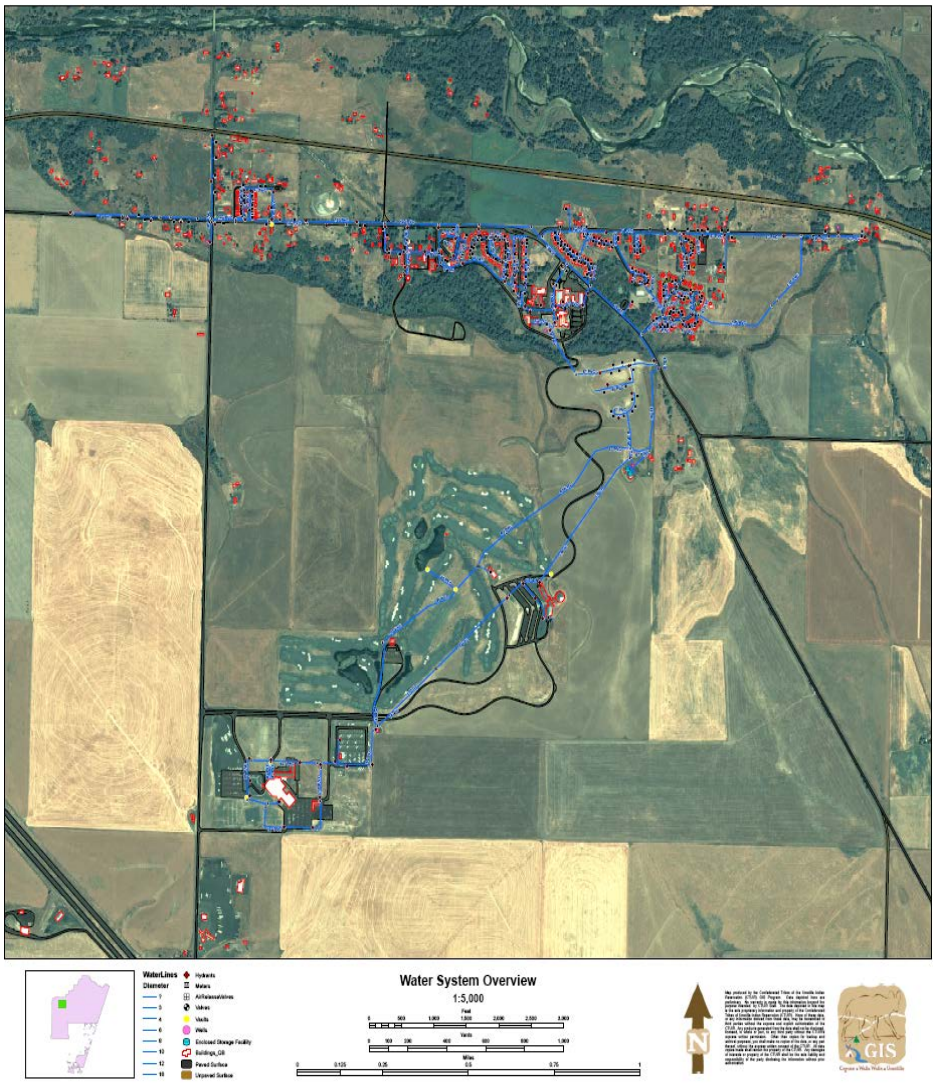
Water

The Umatilla Indian Reservation owns and operates its own water system. The reservation's water system serves the community of Mission and the Tribe's resort area and the industrial-commercial development locate between the community of Mission and I-84. The source for the Tribe's water system is five wells located within the system's service area.

Water storage is provided by two 550,000 gallon water reservoirs (bolted glass-fused-to-steel tanks) that are 24 feet tall and 65 feet in diameter at an elevation of 1,390 feet. These reservoirs were constructed in 1995.

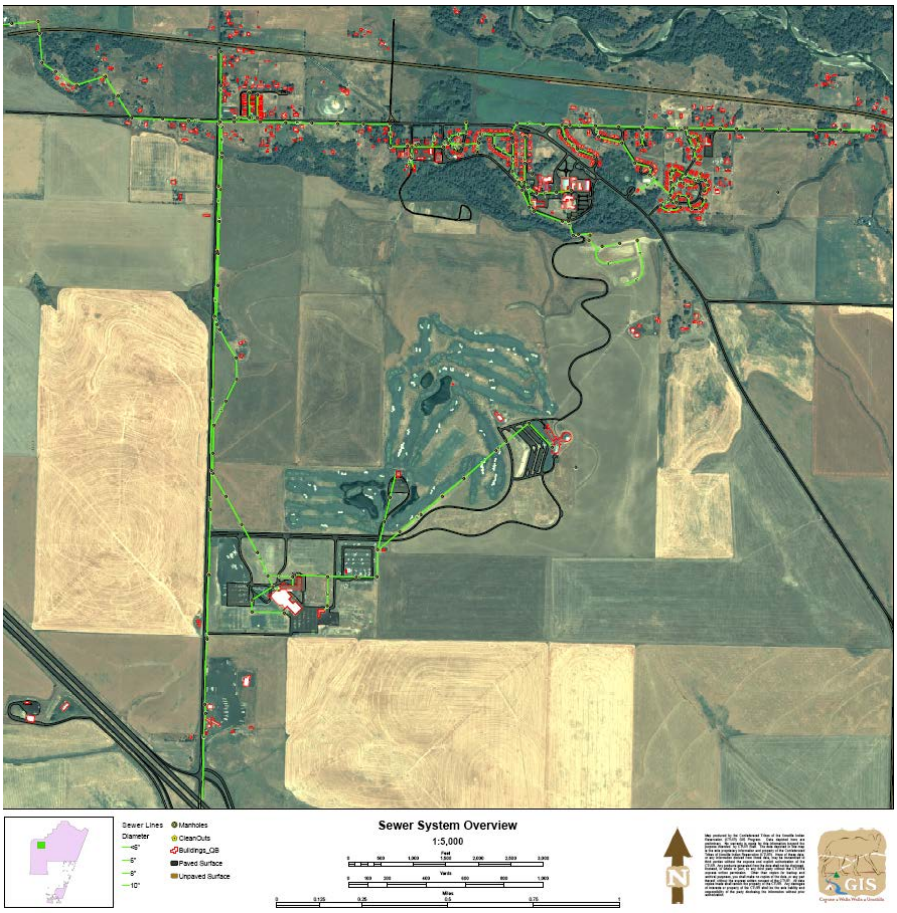
Wells numbers 1 through 4 primarily serve the community of Mission, while well number 5 serves the Wildhorse Casino and Resort, the golf course and RV park and the Tamastslikt Interpretive Center.

An intertie between the city of Pendleton and the CTUIR water system also exists. This allows water from the Pendleton to be supplied to the Tribe's water system.[13]



Sewer

Since 1972, an existing sewer trunk line from the city of Pendleton to the community of Mission has been the primary source for removing wastewater from the area. Additional trunk lines and a lift station help remove wastewater from the Wildhorse Casino and Resort and the Arrowhead Travel Plaza back to the main line serving the community of Mission[14].



Electrical Power

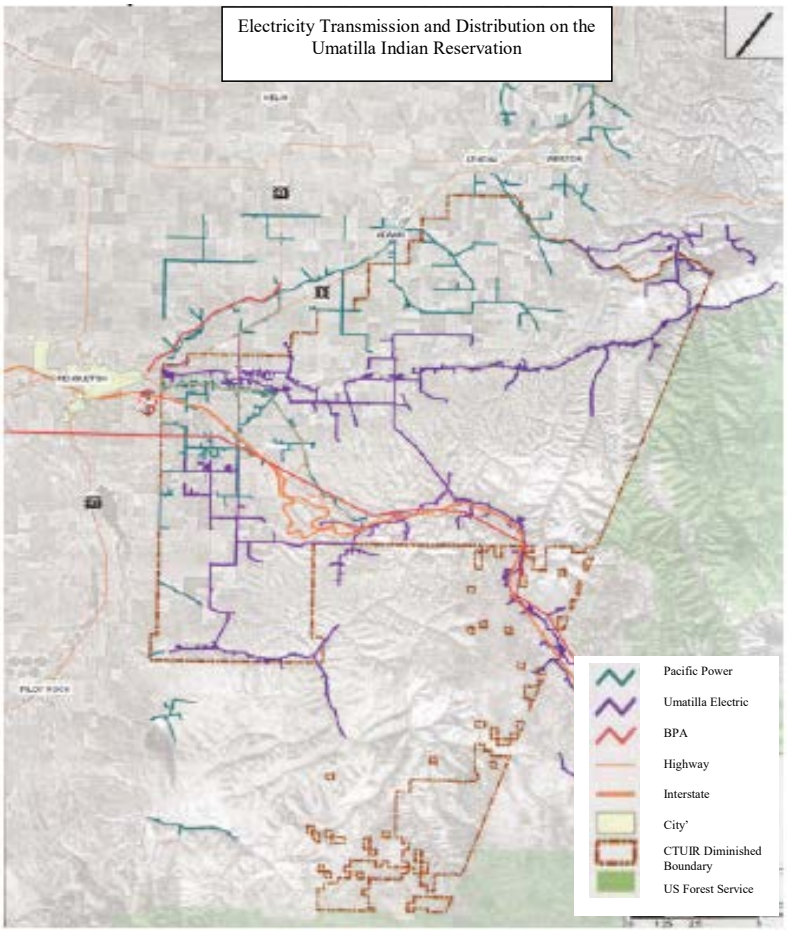
The Bonneville Power Administration has a 35 Mile 230 kV line crossing the Reservation in a 100 foot wide right of way. This line is a regional transmission line that runs roughly east-west through the UIR. A long term agreement between the UIR and BPA has been established to accommodate this line.

Electrical service is provided by Umatilla Electrical Cooperative and Pacific Power. Electrical distribution and transmission infrastructure maps are shown on the next page.

The Umatilla Electric Cooperative (UEC) is a small, non-profit rural electric cooperative. As a preferred customer of the Bonneville Power Administration, Umatilla Electric Cooperative retains first right to federally owned hydroelectric resources. UEC serves approximately ½ the area of the UIR and has approximately 226 miles of line on the Reservation. UEC has a substation located at Mission. UEC

primarily serves residents in the outlying areas of the Reservation. Umatilla Electrical Cooperative purchases most of the electricity they supply to the UIR and other local markets in Umatilla County from the northwest hydropower system.

Pacific Power is a subsidiary of PacifiCorp, a large investor owned integrated electrical power company. Pacific Power serves customers with ½ the distribution lines on the Reservation. Pacific Power serves customers from the Round-Up Substation that tie into the Bonneville 230 kV line. Pacific Power serves the primary commercial load on the reservation including the Wildhorse Resort and Casino, RV Park, Arrowhead Travel Plaza, Gulf Course and Tamástslikt Culture Institute as well as many of the more densely populated residential areas[15].



Natural Gas

Cascade Natural Gas (CNG) is the sole provider of natural gas service on the Umatilla Indian Reservation. Major natural gas transmission lines run across the UIR in roughly a north south direction. The natural gas transmission lines are owned and operated by Williams of Tulsa, Oklahoma. There are three Williams owned natural gas transmission lines of 30, 22, and 6 inches that cross the Umatilla Indian Reservation, the latter a lateral to Walla Walla, Washington. Cascade Natural Gas also serves the Umatilla Indian Reservation with a distribution system that includes ½ -4" lines.

Chevron provides liquid petroleum products through two liquid fuel transmission lines of 6 and 8 inch and still owns a tank facility on the reservation that is currently not used due to environmental concerns.

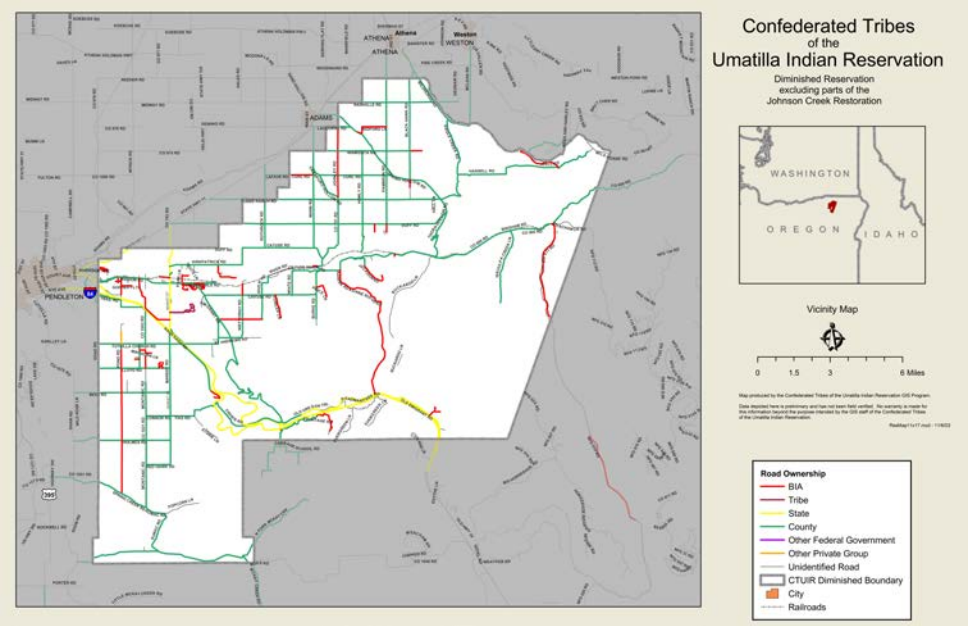
Fuel Storage

There is only one commercial transportation fuel station on the Reservation, the Arrowhead Travel Plaza. The truck stop is owned by the CTUIR and is located along interstate I-84. The plaza provides gasoline, diesel and liquefied petroleum gas service and is diversifying to serve all travelers.

10 - Transportation

The UIR and Umatilla County rely primarily on automobiles and trucks as the main sources of transportation. Maintaining the highway and road system and to the reservation and within the reservation is essential to the area economy and general welfare of the residents of the UIR.

Interstate I-84 runs through the reservation beginning just east of the city of Pendleton to the reservation's eastern boundary. The other roads on the Umatilla Indian Reservation are maintained primarily by Umatilla County and the Bureau of Indian Affairs (BIA). The map below identifies road ownership on the UIR.



Other transportation modes that exist on the UIR are rail lines, pipelines used for transporting natural gas, and high voltage electrical lines used by the Bonneville Power Administration to transport electricity.

Commuting

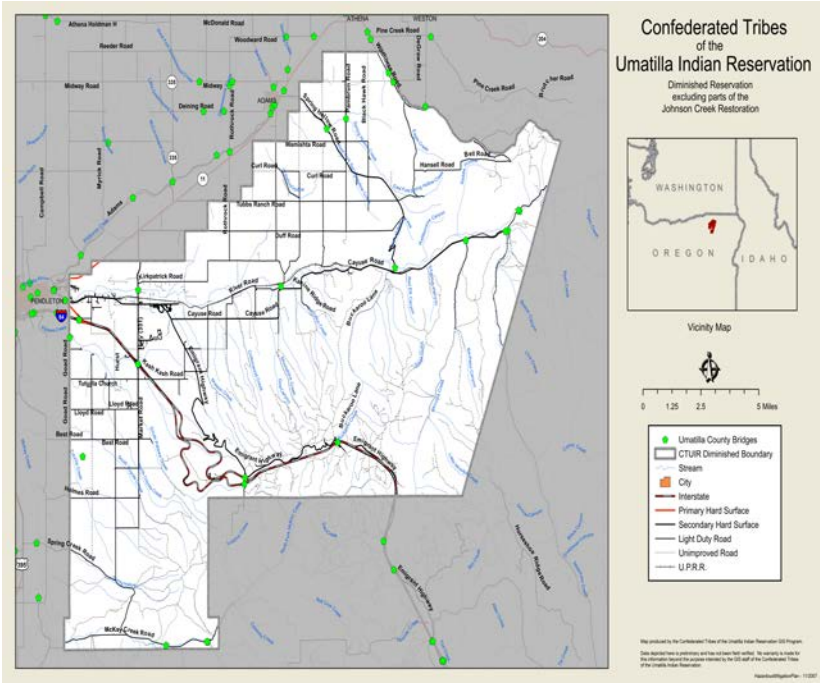
A high percentage of workers drive alone to work. As the area's population increases, there will be an increase of automobile and truck traffic that will place additional stress on local roads, bridges and infrastructure. The impact of an emergency can disrupt automobile traffic and the local transit system and make evacuations difficult. This is particularly important where hazardous materials are being transported along Interstate 84 and nearby railroad lines. An accident involving hazardous materials could result in a dangerous situation. In addition, weather related hazards, such as severe winter storms, freezing fog and localized flooding can render roads unusable. A severe winter storm has the potential to disrupt the daily driving routine for the entire reservation and the people living and working on the reservation.

According to Census 2000 data, the average commute for workers in the Mid-Columbia Region is 19 minutes each way. The mode of transportation for most commuters is primarily automobiles[16].

Bridges and Highways

There are 20 bridges on or partially on the reservation (See map below). Most bridges are not seismically retrofitted, creating significant risk to the commuting population, the region's economy, particularly in areas that may be at risk for earthquakes. Incapacitated bridges can disrupt traffic and

exacerbate economic losses because of the inability of industries to transport services and products to clients. The bridges in the region are part of the interstate, state and local highway system. Some bridges are maintained by the Oregon Department of Transportation, while others are maintained by other jurisdictions. The following map identifies bridges and roads on the reservation.



11 - Critical and Important Facilities and Assets

Critical facilities are those facilities that are critical to government response and recovery activities immediately after a disaster. These facilities include but are not limited to police and fire stations, public works facilities, sewer and water facilities, hospitals, bridges and roads, shelters. Important facilities may not be critical during or immediately after a disaster but are important to the resiliency and recovery of the reservation from a disaster. Examples of important facilities to the reservation are the Wildhorse Resort and Casino, the Arrowhead Travel Center, and the Mission Market.

Critical Facilities During Times of Disaster

Government Complex
New Public Safety Building - Fire station – Police Station
Yellowhawk Health Clinic
Infrastructure Lifelines: Water, Telephone, Electricity, Natural Gas, Sewer Lines, Cell Phone Facilities, Main Transportation Routes

Historic and Cultural Sites

Tamastslikt Cultural Institute
Nixyaawii Charter School
St. Andrews Mission
Indian Cemeteries (3) [1 is off the Reservation near McKay Reservoir]
Veterans Memorial
Longhouse

Economic and Special Needs Assets

Elizabethan Manor [adult care facility]
Mission residential area
Cayuse residential area
Thornhollow/Gibbon residential area
Coyote Business park
Wildhorse Casino and Resort (hotel)
Grain Elevator
Mission Market
Tribal Government Offices
Arrowhead travel center, incl. Cody's Restaurant
Golf course
Mission Seventh-day Adventist School
Nixyaawii Charter School
Head Start
BIA Offices
Senior Center

Infrastructure

Tribal Environmental Recovery Facility
Transportation corridors [I-84, railroad]
Waterlines
Natural Gas transmission pipelines
Sewer lines

Environmental Assets

Golf Course
fish facilities
wetlands ["the swamp"]
Wetlands Park
Indian Lake

[1] CTUIR fact sheet: http://ctuir.org/CTUIR%20info%20packet.pdf
[2] http://www.ocs.oregonstate.edu/county_climate/Umatilla_files/Umatilla.html~~Bureau of Reclamation: http://www.usbr.gov/pn/programs/leao_misc/pdf/westland/Chapter1.pdf~~
[3] CTUIR Renewable Energy Feasibility Study, June 20, 2005
[4] U.S. Bureau of the Census, 20~~0~~10 Census
[5] Ibid
[6] ~~U.S. Bureau of the Census, 2000 Census~~Ibid
[7] U.S. Census Bureau, 2006-2010 American Community Survey

Formatted: Font: 9 pt
Formatted: Font: 9 pt
Formatted: Font: 9 pt
Formatted: Font: 9 pt, Not Bold
Formatted: Font: 9 pt
Formatted: Font: 9 pt, Not Bold

[8] Data provided by the CTUIR Tribal Planning Office
[9] ~~**U.S. Census Bureau, 2006-2010 American** Community **Survey**Prepared by Patty Perry, CTUIR Planning Office~~
[10] U.S. Bureau of the Census, Profile of Housing Characteristics 2000.
[11] U.S. Bureau of the Census, Profile of Housing Characteristics 2000.
[12] U.S. Bureau of the Census, Profile of Economic Characteristics 2000.
[13] CTUIR Water and Wastewater Master Plan, 2006, pp. ES -1to ES-4
[14] CTUIR Water and Wastewater Master Plan, 2006, p. ES -10
[15] Source: http://www.eere.energy.gov/tribalenergy/pdfs/umatilla05final.pdf
[16] Page R5-6 Oregon Natural Hazards Workgroup, September 2002

Confederated Tribes *of the*
Umatilla Indian Reservation

46411 Timíne Way
Pendleton, OR 97801

www.ctuir.org
Phone 541-276-3099

email: info@ctuir.org
Fax: 541-276-3099

HAZARD MITIGATION PLAN SIGN-IN SHEET
October 20, 2014

Attendees/Agency/Dept./ Comm. or Commission	Signature (legible)	EMAIL ADDRESS
CTUIR – Planning Office	J.D Tovey	
CTUIR – Public Works		
CTUIR – Natural Resources		
CTUIR – DOSE		
Yellowhawk		
Cultural Resources Comm.		
Natural Resources Comm.	Gerald Reed	805 Elderberry Lp
Science & Tech. Comm.		
Fish & Wildlife Comm.		
Tribal Water Comm.		
Law & Order Comm.	Mike Reed	50414 E Poverty Flats Rd
Tiicham Cons. Dist.		
CTUIR General Council		
ODOT		
BIA-Superintendent		
City of Pendleton		
FEMA - Mitigation		
NOAA – Weather Service	Dennis Hull	
NRCS		
OR Dept. of Forestry		
US Corps of Engineers	Les Miller by phone	
US Forest Service		
Umatilla County		
WRC		
Others:		
WRC - Toni Cordero		
CTUIR Public Safety - Ray Denny		
CTUIR TPO - Patty Perry		

October 20, 2014 – CTUIR Hazard Mitigation Plan

Steering Committee Agenda

1:00p.m. CTUIR Public Safety Building

1. Complete review of Draft Section 2

2. Review Draft Section 3 – collection of data contributions from committee

3. Disaster Prevention survey update – have you completed yours?

4. Next meeting– December 15, 2014 1:00p.m. proposed

Patty Perry contact info: (541) 429-7518; pattyperry@ctuir.org

Confederated Tribes *of the*
Umatilla Indian Reservation

46411 Timíne Way
Pendleton, OR 97801

www.ctuir.org
Phone 541-276-3099

email: info@ctuir.org
Fax: 541-276-3099

HAZARD MITIGATION PLAN SIGN-IN SHEET
October 20, 2014

Attendees/Agency/Dept./ Comm. or Commission	Signature (legible)	EMAIL ADDRESS
CTUIR – Planning Office	J.D Tovey	
CTUIR – Public Works		
CTUIR – Natural Resources		
CTUIR – DOSE		
Yellowhawk		
Cultural Resources Comm.		
Natural Resources Comm.	Gerald Reed	805 Elderberry Lp
Science & Tech. Comm.		
Fish & Wildlife Comm.		
Tribal Water Comm.		
Law & Order Comm.	Mike Reed	50414 E Poverty Flats Rd
Tiicham Cons. Dist.		
CTUIR General Council		
ODOT		
BIA-Superintendent		
City of Pendleton		
FEMA - Mitigation		
NOAA – Weather Service	Dennis Hull	
NRCS		
OR Dept. of Forestry		
US Corps of Engineers	Les Miller by phone	
US Forest Service		
Umatilla County		
WRC		
Others:		
WRC - Toni Cordero		
CTUIR Public Safety - Ray Denny		
CTUIR TPO - Patty Perry		

CTUIR Hazard Mitigation Plan – October 20, 2014

1:00p.m. CTUIR Public Safety Building Conference Room

Steering Committee MEETING SUMMARY:

Attendance: see attached sign-in sheet

AGENDA:

1. Complete review of Draft Section 2: Patty Perry noted a change to the introduction to on Section 1 to include the definition of hazard and mitigation. She reviewed the red-lined draft of Section 2 noting the significant amount of changes to the profile since 2008. Some of the maps have been updated and some are still in process. Patty indicated she is still working with the CTUIR GIS Program and is waiting for some data to be received from other CTUIR Departments to complete.

Les Miller, USACO, commented on the updated road map and suggested identification of access/maintenance roads (BPA, pipelines, Forest Service, UPRR) which may need to be used to access properties in an emergency. Ray Denny stated some agreements are in place. Les suggested this could be an action item; to seek out emergency access agreements with these entities and develop a complete GIS emergency access layer showing all access roads on the UIR.

2. Review of Draft Section 3: Hazard Identification/Risk Assessment Summary

Patty Perry reviewed the list of natural and man-made hazards that was identified in the 2008 Plan, and presented a list of hazards for the Committee's review. She also reviewed results of the 16 surveys received through the public outreach forum. The Committee reviewed and discussed the various hazards and added Solar Flares as a natural hazard. Hanford Nuclear, Railroad Derailments, Cyber Attacks and Power Grid Failure were also added as man-made hazards.

Committee members in attendance had no further comments or questions regarding these Sections. Les Miller announced his retirement at the end of the year and would most likely not be able to do any traveling in December but may be able to call in or provide the committee an introduction to the next USACE representative.

3. **Next meeting:** Patty Perry noted that although a meeting in November was initially proposed, the addition of the new hazards will require additional research and evaluation. A meeting date of December 15, 2014 was agreed to.

Next Agenda:

To be determined

Follow-up:

Patty Perry and Ray Denny to coordinate on the research necessary to complete the plan;

Patty Perry to continue the writing and map generation with the CTUIR GIS Program

December 15, 2014 – CTUIR Hazard Mitigation Plan

Steering Committee Agenda

1:00p.m. CTUIR Public Safety Building

1. Continued review of Draft Section 3

2. Review Draft Section 4 – Projected Impacts to the Umatilla Indian Reservation and CTUIR-owned off-Reservation Trust lands.

3. Section 5 - Mitigation Projects.

4. Next meeting and preparation for public involvement

Patty Perry contact info: (541) 429-7518; pattyperry@ctuir.org

CTUIR Hazard Mitigation Plan – December 15, 2014

1:00p.m. CTUIR Public Safety Building Conference Room

Steering Committee MEETING SUMMARY:

Attendance: see attached sign-in sheet

AGENDA:

1. Review of Draft Section 3: Patty Perry summarized how the Committee identified the hazards at the last meeting and noted that although Solar Flares was brought up as a concern there was no documentation that could be located regarding it as a natural hazard for our area. Ms. Perry also noted that there were some secondary issues involving Solar Flares that involved communication and power grid failure issues. She suggested that since power grid failure was being included as a man-made hazard that Solar Flares not be included in the Plan. No Committee members present were in opposition to the suggestion.

Les Miller suggested the Plan should document that Solar Flares, as a potential hazard, was considered by the Steering Committee. Mr. Miller also suggested that the column titles in Table 3-1 would be easier to read if they were angled.

The group recommended new manmade hazard sections be added for railroad derailments and cyber-attack of CTUIR systems. A contractor, funded by Homeland Security, is conducting a risk assessment of the CTUIR information systems. The assessment will be completed in December, 2014.

Patty Perry noted a need to address the off-Reservation CTUIR-owned trust lands with respect to these hazards. Hazards are addressed in a broad way for these lands (Wanaket, Wanapa and French Town) via the Umatilla County and Walla Walla County Plans so this Plan will address these lands as to their likely vulnerability to the hazards.

Olin Anderson, CTUIR Dept. of Natural Resources Fisheries Program, noted the Plan needs to address First Foods. Patty Perry reassured Mr. Anderson that First Foods is now incorporated in the Plan throughout instead of just one area and noted a few sections. Mr. Anderson said he would review the documents and questioned how climate change is addressed in the Plan. He also suggested that Cultural Impacts be added to Table 3-2.

The Committee continued to review the natural hazards:

Flooding – Patty Perry reviewed the updates made regarding the CTUIR's entry into the National Flood Insurance Program and reviewed the updated flood event tables and information. Based on the current available information; the UIR's vulnerability remains at the moderate level.

Olin Anderson indicated the desire to protect First Foods and the floodplain, to limit development and to remove the development that already exists. Ms. Perry noted that development is already limited in the Flood Hazard Overlay Zone and prohibited within the floodway portion of that zone. She explained that although the purpose of the current regulations is insurance related, they serve a dual purpose- to protect the flood plain and its habitat.

Ray discussed the notifications sent by the Corp of Engineers concerning Umatilla River levee inspection failures at North Wenix Springs and Shaplish. Until repaired, these sections of levee would not be eligible for emergency repair public assistance funding in the case of failure.

In the past five years, the Mission housing area has experienced flooding due to high water tables. The group suggested adding information to the plan to cover this flooding impact to public housing.

Wildfire - Patty noted that the previous Plan did not contain information that describes the jurisdictional relationship between Oregon Department of Forestry, the BIA and the Tribal Fire Department. The History of Wildfires section was edited by the three agencies during the meeting to ensure accuracy. Les Miller commented that the sections included in the Plan that address impacts from each hazard on the special needs population was a good thing.

Severe Winter Weather – The Total Monthly Snowfall table has been updated and text adjusted. The Probability of winter storms affecting the UIR remains high.

Spring and Summer Storms – The historical table of storms has been updated and the Vulnerability continues to be medium.

2. Review of Draft Section 4 – Projected Impacts to the Umatilla Indian reservation and CTUIR-owned off-Reservation Trust lands. This was addressed under Item 1.

3. Section 5 - Mitigation Projects.

Several members had to leave the meeting early and due to the reduced participation the entire Agenda was not completed.

4. **Next meeting:** No future meeting date was determined. Les Miller noted that he is retiring and no one from the Corps has been assigned to take his place on this advisory committee. He

said the draft Plan can be sent to the Readiness Section, Lance Lindsay, in the Portland Office for review.

Next Agenda: Complete review of Section 3, 4 and 5.

Follow-up:

Patty Perry and Ray Denny to coordinate on the research necessary to complete the plan;

Patty Perry to continue the writing and map generation with the CTUIR GIS Program

12-15-14

CTUIR
Hazard Mitigation Steering Committee

Ray Denny	CTUIR	Staff	541-429-7606
Darron Williams	BIA		541 278 3788
Tom Hebert	SAIF		~~280~~-377-1518
Dennis Perilli	ODF		541-276-3491
Olin Anderson	CTUIR	DNR/Fisheries	
Les Miller	USCOE	on phone	
Toni Cordell	WRC		5419661986
Patty Perry	CTUIR	Planning	
Gerald Reed	NRC		

March 2, 2015 – CTUIR Hazard Mitigation Plan

Steering Committee Agenda

1:30p.m. CTUIR Public Safety Building

1. Summary of Draft changes made since last meeting - Handout

2. Sections 5 & 6 - Mitigation Projects review

3. Next meeting and preparation for public involvement process
   - Update Plan completion schedule

Patty Perry contact info: (541) 429-7518; pattyperry@ctuir.org

March 2, 2015

2015 CTUIR Hazard Mitigation Plan status update – items completed since last meeting December 15, 2014: Maps updated throughout the document

Section 1: Introduction

- Completed information on off-Reservation CTUIR-owned Trust lands
- Still needs adjustments as other Sections are completed

Section 2: Profile

- Added residential heating sources graphic pie chart (Pg. 12)
- Added paragraph regarding climate change (Pg. 2)
- Revised Item 11 (Pg. 19) listing Reservation assets list

Section 3: Hazard Identification/Risk Assessment Summary

- Natural hazards list- deleted epidemiological from list
  - ✓ Not considered a natural hazard in Oregon Plan
  - ✓ No documentation
  - ✓ Recognized as important and addressed by the Dept. of Human Services Public Health Vulnerability Assessment (2014)
  - ✓ There is no CTUIR Epidemiological study/evaluation – Study addressing alcohol and drug use on Reservation as an epidemic was completed and apparently referred to as the CTUIR Epidemiological Study inaccurately.
- Man-Made hazards list – railroad issues included in with hazardous material spills and updated;
- Reformatted entire Section so each hazard is assessed in order as it occurs on list and with same criteria
- Added Cultural Impact to Tables 3-2 and 3-23 for qualitative impact/risk assessment (based on Steering Committee comment). This addition required adding sections to address this throughout this entire Section.
- Added climate change sub-section (Pg. 4)
- Added Table 3-7, Wildfire History and Cause Summary
- Added Special Needs sub-section to all hazards addressed for consistency
- Updated Table 3-20, Incidents at Public Rail Crossings
- Updated Dam Failure sub-section
- Added sub-section 4; Electronic/Communications Failure (still need to add data supporting how this is a hazard to Reservation); History of failure, Impacts to UIR assets, Extent and Probable Intensity and Vulnerability

- Completed Risk Assessment summary and updated based on previous scoring parameters

Section 4: Projected Impacts from Disasters to the UIO

- All maps updated
- Table 4-1: updated as best I could (waiting for assistance with $ information from Finance Dept.)
- Updated all other Tables with hazard list established in Chapter 3 against the assets and categories
- Added Cultural Impact to all assessments and documentation revising tabulations and summary

Section 5: Hazard Mitigation Goals and Measures

- Reviewed by staff and updated

Section 6: Mitigation Measure Implementation

- Reviewed by staff and partially updated

CTUIR Hazard Mitigation Plan – March 2, 2015, 2014

1:30p.m. CTUIR Public Safety Building Conference Room

Steering Committee MEETING SUMMARY:

Attendance: see attached sign-in sheet

AGENDA:

1. Summary of Draft changes made since December 2014 meeting – handout

Patty Perry summarized the handout listing changes made to Sections 1-7 based on Committee comments and data research. Questions were raised about the hazard risk assessment calculations and the process was explained (Section 3).

2. Section 5 and 6 – Mitigation Projects review

Mitigation measures listed in Section 5 were reviewed and several suggestions from committee members present were added:

- MH4 add materials
- MH5 update with social media and Tribal radio station KCUW
- New; CTUIR develop a method of mass communication, various methods discussed including Reverse 911 and Code Red (text messaging)
- New; CTUIR obtain Satellite phones for maintaining communication during outages and disasters. Also suggested for CTUIR workers who have to be in remote areas where there is no cell phone coverage.
- New; CTUIR participation in great "Shake Out" event (earthquake)
- New; Coordinate with Union Pacific Railroad to obtain training and/or equipment for CTUIR emergency responders.

Patty Perry noted that new items and old items will be evaluated and prioritized under Section 6. Perry also informed the Committee that she requested review of the mitigation measures by the CTUIR Capital Improvements Committee (CIC) at their meeting February 26, 2015. The CIC consists of CTUIR Department and Program Directors and Managers that have knowledge of and direct involvement with all CTUIR improvement projects.

3. Next meeting and public involvement discussion

No future meeting date was determined. Patty Perry noted that Ray Denny is working on getting a place on the CTUIR web site for display of the draft Plan when complete. The Plan still needs some hazard-related data and CTUIR asset replacement figures from finance. The next meeting should have the entire draft Plan ready to start the internal review process.

Next Agenda: Finalize Draft and start internal/public review process.

Confederated Tribes *of the*
Umatilla Indian Reservation

46411 Timíne Way
Pendleton, OR 97801

www.ctuir.org
Phone 541-276-3099

email: info@ctuir.org
Fax: 541-276-3099

HAZARD MITIGATION PLAN SIGN-IN SHEET

March 2, 2015

Attendees/Agency/Dept./ Comm. or Commission	Signature (legible)	EMAIL ADDRESS
CTUIR – Planning Office	Kristy Berry	
CTUIR – Public Works	(Frank Anderson)	
CTUIR – Natural Resources		
CTUIR – DOSE		
Yellowhawk	(Erick Gabriel)	
Cultural Resources Comm.		
Natural Resources Comm.		
Science & Tech. Comm.		
Fish & Wildlife Comm.		
Tribal Water Comm.		
Law & Order Comm.		
Tiicham Cons. Dist.		
CTUIR General Council		
ODOT		
BIA-Superintendent		
City of Pendleton	Klaus J Hoehna	Klaus.hoehna@ci.pendleton.or.us
FEMA - Mitigation		
NOAA – Weather Service		
NRCS		
OR Dept. of Forestry		
US Corps of Engineers		
US Forest Service		
Umatilla County		
WRC		
Others:		
City of Pendleton	Tim Smith	Tim.Smith@ci.pendleton.or.us
Public Safety - Ray Denny		

September 21, 2015– CTUIR Hazard Mitigation Plan

Steering Committee Agenda

1:30p.m. CTUIR Public Safety Building

1. Summary of Status
2. Collection of Prioritization Forms 1 and 2/Section 5 - Mitigation Projects prioritization. Questions?
3. Review of Section 8 and what happens next?
4. Schedule for completion of internal review (C/Cs), BOT Work Session, General Council and final public meeting

Patty Perry contact info: (541) 429-7518; pattyperry@ctuir.org

Ray Denny contact info: (54) 429-7606; raydenny@ctuir.org

Today's Date: September 8, 2015

To: CTUIR Hazard Mitigation Steering Committee members

From: Patty Perry (541-429-7518) and Ray Denny (541-429-7606)

Regarding: Next meeting scheduled for Monday, September 21, 2015

We invite you to the next Committee meeting to be held 1:30 – 4:00 on Monday, September 21, 2015 in the CTUIR Public Safety Building conference room. Draft Sections of the Hazard Mitigation Plan can be viewed on the internal Z:\Planning\Haz Mit Plan 2015 drive or are available on the CTUIR FTP site using the following instructions: In the address bar put this: ftp://ftp.services.ctuir.org and enter Username ctuir and Password public.

The DRAFT Plan has been completed with the exception of the prioritization of the list of mitigation measures/action items. That's where you come in as a member of this Committee. We need your input to prioritize these items since this is one of FEMA's requirements for an 'approved' Mitigation Plan. The complete listing of these measures and an explanation of the prioritization process can be found in Section 5 and attached to this notice. The process involves the completion of two forms included in this meeting packet. **Please complete these forms prior to the meeting and bring the completed forms to the meeting. If you need hard copies of these forms please contact either of us as soon as possible and we will get them to you.**

2015 CTUIR Hazard Mitigation Plan status update – items completed since last meeting

Since last meeting in March, Planning staff completed the Draft Plan, Executive Summary and coordinated with Oregon Emergency Management and FEMA Region 10 Mitigation Division regarding submission requirements. The Sections of the plan have been condensed and revised to meet the current CFR requirements for Tribal Mitigation Plans.

August 27, 2015 -	Presented update and list of Mitigation Measures to the Capital Improvements Committee for finalization prior to prioritization by the Committee.
September 1, 2015-	Ray Denny presented and discussed Section 8 with the Law and Order Committee for confirmation of monitoring and maintenance process.
September 8, 2015-	Patty Perry reviewed the Executive Summary with the Natural Resources Commission as an informational item on their agenda.
October-	Internal review (Committees/Commissions, BOT, General Council)

Formal Public Meeting- to include all applicable agencies (local jurisdictions, State, Federal) and the general public

CTUIR Hazard Mitigation Plan – September 21, 2015

1:30p.m. CTUIR Public Safety Building Conference Room

Steering Committee MEETING SUMMARY:

Attendance: Patty Perry, Ray Denny, Dennis Hull (NOAA) and Eric Gabriel (YTHC); see also attached sign-in sheet

AGENDA:

1. **Summary of Draft changes made since March 2015 meeting – handout**

   Patty Perry summarized the handout/meeting notice status update describing coordination and other CTUIR internal meetings for review held.

2. **Collection of Prioritization Forms 1 and 2/Section 5**

   Patty Perry noted that the forms were sent out to all Steering Committee members via email and hard copies hand delivered or mailed to CTUIR committee/commission volunteers. Two copies were completed (Patty Perry and JD Tovey). Patty also noted that the prioritization process in 2007 used six forms that were completed by the TERC members. Ray Denny, Dennis and Eric committed to complete and submit their forms which will make a total of five. Eric requested a copy on a thumb drive since Yellowhawk does not have access to the CTUIR internal shared drive.

   It was suggested that a follow up notice/reminder be sent to the Steering Committee members with a deadline of October 2, 2015 to get at least one set of the forms completed.

3. **Review of Section 8**

   Patty Perry reviewed the monitoring process using the projector for those present. She noted that Ray Denney reviewed this section with the Law and Order Committee on September 1, 2015 and is expecting approval in the form of a motion at their next meeting, October 6th.

4. **Schedule for Completion of Internal Review**

   After discussion, it was determined that following the October 2, 2015 deadline to receive the prioritization forms Ray and Patty will meet to determine the schedule for which committees and commissions should review and schedule a Board Work Session then General Council in October. Patty will tally the prioritization results and coordinate the FEMA approval after the Board Work Session.

No additional meetings of the Steering Committee will be held. According to the Section 8 monitoring process, the Law and Order Committee which is advisory to the Public Safety Department will take over its role to review the Plan.

September 21, 2015

Name	organization
Dennis Hull	NOAA Weather
Eric Gabler	YTHC
Patty Perry	CTUIR - Planning
Ray Denny	CTUIR - Public Safety

Explanation of the Benefit-Cost Assessment (Form 1)

The Benefit-Cost Assessment Form is part of a two step prioritization process. This form is the first step. It is designed to help the hazard mitigation plan's steering committee evaluate and prioritize mitigation measures using criteria which allow comparisons among various types of proposed mitigation actions. This form or table has a place to list the mitigation actions or projects, a scale for measuring estimated benefits and estimated costs, and two categories for concluding whether the participant believes the project's benefits are greater than its costs and if the project is eligible for a FEMA grant.

Estimated Benefits

Under the Estimated Benefits category, the form provides for a quick assessment of whether the proposed mitigation measure's will prevent or reduce the following:

- Injuries or deaths
- Displacement Costs
- Disruption Costs
- Loss of Service
- Business Closure
- Bridge/Road Closure
- Recovery Costs
- Replacement Costs

Based on the perceived ability of the mitigation measures value in preventing or reducing losses from hazardous events, the user of this form will circle a 50 if the benefits from the mitigation action are very high, a 40 if the benefits are high, a 30 if a medium level of benefits are derived, a 20 if the benefits are low and a 10 if they are very low.

Estimated Costs

A similar process, as used to assess benefits, is used for assessing project costs. Because mitigation measures were not analyzed for their actual costs, five categories of costs were provided to help compare project benefits with project costs. The five categories are as follows:

< $10,000
$10,000 to $25,000
$25,001 to $100,000
$100,001 to $ 250,000
> $250,000

If a project is less than $10,000, it falls into the "very low" category for cost, and a 50 is circled; if a projects costs between $10,000 and $25,000, it has "low" costs and a 40 is circled. "Medium" costs are $25,001 to $100,000 and receive a 30. Between $100,001 and $250,000 are considered "high" costs and receive a 20. Costs greater than $250,000 are considered "very high" and receive a 10. By completing this form in this manner, an emphasis on the benefits and costs of each mitigation measure has been incorporated into the prioritization process as required by FEMA.

B>C and FEMA Eligible?

The "benefit greater than cost" category gives those assessing proposed mitigation measures the opportunity to conclude whether they believe the proposed mitigation measure provides greater benefits in mitigating against future hazardous events than the costs associated with implementing the proposed measure. If information is available about whether the proposed mitigation measure is eligible for a FEMA grant, indicating whether it is eligible or not is entered on the form.

Mitigation Measure Prioritization (Form 2)

Once the Benefit-Cost assessment is complete, assessing how the proposed mitigation projects satisfy FEMA and local objectives and whether they can or cannot easily obtain funding are considerations helpful in prioritizing proposed mitigation actions. Like the previous benefit-cost assessment form, assessing points using the following criteria will help in determining which proposed mitigation actions are high, medium and low priority projects.

The criteria and the possible points under each criterion are as follows:

Eliminates Repetitive Loss (0-10 pts)
Greatest Economic Impact (0-10)
Greatest Good for Most People (0-10)
Least Expensive Option (0-10)
Funding Is Secure or Easy to Obtain (0-5)
Can Fund Sooner (0-5)
Has Greater Public and Political Support (0-5)
Benefits More Than One Jurisdiction (0-5)
Addresses Two or More Goals (0-5)
Local Ability to Perform Project (0-5)

Using the first four criteria, the participant is allowed to award up to 10 points because these criteria address major mitigation objectives and save tax dollars. Participants are allowed to award up to 5 points for the remaining criteria which focus primarily on the ability to implement the mitigation measure or the measures value in successfully executing of the hazard mitigation plan.

Once the Benefit-Cost Assessment and Mitigation Action Prioritization Process forms are completed, the scores are totaled for each mitigation project to determine an overall score used for ranking the measures overall priority.

(For confidentiality, each completed form will be given a number and will be used for tallying and documentation purposes only)

FORM 1: Benefit – Cost Assessment

Measure/Action	Estimated Benefits				Estimated Cost			B > C
PE-1: INFORMATION.	**Prevents or Reduces:** - Injury or Loss of Life - Displacement Costs - Disruption Costs - Loss of Service - Business Closure - Bridge/Road Closure - Recovery Costs - Replacement Costs	Very High High Medium Low Very Low	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
PE-2: BUSINESS CONTINUITY PLAN.	**Prevents or Reduces:** - Injury or Loss of Life - Displacement Costs - Disruption Costs - Loss of Service - Business Closure - Bridge/Road Closure - Recovery Costs - Replacement Costs	Very High High Medium Low Very Low	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
PE-3: GOVERNMENT CONTINUITY PLAN.	**Prevents or Reduces:** - Injury or Loss of Life - Displacement Costs - Disruption Costs - Loss of Service - Business Closure - Bridge/Road Closure - Recovery Costs - Replacement Costs	Very High High Medium Low Very Low	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
PE-4: HAZARDOUS EVENTS ON WEBSITE	**Prevents or Reduces:** - Injury or Loss of Life - Displacement Costs - Disruption Costs - Loss of Service - Business Closure - Bridge/Road Closure - Recovery Costs - Replacement Costs	Very High High Medium Low Very Low	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
PE-5: PARTNER TO SHARE RESOURCES.	**Prevents or Reduces:** - Injury or Loss of Life - Displacement Costs - Disruption Costs - Loss of Service - Business Closure - Bridge/Road Closure - Recovery Costs - Replacement Costs	Very High High Medium Low Very Low	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
PE-6: REGIONAL E.M. and INFO HUB.	**Prevents or Reduces:** - Injury or Loss of Life - Displacement Costs - Disruption Costs - Loss of Service - Business Closure - Bridge/Road Closure - Recovery Costs - Replacement Costs	Very High High Medium Low Very Low	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**

(For confidentiality, each completed form will be given a number and will be used for tallying and documentation purposes only)

PE-7: STORM-READY.	**Prevents or Reduces:** **- Injury or Loss of Life** **- Displacement Costs** **- Disruption Costs** **- Loss of Service** **- Business Closure** **- Bridge/Road Closure** **- Recovery Costs** **- Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
PE-8: EMERGENCY ALERT SYSTEM.	**Prevents or Reduces:** **- Injury or Loss of Life** **- Displacement Costs** **- Disruption Costs** **- Loss of Service** **- Business Closure** **- Bridge/Road Closure** **- Recovery Costs** **- Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
PE-9: COMMUNITY RATING SYSTEM. (NFIP program)	**Prevents or Reduces:** **- Injury or Loss of Life** **- Displacement Costs** **- Disruption Costs** **- Loss of Service** **- Business Closure** **- Bridge/Road Closure** **- Recovery Costs** **- Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
PE-10: EMERGENCY OPERATIONS PLAN.	**Prevents or Reduces:** **- Injury or Loss of Life** **- Displacement Costs** **- Disruption Costs** **- Loss of Service** **- Business Closure** **- Bridge/Road Closure** **- Recovery Costs** **- Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
PE-11: EDUCATE. **(promote local awareness of hazards and mitigation)**	**Prevents or Reduces:** **- Injury or Loss of Life** **- Displacement Costs** **- Disruption Costs** **- Loss of Service** **- Business Closure** **- Bridge/Road Closure** **- Recovery Costs** **- Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
PE-12A: FLOODING. Assist home owners that have previously flooded to protect their structures from future damage.	**Prevents or Reduces:** **- Injury or Loss of Life** **- Displacement Costs** **- Disruption Costs** **- Loss of Service** **- Business Closure** **- Bridge/Road Closure** **- Recovery Costs** **- Replacement Costs**	Very High High Medium Low Very Low	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
PE-12B: FLOODING. Maintain compliance with current NFIP regulations to make flood insurance available to property owners in the UIR.	**Prevents or Reduces:** **- Injury or Loss of Life** **- Displacement Costs** **- Disruption Costs** **- Loss of Service** **- Business Closure** **- Bridge/Road Closure** **- Recovery Costs** **- Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**

(For confidentiality, each completed form will be given a number and will be used for tallying and documentation purposes only)

PE-13: EARTHQUAKE. Participate in the "Great Shake Out" to educate and remind residents how to prepare for and respond to an earthquake event	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
PE-14: FOG. Expand the radio frequency traveler's information program to inform the public of road conditions on I-84	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
PE-15A: WILDFIRES. Coordinate with and support prevention and education efforts identified in the BIA WFPP.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
PE-15B: WILDFIRES. Identify and inform property owners about bridges that cannot support weight of emergency vehicles.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
PE-15C: WILDFIRES. Promote retrofitting of homes in WUI areas with noncombustible materials.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
PE-16: Natural Gas Pipeline Break. Coordinate with the pipeline company operators to provide pipeline safety education forums.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
P-1: COMP. PLAN Ensure all CTUIR functional plans adopted consider mitigation measures to address relevant hazards.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**

(For confidentiality, each completed form will be given a number and will be used for tallying and documentation purposes only)

P-2: LAND DEV. CODE Help protect <u>future</u> development from hazardous events	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
P-3: LDC (Landslides & Wildfires) Help protect <u>existing</u> and future development from hazardous events	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
P-4: Int'l Building Codes. Help make new or renovated structures more disaster resistant.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
P-5A: FLOODING Purchase and remove existing structures in flood hazard areas as funding and willing sellers allow.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
P-5B: FLOODING. Pursue vegetation and restoration practices that assist in enhancing and restoring the natural and beneficial functions of the flood plain and watershed	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
P-5C: FLOODING. Include properties located within the Flood Hazard Overlay Zone as a priority in the CTUIR Land Acquisition Strategy Plan as funding and willing sellers allow.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
P-5D: FLOODING. Work with local, state and federal jurisdictions to install, maintain and operate stream gauging stations on the UIR.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**

(For confidentiality, each completed form will be given a number and will be used for tallying and documentation purposes only)

P-6A: EARTHQUAKE. Conduct a study to determine which buildings and infrastructure on the UIR face a risk from earthquakes.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
P-6B: EARTHQUAKE. Monitor earthquake activity; establish and implement an infrastructure inspection process for the Community water and sewer system; retrofit as needed.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
P-6C: EARTHQUAKE. Update the 2006 CTUIR Water and Wastewater Master Plan.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
P-7A: FOG. Provide additional cameras on I-84.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
P-7B: FOG. Work with ODOT and State Police to provide a lead car to guide vehicles on Cabbage Hill during times of dense and freezing fog**.**	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
P-8: SEVERE WINTER STORMS. Expand the NOAA emergency management signal covering the UIR.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
P-9A: WILDFIRE. Evaluate all new development within the designated high and medium wildland-urban interface (WUI) areas for fire hazard.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**

(For confidentiality, each completed form will be given a number and will be used for tallying and documentation purposes only)

P-9B: WILDFIRE. Within designated WUI and at risk WFPP areas ensure adequate access/egress for fire-fighting vehicles.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
P-10A: DROUGHT. Develop/Update Water Conservation Plan.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
P-10B: DROUGHT. Provide technical assistance and low-interest loans to farmers and ranchers to develop livestock watering systems.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
P-11A: DUST STORMS. Provide technical assistance and low-interest loans to farmers and ranchers to develop livestock watering systems.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
P-11B: DUST STORMS. Develop an Agricultural Management Plan for the UIR to include soil retention best management practices.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
P-11C: DUST STORMS. Explore methods of improving communication of hazardous blowing dust conditions with local public safety and law enforcement agencies.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
P-12: DAM FAILURE. Implement and update as necessary, the Indian Lake Dam EOP.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**

(For confidentiality, each completed form will be given a number and will be used for tallying and documentation purposes only)

S-1A: FLOODING. Identify and implement measures to mitigate erosion of the county road serving Upper McKay Creek.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
S-1B: FLOODING. Flood-proof existing homes in the "July Grounds" area to mitigate for mold and rot associated with the high water table hazard.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
S-2A: SEVERE WINTER STORMS. Replace existing power lines with heavier T-2 line, shorter spans, and heavier poles and crossbars.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
S-2B: SEVERE WINTER STORMS. Bury utility lines to remove the risk of power outages due to ice.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
S-2C: SEVERE WINTER STORMS. Install a second substation to provide a secondary service route to the power grid system.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
S-2D: SEVERE WINTER STORMS. Develop additional semi-truck parking near Arrowhead to address safety issues with I-84 winter closures.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
S-3A: DROUGHT. Increase storage of water, especially off stream storage for beneficial use by Farming Enterprise and First Foods.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**

(For confidentiality, each completed form will be given a number and will be used for tallying and documentation purposes only)

S-3B: DROUGHT. Increase storage capacity and supply of potable water to the CTUIR Community Water System which is at capacity.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
PP-1A: WILDFIRES. Develop a Reservation slash pickup, chipping and reuse program in WUI designated areas for homeowners.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
PP-1B: WILDFIRES. Inventory existing water supplies within the UIR suitable for use in fighting wildland fires.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
PP-2A: HAZARDOUS MATERIALS SPILLS. Provide an enclosed and "haz mat ready" safety facility for trucks with leaking loads near the most accident-prone area of I-84 within the Reservation boundaries.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
PP-2B: HAZARDOUS MATERIALS SPILLS. Increase patrol of Casino and Arrowhead parking areas for leaking materials or when I-84 is closed.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
PP-3: FLOODING. Move the affected people out of danger by relocating or elevating threatened homes.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
ES-1: EMERGENCY OPERATIONS PLAN. **A.** Annually review the Plan with individuals and agencies responsible for implementation.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**

(For confidentiality, each completed form will be given a number and will be used for tallying and documentation purposes only)

ES-1: EMERGENCY OPERATIONS PLAN. B. Amend all as necessary to keep current.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
ES-2: SEVERE WINTER STORMS. Work with existing utility companies providing services within the UIR to coordinate emergency response to address power outages.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
ES-3A: WILDFIRES. Within designated WUI and at risk WFPP areas provide emergency access/egress road signs and maps for homeowners.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
ES-3B: WILDFIRES. Develop a process to encourage private property owners to upgrade their bridges to support the weight of fire trucks and emergency vehicles.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
ES-4: DUST STORMS. Expand and use the EAS to provide timely information to the traveling public about hazardous blowing dust conditions.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
ES-5A: HAZARDOUS MATERIALS SPILLS. Coordinate with the Union Pacific Railroad for local response to derailments and spills.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
ES-5B: HAZARDOUS MATERIALS SPILLS. Develop a response training program with UPRR and Umatilla County for use of specialized equipment.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**

(For confidentiality, each completed form will be given a number and will be used for tallying and documentation purposes only)

ES-6: CRITICAL FACILITIES PROTECT Ensure all critical facilities are equipped with emergency backup generators and fuel supply.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
NR-1: FLOODING. Pursue vegetation and restoration practices that assist in enhancing and restoring the natural and beneficial functions of the flood plain and watershed.	**Prevents or Reduces:** - **Injury or Loss of Life** - **Displacement Costs** - **Disruption Costs** - **Loss of Service** - **Business Closure** - **Bridge/Road Closure** - **Recovery Costs** - **Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**

FORM 2: MITIGATION ACTION ITEM PRIORITIZATION

	Eliminates Repetitive Loss (1-10pts)	Greatest Economic Impact (0-10)	Greatest Good for Most People (0-10)	Least Expensive Option (0-10)	Funding Is Secure or Easy to Obtain (0-5)	Can Fund Sooner (0-5)	Has Greater Public and Political Support (0-5)	Benefits More Than One Jurisdiction (0-5)	Addresses Two or More Goals (0-5)	Local Ability to Perform Project (0-5)	TOTAL POINTS From both forms
PE-1: INFORMATION.											
PE-2: BUSINESS CONTINUITY PLAN.											
PE-3: GOVERNMENT CONTINUITY PLAN.											
PE-4: HAZARDOUS EVENTS ON WEBSITE											
PE-5: PARTNER TO SHARE RESOURCES.											
PE-6: REGIONAL E.M. and INFO HUB.											
PE-7: STORM-READY.											
PE-8: EMERGENCY ALERT SYSTEM.											
PE-9: COMMUNITY RATING SYSTEM. **(NFIP program)**											
PE-10: EMERGENCY OPERATIONS PLAN.											
PE-11: EDUCATE. (promote local awareness of hazards and mitigation)											
PE-12A: FLOODING. Assist home owners that have previously flooded to protect their structures from future damage.											
PE-12B: FLOODING. Maintain compliance with current NFIP regulations to make flood insurance available to property owners in the UIR.											

	Eliminates Repetitive Loss (1-10pts)	Greatest Economic Impact (0-10)	Greatest Good for Most People (0-10)	Least Expensive Option (0-10)	Funding Is Secure or Easy to Obtain (0-5)	Can Fund Sooner (0-5)	Has Greater Public and Political Support (0-5)	Benefits More Than One Jurisdiction (0-5)	Addresses Two or More Goals (0-5)	Local Ability to Perform Project (0-5)	TOTAL POINTS From both forms
PE-13: EARTHQUAKE. Participate in the "Great Shake Out" to educate and remind residents how to prepare for and respond to an earthquake event											
PE-14: FOG. Expand the radio frequency traveler's information program to inform the public of road conditions on I-84											
PE-15A: WILDFIRES. Coordinate with and support prevention and education efforts identified in the BIA WFPP.											
PE-15B: WILDFIRES. Identify and inform property owners about bridges that cannot support weight of emergency vehicles.											
PE-15C: WILDFIRES. Promote retrofitting of homes in WUI areas with noncombustible materials.											
PE-16: Natural Gas Pipeline Break. Coordinate with the pipeline company operators to provide pipeline safety education forums.											
P-1: COMP. PLAN Ensure all CTUIR functional plans adopted consider mitigation measures to address relevant hazards.											
P-2: LAND DEV. CODE Help protect <u>future</u> development from hazardous events											

	Eliminates Repetitive Loss (1-10pts)	Greatest Economic Impact (0-10)	Greatest Good for Most People (0-10)	Least Expensive Option (0-10)	Funding Is Secure or Easy to Obtain (0-5)	Can Fund Sooner (0-5)	Has Greater Public and Political Support (0-5)	Benefits More Than One Jurisdiction (0-5)	Addresses Two or More Goals (0-5)	Local Ability to Perform Project (0-5)	TOTAL POINTS From both forms
P-3: LDC (Landslides & Wildfires) Help protect existing and future development from hazardous events											
P-4: Int'l Building Codes. Help make new or renovated structures more disaster resistant.											
P-5A: FLOODING Purchase and remove existing structures in flood hazard areas as funding and willing sellers allow.											
P-5B: FLOODING. Pursue vegetation and restoration practices that assist in enhancing and restoring the natural and beneficial functions of the flood plain and watershed											
P-5C: FLOODING. Include properties located within the Flood Hazard Overlay Zone as a priority in the CTUIR Land Acquisition Strategy Plan as funding and willing sellers allow.											
P-5D: FLOODING. Work with local, state and federal jurisdictions to install, maintain and operate stream gauging stations on the UIR.											
P-5E: FLOODING. Work with local, state and federal jurisdictions to install, maintain and operate stream gauging stations on the UIR.											
P-6A: EARTHQUAKE. Conduct a study to determine which buildings and infrastructure on the UIR face a risk from earthquakes.											

	Eliminates Repetitive Loss (1-10pts)	Greatest Economic Impact (0-10)	Greatest Good for Most People (0-10)	Least Expensive Option (0-10)	Funding Is Secure or Easy to Obtain (0-5)	Can Fund Sooner (0-5)	Has Greater Public and Political Support (0-5)	Benefits More Than One Jurisdiction (0-5)	Addresses Two or More Goals (0-5)	Local Ability to Perform Project (0-5)	TOTAL POINTS From both forms
P-6B: EARTHQUAKE. Monitor earthquake activity; establish and implement an infrastructure inspection process for the Community water and sewer system; retrofit as needed.											
P-6C: EARTHQUAKE. Update the 2006 CTUIR Water and Wastewater Master Plan.											
P-7A: FOG. Provide additional cameras on I-84.											
P-7B: FOG. Work with ODOT and State Police to provide a lead car to guide vehicles on Cabbage Hill during times of dense and freezing fog.											
P-8: SEVERE WINTER STORMS. Expand the NOAA emergency management signal covering the UIR.											
P-9A: WILDFIRE. Evaluate all new development within the designated high and medium wildland-urban interface (WUI) areas for fire hazard.											
P-9B: WILDFIRE. Within designated WUI and at risk WFPP areas ensure adequate access/egress for fire-fighting vehicles.											
P-10A: DROUGHT. Develop/Update Water Conservation Plan.											
P-10B: DROUGHT. Provide technical assistance and low-interest loans to farmers and ranchers to develop livestock watering systems.											

	Eliminates Repetitive Loss (1-10pts)	Greatest Economic Impact (0-10)	Greatest Good for Most People (0-10)	Least Expensive Option (0-10)	Funding Is Secure or Easy to Obtain (0-5)	Can Fund Sooner (0-5)	Has Greater Public and Political Support (0-5)	Benefits More Than One Jurisdiction (0-5)	Addresses Two or More Goals (0-5)	Local Ability to Perform Project (0-5)	TOTAL POINTS From both forms
P-11A: DUST STORMS. Provide assistance and low-interest loans to farmers and ranchers to develop livestock watering systems.											
P-11B: DUST STORMS. Develop an Agricultural Management Plan for the UIR to include soil retention best mgt. practices.											
P-11C: DUST STORMS. Explore methods of improving communication of hazardous blowing dust conditions with local public safety and law enforcement agencies.											
P-12: DAM FAILURE. Implement and update as necessary, the Indian Lake Dam EOP.											
S-1A: FLOODING. Identify and implement measures to mitigate erosion of the county road serving Upper McKay Creek.											
S-1B: FLOODING. Flood-proof existing homes in the "July Grounds" area to mitigate for mold and rot associated with the high water table hazard.											
S-2A: SEVERE WINTER STORMS. Replace existing power lines with heavier T-2 line, shorter spans, and heavier poles and crossbars.											
S-2B: SEVERE WINTER STORMS. Bury utility lines to remove the risk of power outages due to ice.											

	Eliminates Repetitive Loss (1-10pts)	Greatest Economic Impact (0-10)	Greatest Good for Most People (0-10)	Least Expensive Option (0-10)	Funding Is Secure or Easy to Obtain (0-5)	Can Fund Sooner (0-5)	Has Greater Public and Political Support (0-5)	Benefits More Than One Jurisdiction (0-5)	Addresses Two or More Goals (0-5)	Local Ability to Perform Project (0-5)	TOTAL POINTS From both forms
S-2C: SEVERE WINTER STORMS. Install a second substation to provide a secondary service route to the power grid system.											
S-2D: SEVERE WINTER STORMS. Develop additional semi-truck parking near Arrowhead to address safety issues with I-84 winter closures.											
S-3A: DROUGHT. Increase storage of water, especially off stream storage for beneficial use by Farming Enterprise and First Foods.											
S-3B: DROUGHT. Increase storage capacity and supply of potable water to the CTUIR Community Water System which is at capacity.											
PP-1A: WILDFIRES. Develop a Reservation slash pickup, chipping and reuse program in WUI designated areas for homeowners.											
PP-1B: WILDFIRES. Inventory existing water supplies within the UIR suitable for use in fighting wildland fires.											
PP-2A: HAZARDOUS MATERIALS SPILLS. Provide an enclosed and "haz mat ready" safety facility for trucks with leaking loads near the most accident-prone area of I-84 within the Reservation boundaries.											
PP-2B: HAZARDOUS MATERIALS SPILLS. Increase patrol of Casino and Arrowhead parking areas for leaking materials or when I-84 is closed.											

	Eliminates Repetitive Loss (1-10pts)	Greatest Economic Impact (0-10)	Greatest Good for Most People (0-10)	Least Expensive Option (0-10)	Funding Is Secure or Easy to Obtain (0-5)	Can Fund Sooner (0-5)	Has Greater Public and Political Support (0-5)	Benefits More Than One Jurisdiction (0-5)	Addresses Two or More Goals (0-5)	Local Ability to Perform Project (0-5)	TOTAL POINTS From both forms
PP-3: FLOODING. Move the affected people out of danger by relocating or elevating threatened homes.											
ES-1: EMERGENCY OPERATIONS PLAN. A. Annually review the Plan with individuals and agencies responsible for implementation.											
ES-1: EMERGENCY OPERATIONS PLAN. B. Amend all as necessary to keep current.											
ES-2: SEVERE WINTER STORMS. Work with existing utility companies providing services within the UIR to coordinate emergency response to address power outages.											
ES-3A: WILDFIRES. Within designated WUI and at risk WFPP areas provide emergency access/egress road signs and maps for homeowners.											
ES-3B: WILDFIRES. Develop a process to encourage private property owners to upgrade their bridges to support the weight of fire trucks and emergency vehicles.											
ES-5A: HAZARDOUS MATERIALS SPILLS. Coordinate with the Union Pacific Railroad for local response to derailments and spills.											
ES-5B: HAZARDOUS MATERIALS SPILLS. Develop a response training program with UPRR and Umatilla County for use of specialized equipment.											

	Eliminates Repetitive Loss (1-10pts)	Greatest Economic Impact (0-10)	Greatest Good for Most People (0-10)	Least Expensive Option (0-10)	Funding Is Secure or Easy to Obtain (0-5)	Can Fund Sooner (0-5)	Has Greater Public and Political Support (0-5)	Benefits More Than One Jurisdiction (0-5)	Addresses Two or More Goals (0-5)	Local Ability to Perform Project (0-5)	TOTAL POINTS From both forms
ES-6: CRITICAL FACILITIES PROTECT Ensure all critical facilities are equipped with emergency backup generators and fuel supply.											
NR-1: FLOODING. Pursue vegetation and restoration practices that assist in enhancing and restoring the natural and beneficial functions of the flood plain and watershed.											

Confederated Tribes *of the*
Umatilla Indian Reservation
Tribal Planning Office

46411 Timíne Way
Pendleton, OR 97801

www.ctuir.org email: info@ctuir.org
Phone 541-276-3099 Fax: 541-276-3099

DATE: August 27, 2015

TO: Capital Improvements Committee

FROM: Patty Perry, Senior Planner

RE: Hazard Mitigation Plan update

Attached is a DRAFT Executive Summary and Section 5. Section 5 includes a table containing the list of mitigation measures/Action Items assembled by FEMA categories. The Steering Committee will be meeting soon to prioritize the items on this table and I wanted any comments or additional items (based on the qualifications listed) from the CIP before the prioritization occurs.

Please let me know if you have any additions to this list by September 4, 2015. Email is good and if you would like to review the entire draft plan it is located in the Planning folder on the Z drive.

Thank you

DATE: February 26, 2015
TO: Capital Improvements Committee (CIC)
FROM: Patty Perry, Senior Planner and Ray Denny, Public Safety Director
RE: DRAFT Hazard Mitigation Plan development; request for input from CIC

Your input regarding the development of pre-disaster hazard mitigation projects for the UIR is requested. Sections 5 and 6 contain a list of projects from the old 2008 Plan and their implementation assignments. These projects may or may not be classified as Capital. The CTUIR has added quite a few capital assets since the 2008 Plan which need to be assessed for risk. Full Drafts of Sections 1-6 in their entirety can be found on the Z Drive for review and context.

Please help by: 1) Reviewing Section 4 Table 4-1 Assets and Critical Facilities (attached) and provide feedback to Patty as to the accuracy of the listed assets and to fill in the missing data (highlighted in green);

Table 4-1: Assets and Critical Facilities

CTUIR Economic Assets	Critical at time of disaster	Special Needs Population	Estimated Replacement Cost	Building Type
Coyote Business Parks			$5,500,000	Commercial
Wildhorse Casino	X		$50,000,000	Commercial
Wildhorse Golf Course				Commercial
Wildhorse RV Park				Commercial
Wildhorse Hotel				Commercial
Grain Elevator				Ag. Commercial
Mission Market			$800,000	Commercial
Yellowhawk Tribal Health Clinic	X	X		Medical
Tribal Government Offices	X		$21,938,000	Governmental
Arrowhead Travel Center			$1,769,000	Commercial
Davita Dialysis Center		X	$515,055	Medical
US Forest Service (leased from CTUIR)				Government
Tamástslikt Cultural Institute				Cultural
Field Station Laboratory				Science Research
Kayak Public Transit (fleet maintenance and bus barn)				Maintenance
Public Safety building	X			Police, Communications
Tribal Environmental Recovery Center				Solid Waste
Cultural & Historic Resources				
Tamastslikt Cultural Institute			$11,600,000	Cultural
Nixyáawii Community School				Education
St. Andrews Mission				Religious
Indian cemeteries and burial grounds				Cultural

Veterans Memorial Identified and unidentified cultural resources			$225,000	Governmental
Infrastructure & Critical Facilities				
Government Complex				
Umatilla Tribal Fire Department	x		$1,885,000	
Yellowhawk Clinic	x		$5,500,000	
Public safety building (Police Station, Emergency Management)	x		$2,300,000	
Tribal Housing				
Transportation corridor [I-84, railroad]	x			
Six wells and connecting waterlines				
Two water storage tanks			$404,208	
Gas transmission pipelines				
Sewer system lines				
Electric transmission system				
Environmental Assets				
fish hatchery facilities				
First Foods habitat				
Wetlands Park			$200,000	
Indian Lake Dam				
Administration				
Public Works			$325,000	
BIA				
Senior Center		x		
Tribal Environmental Recovery Facility (transfer station)				
Nixyáawii Community School		x		
Cay-Uma-Wa Education Center		x		
Community Center/Recreation Building			$1,748,000	

2) Based on the following list of natural and man-made hazards appurtenant to the UIR, do you have any pre-disaster mitigation measures/projects to recommend? Below the hazards list is an excerpt from a section from the draft HMP Section 5 with some of the measures from the 2008 CTUIR as example, please view full list in Section 5 on the Z drive:

Natural Hazards	**Man-made Hazards**
Flood	Hazardous Material Spills
Wildfires	Natural Gas Pipeline Break
Severe Winter Storms	Dam Failure
Spring-Summer Storms	Power/Communications Failure
Wind	
Dust Storm	
Drought	
Fog	
Earthquake	
Volcanic Events	
Landslides	
Extreme Heat	

FLOOD MEASURES a number of the flood mitigation measures will help **protect existing buildings and infrastructure** from future flooding.

FL-4 Consider replacing the culvert at "Shortmile Road and the railroad crossing" and deepen the channel to allow the passage of all flows associated with flooding caused by Mission Creek (Gardenhire)

FL-5 Completed: Establish a berm along the upstream side of the bench in Cayuse, including the area of the "plug"(Gardenhire). **This measure was completed by Umatilla County as an emergency measures to save the road.**

FL-6 Move the affected people out of danger by relocating or elevating threatened homes (Gardenhire).

FL-7 Purchase and remove existing structures located within the designated Special Flood Hazard Areas (Flood Hazard Overlay Zone) as funding and willing sellers become available.

FL-8 Identify measures to mitigate erosion of the county road serving Upper McKay Creek (Gardenhire).

FL-9 Floodproof existing homes in the 'July Grounds' area to mitigate for mold and rot associated with the high water table hazard.

FL-10 Pursue vegetation and restoration practices that assist in enhancing and restoring the natural and beneficial functions of the flood plain and watershed.

FL- 11 Work with local jurisdictions/agencies to maintain and operate selected stream gauging stations on the Reservation.

Earthquake Measures – present a medium threat to the reservation. These mitigation measures may be cost-effective and will help **protect existing buildings and infrastructure** from future earthquake damage.

E-l Conduct a study to determine which buildings and infrastructure on the UIR face a risk from earthquakes.

E-2 Monitor earthquake activity and maintain a record for the establishment of routine inspections of CTUIR Community water and sewer infrastructure for damage and leakage.

E-3 Maintain CTUIR Community water and sewer infrastructure in good condition to .

E-4 Review and update the 2006 CTUIR Water and Wastewater System Master Plan.

E-5 Electronically Monitor and implement the Indian Lake Dam Emergency Action Plan (2014)

E – Fog Measures

F-l Provide additional cameras on I-84 (e.g., milepost 222) to assist the motoring public and emergency responders during time of inclement weather.

F-2 Expand the radio frequency traveler's information program to inform the motoring public of hazardous conditions.

F-3 Work with Oregon Department of Transportation and Oregon State Police to provide a lead car to guide vehicles through Cabbage Hill during times of dense and freezing fog.

G - Severe Winter Storm Measures – Most of these mitigation measures will help **protect existing infrastructure** from damage and power outages from winter storms.

WS-l Replace existing power lines with heavier T-2 line, shorter spans, and heavier poles and crossbars. It is estimated this will increase the overall strength of power distribution lines by 66%.

WS-2 Burying utility lines. This removes the risk of power outages due to ice accumulation or tree limbs bringing down power lines.

WS-3 Pruning trees away from power lines and enforcing policies regarding tree limb clearances.

WS-4 Work with existing utility companies providing services within the Reservation to coordinate emergency response to address power outages due to severe storms or other hazards.
WS-5 Ensure the availability of electric service to the Reservation by coordinating with existing utility companies to install a second substation to provide a secondary service route to the regional power grid system.
WS-5 Expand the NOAA emergency management signal covering the UIR

HMP Background:

- Original Hazard Mitigation Plan was developed by consultants through a FEMA Hazard Mitigation Planning Grant managed by the former Emergency Management Coordinator. A Tribal staff committee was formed (Tribal Emergency Response Committee-TERC) and acted as the steering committee for its development. The TERC has not been functioning and a new Haz Mit Steering Committee has been formed.
- The Original Plan was adopted by the Board November, 2008 and subsequently approved by FEMA. The Plan is effective for five years and is required to be updated before the expiration date, the CTUIR Plan is expired as of the end of 2013.
- The HMP is required by FEMA for counties, states and reservations to receive federal funding for pre and post disaster financial assistance.

Plan Content summary:
SECTION 1: Introduction – Purpose, Scope, Process, Federal law requirements
SECTION 2: Profile of the UIR – Statistics, maps, off-Reservation trust lands
SECTION 3: Hazard Identification/Risk Assessment Summary
- Natural and Man-Made hazards identified and assessed as to definition, history, impacts, extent and probable intensity and UIR vulnerability

SECTION 4: Projected Impacts on UIR
- Identification of hazard areas, critical facilities and assets impacted by hazards
- Analysis of potential losses of assets due to disasters

SECTION 5: Hazard Mitigation Goals and Measures
- Possible mitigation measures for each identified hazard
- Measures prioritized

SECTION 6: Mitigation Measure Assignments
- Each Measure evaluated based on priority and how it would be implemented

SECTION 7: Existing Plans and Programs
SECTION 8: Coordination with Other Jurisdiction's Hazard Mitigation
- Umatilla County, Walla Walla County, City of Pendleton, State of Oregon, BIA, Corps of Engineers

SECTION 9: CTUIR Grant and Program Capability
SECTION 10: Hazard Mitigation Measure Funding
SECTION 11: Monitoring, review and Evaluation Process
SECTION 12: Cultural Resources

February 26, 2015
10:30 – 12:00 PM
Waluula/Wanaqit Conference Room (L202)

Members Present: Bill Tovey, Joe Mace, Frank Anderson, JD Tovey, Sean Parker, Patty Perry, Stephanie Seamans, Holly Anderson

Members Absent: Dave Tovey, Deb Croswell

Others present: Ron Lee, Kate Ely, David Haire, Ray Denny

1. Water Resources presentation and Q&A Re Well #6

Ron Lee and Kate Ely gave a power point presentation about how water allocations for the Wells are determined, permit status of Well #6, and efforts to monitor ground water levels to ascertain aquifer health. Summary materials and a copy of the presentation are attached.

Water Resources supports the need to bring Well #6 online to meet water needs for existing development, ensure water allocations of wells 1-5 are not exceeded, and for overall aquifer health on the Reservation. Ron reviewed the various other options that were analyzed prior to drilling Well #6 and reiterated the reasons why this location was preferred, and how the elevation and reservoir will provide for gravity feed and reliability for the entire system. Ron confirmed that the permit for Well #6 will expire in January, 2016 if the water is not put into beneficial use. The temporary permit allowing wells 1-5 to pump the additional 200 acre feet of water allocated to Well #6 also expires at that time. This will likely cause the Well allocation levels to be exceeded based on typical annual water use.

There was also a good discussion about possible additional measures to stretch the allocations, such as implementing a grey water system for watering the golf course.

2. Hazard Mitigation Plan – Patty Perry and Ray Denny

Patty Perry distributed a handout summarizing the update to the Hazard Mitigation plan that Planning and Public Safety are working on. (The handout was also sent electronically prior to the meeting). Patty asked for input from the Capital Improvements Committee regarding replacement costs of existing facilities and input on potential projects that will help to prepare for and lessen the impact of possible future hazards.

Stephanie Seamans suggested adding a project for emergency parking for trucks to solve congestion problems during winter weather closures of I-84.

Confederated Tribes of the Umatilla Indian Reservation
Natural Resources Commission Meeting Minutes
Nixyáawii Governance Center, Wanaq'it Conference Room
September 8, 2015

Members Present:	Steve Sohappy, **Member**; Charles Sams, **Member**; Raymond Huesties, **Secretary**
Members Absent:	Justin Quaempts, **Chair;** Gerald Reed, **Vice-Chair**
Planning Staff Present:	JD Tovey, **Director, Tribal Planning Office**; Patty Perry, **Senior Planner;** Ross Simmons, **Environmental Health Technician**
Others Present:	Joe Pitt, Tribal Attorney; Kathleen Flanagan, WRC Small Business Development; and Megan Stacy and Raven Manta, Tribal Members.

The Natural Resources Commission (NRC) Meeting was called to order at 9:08 A.M. by Secretary Raymond Huesties. A quorum was established by roll call. The Agenda was reviewed and approved.

AGENDA ITEMS:

1. Public Hearing: Environmental Health & Safety Code Amendment
   - Proposed amendment to the Environmental Health & Safety Code to allow permitted home businesses to have a certified kitchen so that certain foods made in the kitchen can be sold commercially.

   JD Tovey provided a staff report, reviewed the proposed amendment and responded to questions from the Commission. Megan Stacy, a small business owner (whose address is 71790 S. Market Rd, Pendleton) and Kathleen Flannigan testified in favor of the amendment. No persons testified in opposition. The Public Hearing was closed at 9:25 A.M. and the Commission deliberated. Charles Sams made a motion to recommend approval of the proposed amendment. The motion was seconded by Steve Sohappy and passed with a vote of 2-0-0.

2. Review of August 25, 2015 NRC meeting minutes

   Secretary Huesties read the minutes into the record and noted that although the minutes state he will be attending the September 22, 2015 Rainwater tour he will be unable to attend. Charles Sams made a motion to approve the August 25, 2015 minutes. The motion was seconded by Steve Sohappy and passed with a vote of 2-0-0.

3. Old Business: None

4. Patty Perry reviewed a memo and the new 2015 Hazard Mitigation Plan Executive Summary. This was an informational item with no action required.

ANNOUNCEMENT OF NEXT MEETING - The NRC will travel to Rainwater for a tour on September 22, 2015 in lieu of their regular meeting. The Commission will call to order (if a quorum is present while on the tour) to approve the September 8, 2015 meeting minutes and to address any other necessary business.

Charles Sams made a motion to adjourn at 10:09 A.M. Steve Sohappy seconded the motion. Motion passed unanimously.

Submitted By:

for Raymond Huesties, Secretary
Natural Resources Commission

Confederated Tribes *of the*
Umatilla Indian Reservation
Tribal Planning Office

46411 Timíne Way
Pendleton, OR 97801

www.ctuir.org
Phone 541-276-3099
email: info@ctuir.org
Fax: 541-276-3099

DATE: September 8, 2015

TO: Natural Resources Commission

FROM: Patty Perry, Senior Planner

RE: UIR Hazard Mitigation Plan update

Thank you for allowing me to introduce you to the new UIR Hazard Mitigation Plan by way of the attached DRAFT Executive Summary that describes its contents. A full copy of the Draft Plan will be available at your meeting. I requested to be on your agenda as an informational item and do not request any formal action from the NRC.

I would like to review the outline of the Plan with you and provide an update on the status of its adoption process. A Hazard Mitigation Steering Committee was put together last year as technical advisors. The Law & Order Committee was appointed by OED to be the lead Committee making the formal recommendation to the Board. The Public Safety Department is responsible for the implementation of this Plan.

Attached is a copy of the Executive Summary for your review.

Executive Summary
for the
Umatilla Indian Reservation Hazard Mitigation Plan

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) Board of Trustees adopted the first Umatilla Indian Reservation (UIR) Hazard Mitigation Plan on November 10, 2008. This action completed the initial efforts of several dedicated tribal members and employees to develop a plan to make the UIR more resistant to hazards both natural and man-made. The information about possible impacts and damage from hazards on the Reservation led to the identification of several mitigation actions that, if implemented, will reduce the effects of various hazards and help prevent the loss of life and personal injury and help reduce damage to property and the Reservation economy.

The effort to protect tribal members, employees, the visiting public, the economy, First Foods, cultural and natural resources of the Umatilla Indian Reservation is ongoing and core to the CTUIR Vision:

> ***"The Confederated Tribes of the Umatilla Indian reservation government serves our community through responsible leadership and accountability. We respect ourselves, citizens, neighbors, environment, culture, religion and a healthy lifestyle. We will uphold and exercise our sovereignty and Treaty. We strive to, once again, be a sustainable, empowered and prosperous nation."***

The efforts that follow, which include the implementation of mitigation actions, further refinement and periodic evaluation of this Plan and an update every five years are steps to ensure the success of this effort.

Although the types of natural and man-made hazards have not changed significantly since the first Plan was prepared, the CTUIR government and Reservation community has grown considerably since 2008. This Plan, prepared predominantly in 2015, reflects these changes in the community, reassesses the risks of hazards to existing and future structures as a means to comprehensively plan for the sustainability of the UIR culture and community.

The following is a summary of what is contained in the Umatilla Indian Reservation Hazard Mitigation Plan:

Section 1 includes a description of: the federal acts which shape the hazard mitigation planning process; the CTUIR governmental authority; the scope of the plan; and, a discussion of the planning process used to develop this plan.

Section 2 provides a profile of the Umatilla Indian Reservation including information about its government, economy, population, and a list of assets important to the community.

Section 3 provides an assessment of 12 natural hazards and three man-made hazards that were evaluated by the Hazard Mitigation Steering Committee to determine their level of risk to the UIR. This assessment includes the following for each natural and man-made hazard: a profile of the hazard, history of occurrence, impacts to UIR, extent and probable intensity and vulnerability.

Section 4 identifies the projected impacts from hazardous events on assets and resources located on the Reservation including critical facilities, infrastructure and CTUIR enterprises.

Section 5 sets goals and organizes proposed mitigation strategies under six mitigation categories: public information and education, preventive activities, structural projects, property protection, emergency services and natural resource protection. Section 5 also describes the process used to prioritize the mitigation measures for the UIR Hazard Mitigation Plan and lists mitigation measures/action items for implementation during this five-year plan.

Section 6 identifies existing policies and procedures that support mitigation efforts, outlines an action plan for the implementation of priority mitigation items, including a description of the project, the responsible party for initiating the action, possible funding sources, and whether the implementation of the measure is a short-term or long-term venture. This section also describes the CTUIR's grant and program management capacity.

Section 7 describes the possible grant funding resources available to the CTUIR to implement the mitigation measures/action items contained as listed in Section 5.

Section 8 provides a description of the plan maintenance process which includes monitoring, evaluating, and updating the plan and a program for continued public involvement in the hazard mitigation planning process.

A number of appendices accompany the UIR Hazard Mitigation Plan. These appendices provide a great deal of information supporting the CTUIR's hazard mitigation planning effort.

Acknowledgements

Patricia T. Perry, AICP is the Tribal Planning Office Senior Planner and principle preparer of this Plan. Ray Denny is the Public Safety Director and acting emergency management coordinator. Nicole Novak, GIS Specialist in the Office of Information Technology, produced the maps for use in the plan.

Members of the Hazard Mitigation Steering Committee (HMSC) served as technical advisors and included representatives from various entities; CTUIR staff and committee/commission members, local, state and federal agencies including:

CTUIR Board of Trustees
Yellowhawk Tribal Health Clinic
CTUIR Public Works Department
CTUIR Department of Natural Resources
CTUIR Natural Resources Commission member
CTUIR Tribal Water Commission member
USDA Natural Resources Conservation Service
US Army Corps of Engineers
Umatilla County Emergency Management
CTUIR Law and Order Committee member
National Weather Service, Pendleton, Oregon
Oregon Department of Forestry, Pendleton, Oregon
Bureau of Indian Affairs, Umatilla Agency
Wildhorse Resort and Casino
Oregon Dept. of Transportation Region 5
City of Pendleton

[i] CTUIR Comprehensive Plan, 2010

PUBLIC MEETING NOTICE

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) Tribal Planning Office and Public Safety Department wish to invite the general public and representatives of state, federal or local governments to a meeting where the CTUIR 2010 Comprehensive Plan updates, Hazard Mitigation Plan and Emergency Operations Plan will be presented.

The meeting will be held **Thursday, February 10, 2016 at 5:00p.m.** in the Yellowhawk Tribal Health Center conference room on the Umatilla Indian Reservation, 73265 Confederated Way, Pendleton, OR.

The presentation of these related plans will inform stakeholders how the CTUIR is prepared to mitigate for natural and man-made hazards, respond to emergencies and to assess the achievement of CTUIR Comprehensive Plan Objectives since 2010.

Public Meeting to be held on CTUIR Comprehensive, Hazard Mitigation and Emergency Operations Plans

When: **Wednesday February 10, 2016 at 5:00 p.m.**

Where: Yellowhawk Conference Room, Yellowhawk Tribal Health Clinic, 73265 Confederated Way, Pendleton, OR 97801

The CTUIR Departments of Administration (Tribal Planning Office) and Public Safety wish to invite the general public to a meeting to preview the 2015 CTUIR Comprehensive Plan updates, the new CTUIR Hazard Mitigation Plan and updated Emergency Operations Plan. These plans came to completion within the same time period so the public unveiling is being combined to inform interested stakeholders how the CTUIR is prepared to mitigate for hazards and to respond to disasters. The general public, as well as any state, federal or local government representatives are welcome to attend.

The current CTUIR Comprehensive Plan, adopted in 2010, is scheduled to be updated every five years to assess the achievement of Objectives through measurable indicators (benchmarks). The Comprehensive Plan is a visioning document that combines the community's vision with that of the CTUIR government through fifteen Elements that have established Objectives designed to achieve the overall vision. Sections of the Comprehensive Plan being updated include the Element Objectives with measurable indicators and the organizational structural changes (organizational chart) that have occurred in the last five years. The overall vision remains the same but the methodology to achieve the vision has been updated.

The first CTUIR Hazard Mitigation Plan was prepared and adopted by the Board of Trustees in 2008. In 2015, a new Plan was developed to replace the 2008 Plan. The purpose of this Plan is to:

- Analyze hazards that have potential to cause death, injury or damage to property and assess the risk of those hazards;
- Provide measures that will prevent or minimize the effects of those hazards;
- Satisfy federal requirements to enable CTUIR eligibility for mitigation project funding and disaster assistance;
- Be a guide for all people living and working on the Reservation to make the Reservation more disaster resistant and resilient;

- Serve as a functional plan to implement the Public Safety Element of the CTUIR Comprehensive Plan;
- Serve as the CTUIR Flood Mitigation Plan.

The CTUIR adopted its first Emergency Operations Plan (EOP) in 2009. It was updated in 2011 and 2015. Where the Hazard Mitigation Plan aims to lessen the impact of hazards through pre-disaster mitigation planning, the EOP provides for a coordinated response and recovery during an emergency or disaster. The CTUIR Department of Public Safety provides emergency response through the Tribal Police and Umatilla Tribal Fire and Emergency Services and coordinates with other regional emergency services by maintaining Mutual Aid Agreements. The EOP works in conjunction with the National Incident Management System, National Response Framework and the State of Oregon Emergency Management Plan. Although individual Tribal enterprises such as Wildhorse Resort and Casino and Cayuse Technologies have their own emergency plans, they fall under the umbrella of the CTUIR EOP which addresses the entire Reservation.

The public is invited to come see how the CTUIR is prepared to respond to disasters and emergencies and to lessen the impact of natural and man-made hazards to Reservation residents and travelers through mitigation actions.

Tribal Planning Office

APPENDIX C

HAZARD DOCUMENTATION

Umatilla County

Crustal Earthquake Scenario Details and Ground Motion Map

Probabilistic Earthquake Scenario Details and Ground Motion Map

Relative Ground Shaking Amplification Susceptibility Map

Relative Liquefaction Hazard Susceptibility Map

Relative Earthquake Induced Landslide Susceptibility Map

Identified Landslide Areas Map

HAZUS Global Reports for Crustal and Probabilistic Scenarios

Crustal Earthquake Scenario Details

Crustal Earthquake Scenario: A magnitude 6.5 earthquake on an Arbitrary Crustal Fault.

For the magnitude 6.5 earthquake on the Arbitrary Fault scenario, we defined the fault source using the "Arbitrary Seismic Source" option within HAZUS (Figure ?-1) (FEMA, 2005). The fault and earthquake event was chosen by examination of USGS data and data in the Geomatrix report (1995) titled *S eismic Design Mapping State of Oregon* prepared for the Oregon Department of Transportation (USGS, 2004). In general, a likely worst-case scenario was selected. Figure ?-1 has the location of the fault, shown as the maroon line. Figure ?-2 displays the PGA for the crustal scenario.

Scenario Name	Umatilla Arbitrary Crustal M6.5
Type of Earthquake	Source
Fault Name	Umatilla_Arbitrary
Historical Epicenter ID #	-
Probabilistic Return Period	NA
Longitude of Epicenter	-118.9750
Latitude of Epicenter	45.7219
Earthquake Magnitude	6.5
Depth (km)	0.00
Rupture Length (km)	29
Rupture Orientation (degrees)	0.00
Attenuation Function	WUS Shallow Crustal Event Extensional

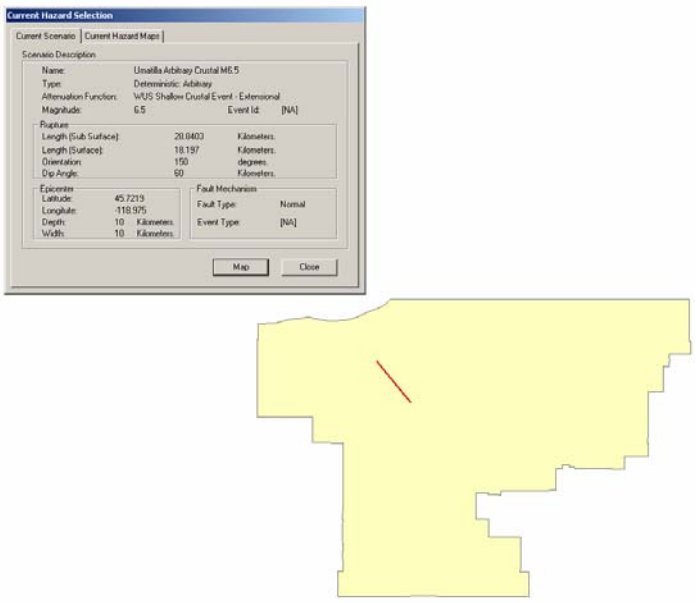


Figure ?-1. Arbitrary Fault details from HAZUS-MH (FEMA, 2005)

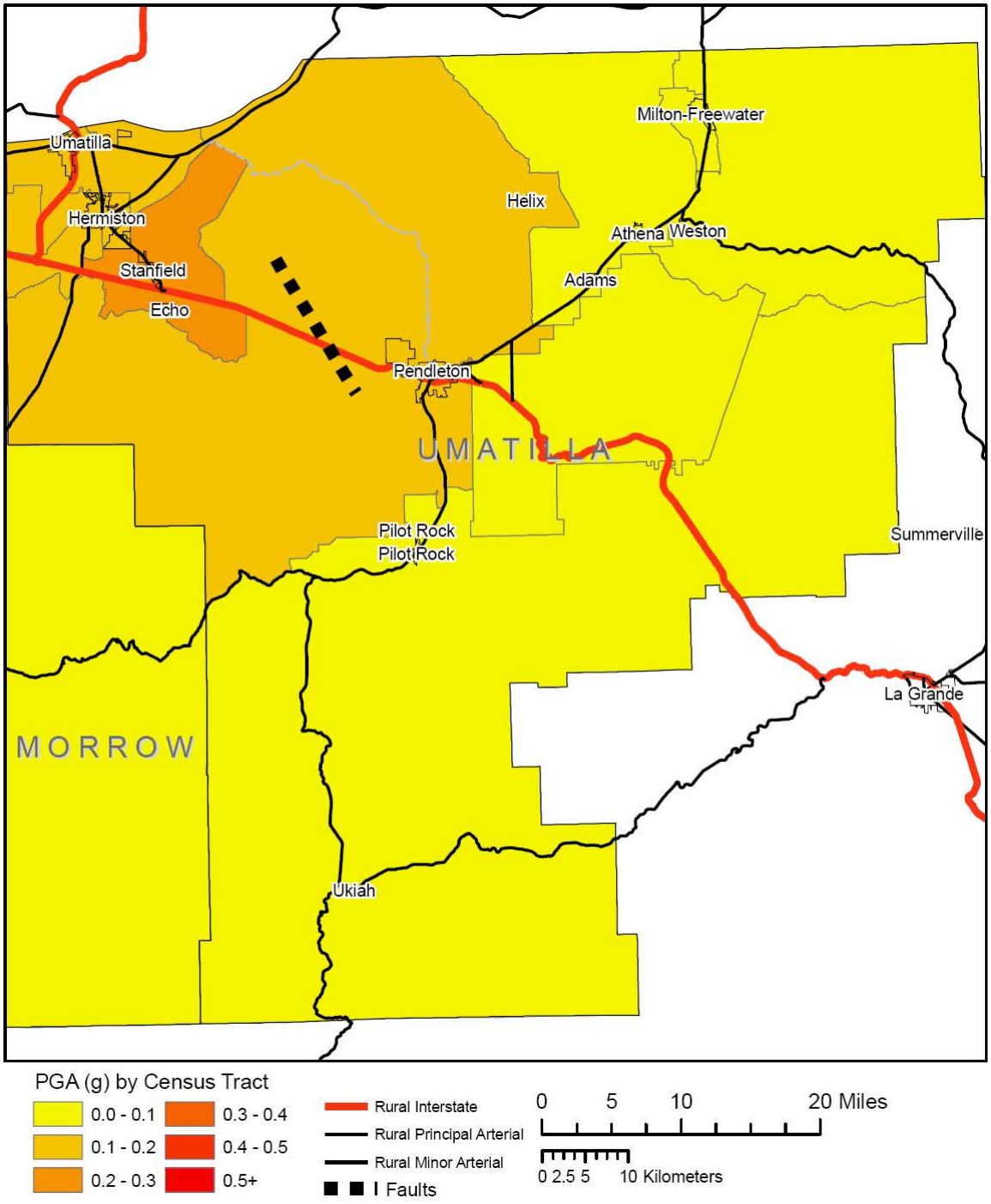


Figure ?-2. Peak ground acceleration (PGA) by census tracts map for crustal scenario, Umatilla County, Oregon (FEMA, 2005).

Probabilistic Earthquake Scenario Details

Probabilistic Earthquake Scenario: A 2500 year mean return period probabilistic earthquake scenario was selected.

For the probabilistic earthquake scenario, we used the "Pre-defined event" option within HAZUS to incorporate ground motion maps developed by USGS to model damage and loss from a magnitude 6.5 driving probabilistic earthquake scenario (Figure ?-3). The maps were developed based on ground motion data provided by the U.S. Geological Survey. The Methodology includes probabilistic seismic hazard contour maps developed by the USGS for the 2002 update of the National Seismic Hazard Maps (Frankel et al., 2002). The USGS maps provide estimates of PGA and spectral acceleration at periods of 0.3 second and 1.0 second, respectively.

Ground shaking with a 2500 year mean return period or 2% probability of being exceeded in 50 years was used. Figure ?-4 displays the PGA for the probabilistic scenario.

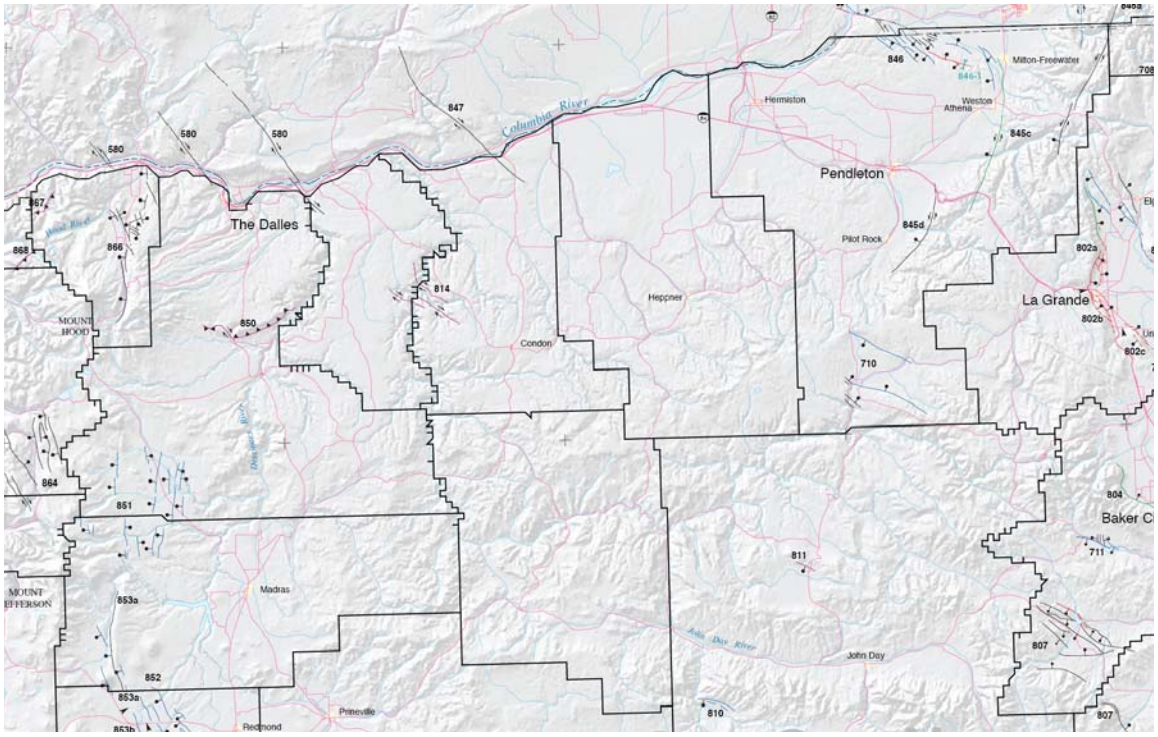


Figure ?-3. Location of the primary faults used to develop the 2500 year return ground motion maps (USGS, 2002).

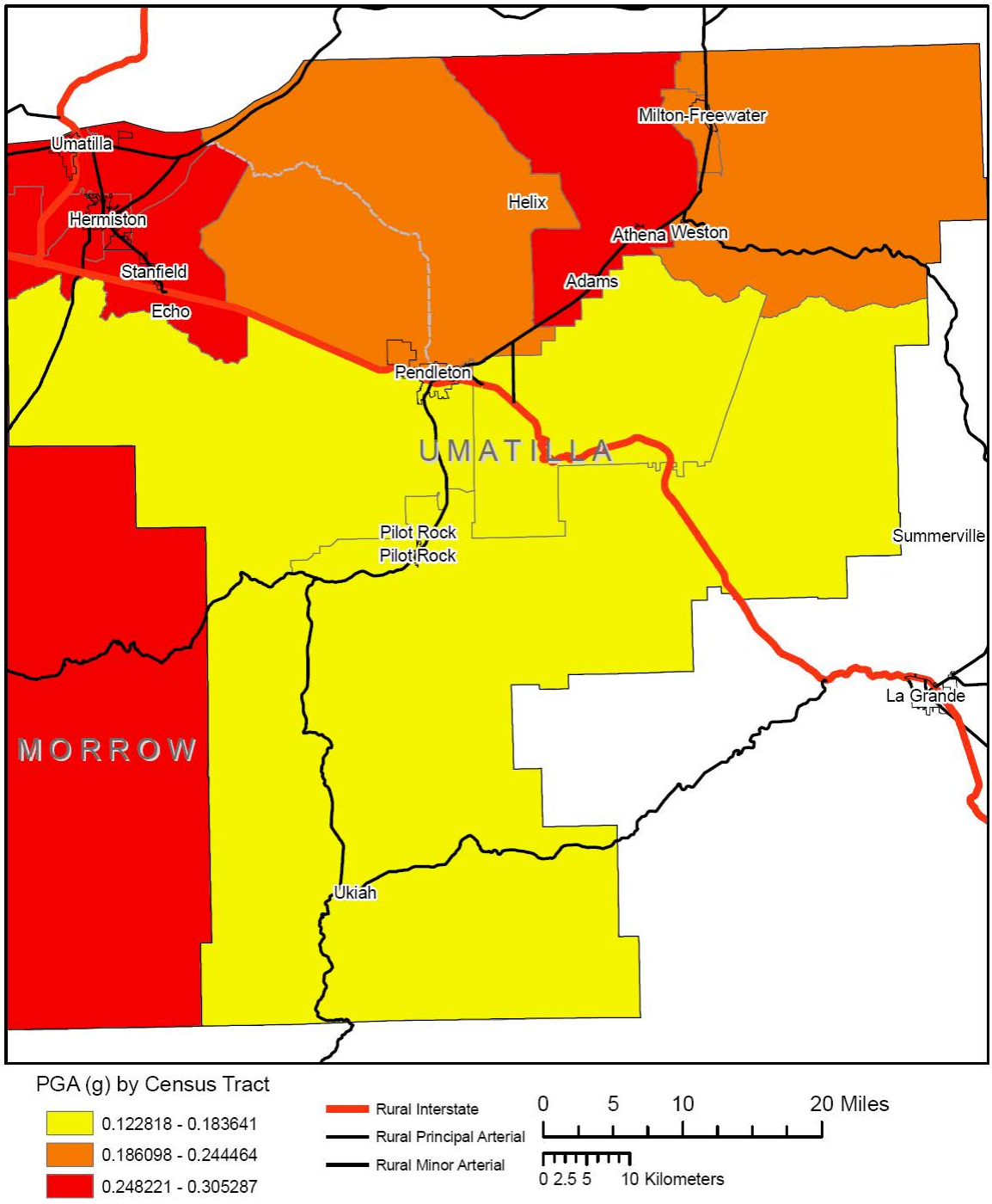


Figure ?-4. Peak ground acceleration (PGA) by census tracts map for probabilistic scenario, Umatilla County, Oregon (FEMA, 2005).

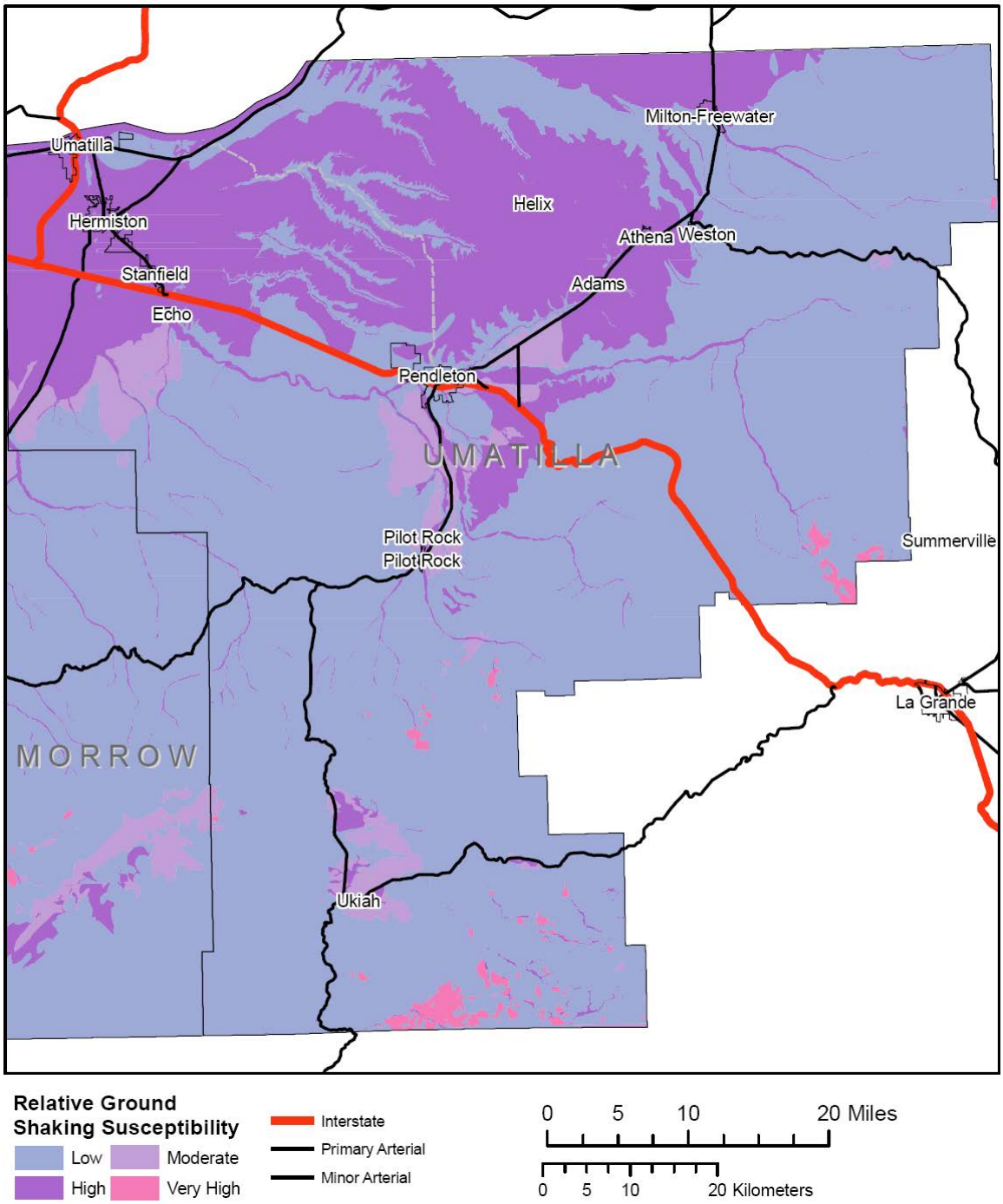


Figure ?-5. Relative ground shaking amplification susceptibility map for Umatilla County, Oregon.

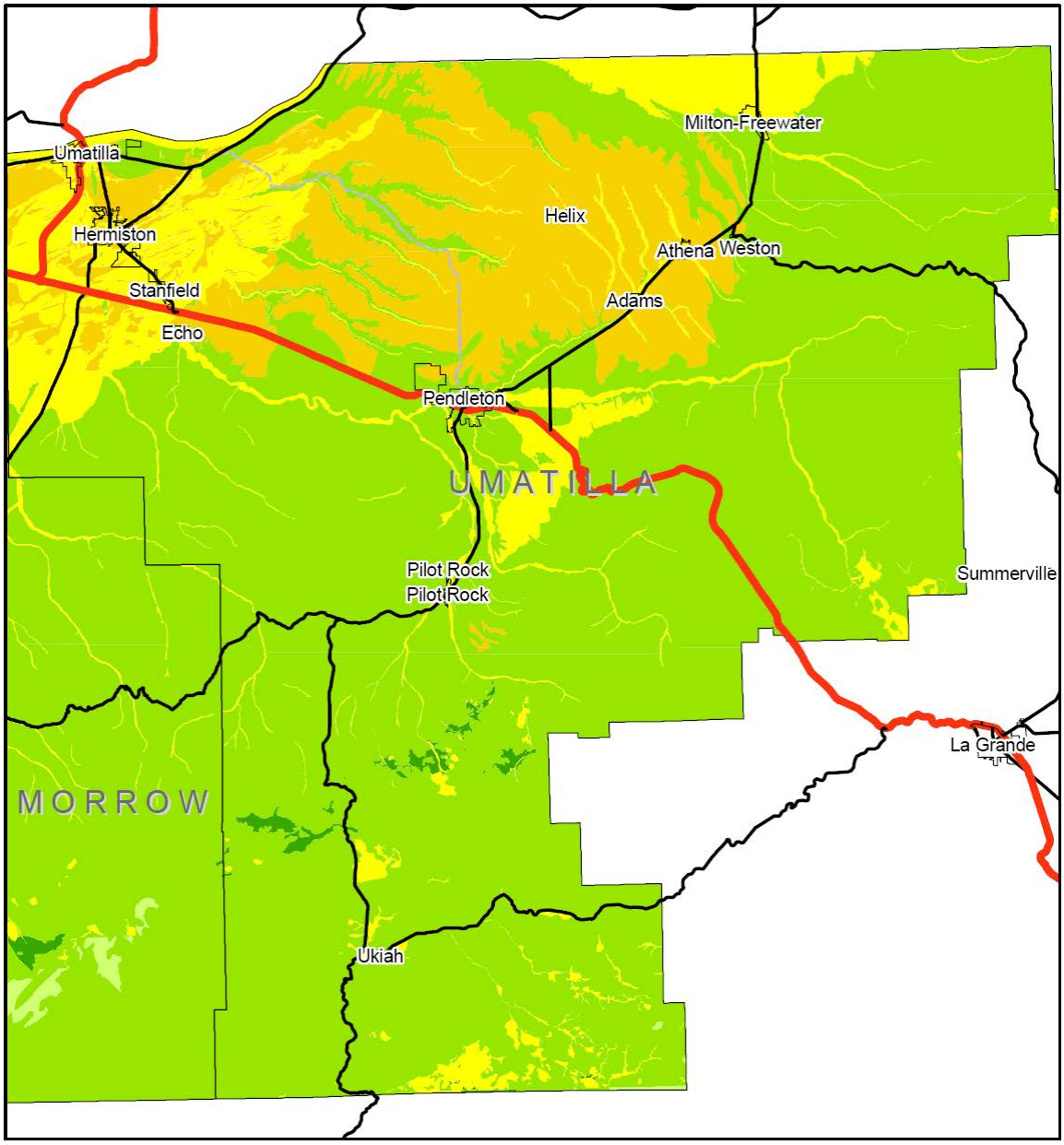


Figure ?-6. Relative liquefaction susceptibility map for Umatilla County, Oregon.

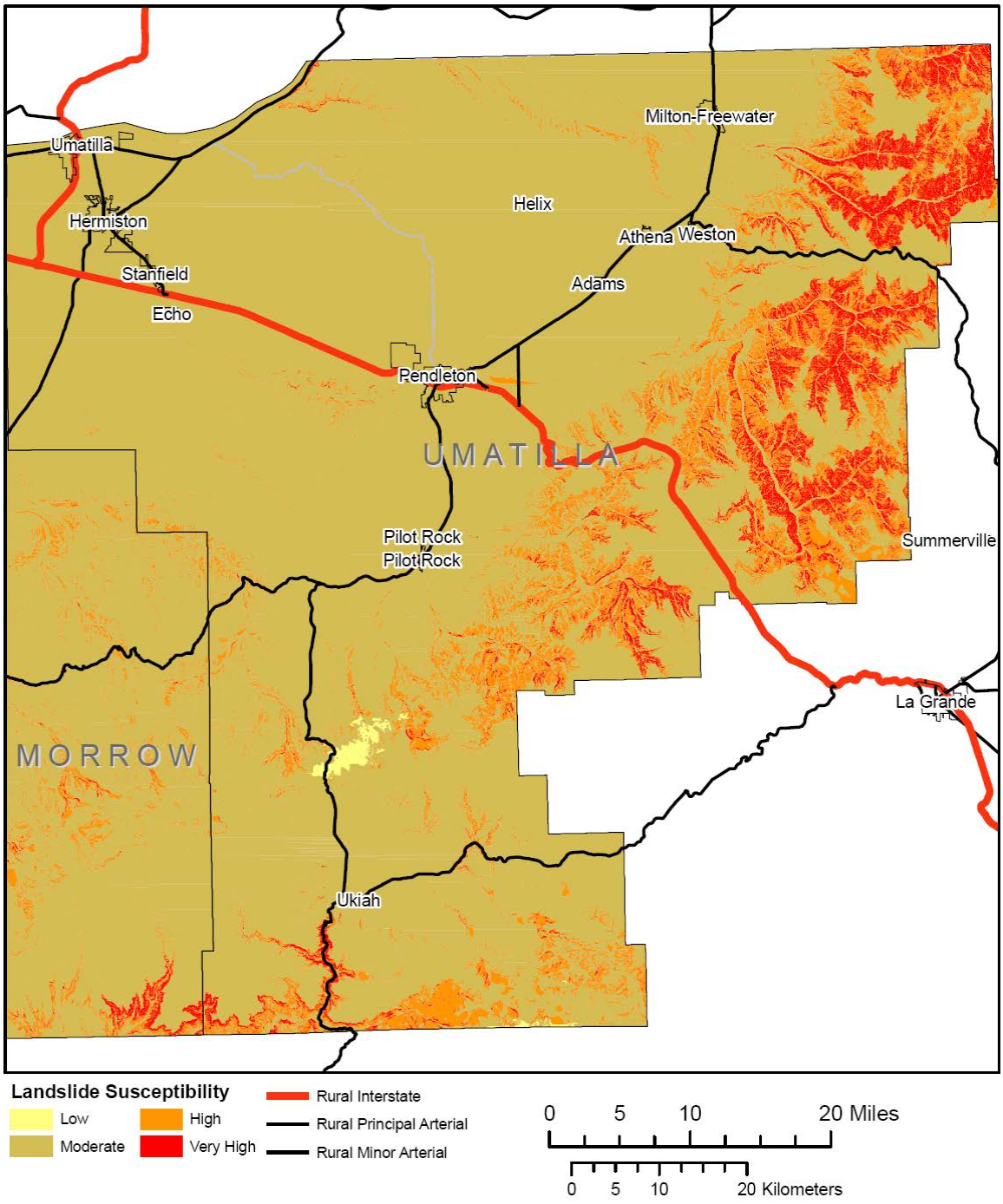


Figure ?-7. Relative earthquake induced landslide susceptibility map for Umatilla County, Oregon.

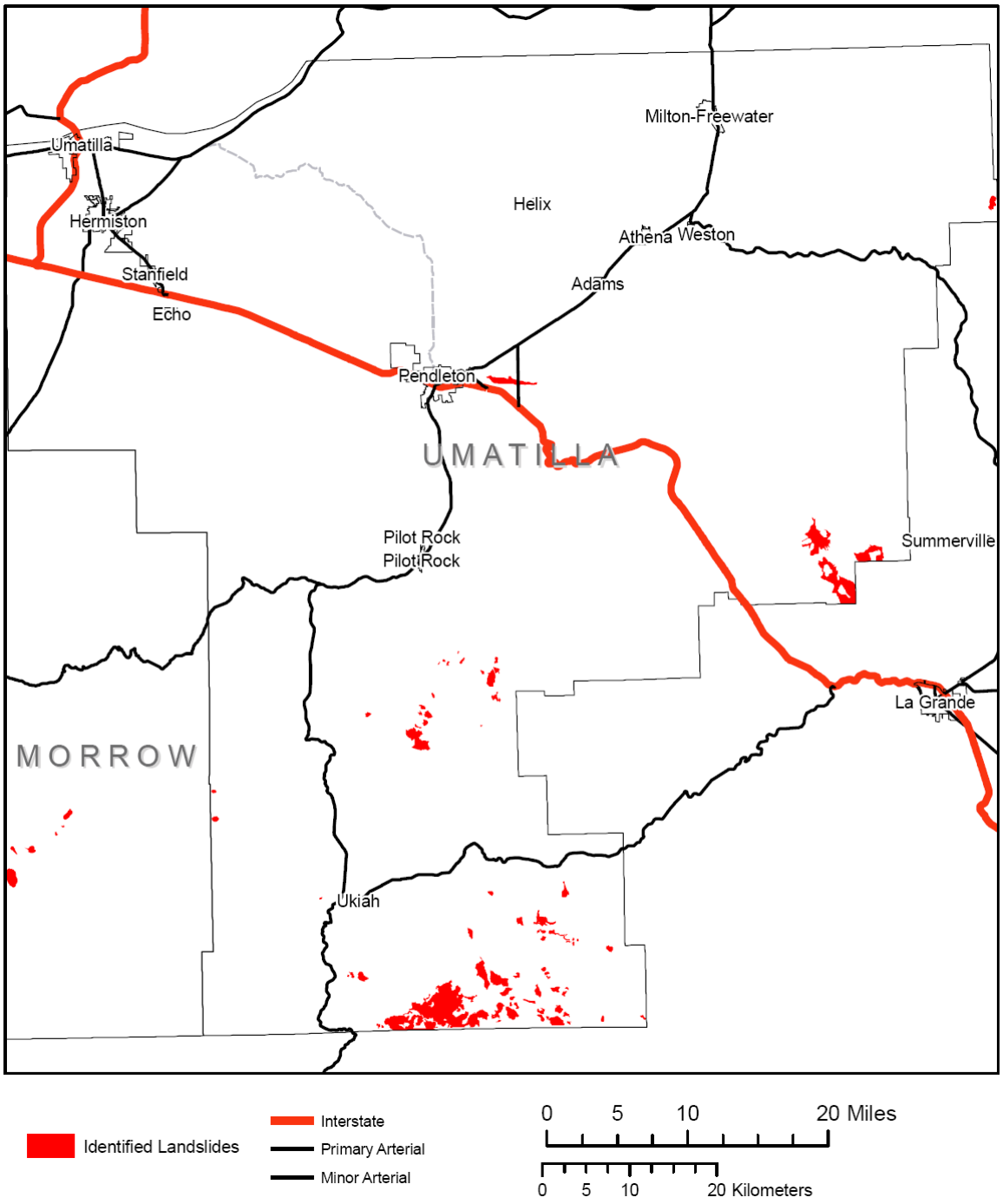


Figure ?-8. Identified landslide map for Umatilla County, Oregon.

HAZUS Global Reports for
Crustal and Probabilistic Scenarios

HAZUS-MH: Earthquake Event Report

Region Name: ***Umatilla County***

Earthquake Scenario: ***Umatilla Arbitrary Crustal M6.5***

Print Date: ***May 31, 2007***

Disclaimer:

The estimates of social and economic impacts contained in this report were produced using HAZUS loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific earthquake. These results can be improved by using enhanced inventory, geotechnical, and observed ground motion data.

Table of Contents

General Description of the Region

HAZUS is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of HAZUS is to provide a methodology and software application to develop earthquake losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from earthquakes and to prepare for emergency response and recovery.

The earthquake loss estimates provided in this report was based on a region that includes 1 county(ies) from the following state(s):

Oregon

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 3,222.72 square miles and contains 15 census tracts. There are over 25 thousand households in the region and has a total population of 70,548 people (2000 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 23 thousand buildings in the region with a total building replacement value (excluding contents) of 3,837 (millions of dollars). Approximately 99.00 % of the buildings (and 84.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 4,956 and 991 (millions of dollars) , respectively.

Building and Lifeline Inventory

Building Inventory

HAZUS estimates that there are 23 thousand buildings in the region which have an aggregate total replacement value of 3,837 (millions of dollars) . Appendix B provides a general distribution of the building value by State and County.

In terms of building construction types found in the region, wood frame construction makes up 75% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

HAZUS breaks critical facilities into two (2) groups: essential facilities and high potential loss (HPL) facilities. Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 3 hospitals in the region with a total bed capacity of 154 beds. There are 32 schools, 4 fire stations, 14 police stations and 0 emergency operation facilities. With respect to HPL facilities, there are 14 dams identified within the region. Of these, 2 of the dams are classified as 'high hazard'. The inventory also includes 6 hazardous material sites, 0 military installations and 0 nuclear power plants.

Transportation and Utility Lifeline Inventory

Within HAZUS, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 2 and 3.

The total value of the lifeline inventory is over 5,947.00 (millions of dollars). This inventory includes over 541 kilometers of highways, 280 bridges, 19,939 kilometers of pipes.

Table 2: Transportation System Lifeline Inventory

System	Component	# locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	280	2,148.10
	Segments	104	2,088.10
	Tunnels	0	0.00
		Subtotal	**4,236.20**
Railways	Bridges	0	0.00
	Facilities	6	14.80
	Segments	247	298.30
	Tunnels	0	0.00
		Subtotal	**313.10**
Light Rail	Bridges	0	0.00
	Facilities	0	0.00
	Segments	0	0.00
	Tunnels	0	0.00
		Subtotal	**0.00**
Bus	Facilities	0	0.00
		Subtotal	**0.00**
Ferry	Facilities	0	0.00
		Subtotal	**0.00**
Port	Facilities	3	7.10
		Subtotal	**7.10**
Airport	Facilities	8	49.30
	Runways	10	351.20
		Subtotal	**400.50**
		Total	**4,956.90**

Table 3: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	199.40
	Facilities	1	37.60
	Pipelines	0	0.00
		Subtotal	**237.00**
Waste Water	Distribution Lines	NA	119.60
	Facilities	6	451.50
	Pipelines	0	0.00
		Subtotal	**571.20**
Natural Gas	Distribution Lines	NA	79.80
	Facilities	2	2.50
	Pipelines	0	0.00
		Subtotal	**82.20**
Oil Systems	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**0.00**
Electrical Power	Facilities	4	497.20
		Subtotal	**497.20**
Communication	Facilities	24	2.70
		Subtotal	**2.70**
		Total	**1,390.30**

Earthquake Scenario

HAZUS uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.

Scenario Name	Umatilla Arbitrary Crustal M6.5
Type of Earthquake	Arbitrary
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	NA
Longitude of Epicenter	-118.97
Latitude of Epicenter	45.72
Earthquake Magnitude	6.50
Depth (Km)	10.00
Rupture Length (Km)	18.20
Rupture Orientation (degrees)	150.00
Attenuation Function	WUS Shallow Crustal Event - Extensional

Building Damage

Building Damage

HAZUS estimates that about 2,663 buildings will be at least moderately damaged. This is over 11.00 % of the total number of buildings in the region. There are an estimated 925 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the HAZUS technical manual. Table 4 below summaries the expected damage by general occupancy for the buildings in the region. Table 5 summaries the expected damage by general building type.

Table 4: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	11	0.06	1	0.03	1	0.04	0	0.07	0	0.04
Commercial	111	0.62	26	0.92	20	1.40	6	2.03	7	0.73
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	9	0.05	2	0.08	2	0.12	0	0.16	0	0.04
Industrial	15	0.09	3	0.12	3	0.19	1	0.28	1	0.09
Other Residential	3,375	18.99	966	33.64	951	65.53	231	80.13	320	34.63
Religion	3	0.02	1	0.02	1	0.04	0	0.07	0	0.02
Single Family	14,251	80.17	1,872	65.20	474	32.68	50	17.27	596	64.44
Total	**17,776**		**2,871**		**1,451**		**288**		**925**	

Table 5: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	14,564	81.93	1916	66.73	472	32.54	45	15.55	603	65.16
Steel	59	0.33	12	0.43	13	0.92	4	1.44	3	0.33
Concrete	61	0.34	15	0.51	11	0.79	3	1.02	3	0.30
Precast	22	0.12	4	0.15	5	0.37	2	0.85	2	0.16
RM	6	0.03	1	0.03	1	0.07	0	0.14	0	0.03
URM	191	1.07	47	1.65	34	2.37	11	3.98	12	1.34
MH	2,874	16.17	876	30.50	913	62.93	222	77.02	302	32.68
Total	**17,776**		**2,871**		**1,451**		**288**		**925**	

*Note:
RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Essential Facility Damage

Before the earthquake, the region had 154 hospital beds available for use. On the day of the earthquake, the model estimates that only 66 hospital beds (43.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 67.00% of the beds will be back in service. By 30 days, 86.00% will be operational.

Table 6: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	3	1	0	2
Schools	32	0	0	28
EOCs	0	0	0	0
PoliceStations	14	0	0	11
FireStations	4	0	0	3

Transportation and Utility Lifeline Damage

Table 7 provides damage estimates for the transportation system.

Table 7: Expected Damage to the Transportation Systems

System	Component	Number of Locations				
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	104	0	0	104	104
	Bridges	280	6	0	276	280
	Tunnels	0	0	0	0	0
Railways	Segments	247	0	0	247	247
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	6	0	0	6	6
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	0	0	0	0	0
Ferry	Facilities	0	0	0	0	0
Port	Facilities	3	0	0	3	3
Airport	Facilities	8	0	0	8	8
	Runways	10	0	0	10	10

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 8-10 provide information on the damage to the utility lifeline systems. Table 8 provides damage to the utility system facilities. Table 9 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, HAZUS performs a simplified system performance analysis. Table 10 provides a summary of the system performance information.

Table 8 : Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	1	0	0	1	1
Waste Water	6	1	0	3	6
Natural Gas	2	0	0	2	2
Oil Systems	0	0	0	0	0
Electrical Power	4	0	0	4	4
Communication	24	0	0	24	24

Table 9 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (kms)	Number of Leaks	Number of Breaks
Potable Water	9,970	89	131
Waste Water	5,982	70	103
Natural Gas	3,988	75	111
Oil	0	0	0

Table 10: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	25,195	107	11	0	0	0
Electric Power		0	0	0	0	0

Induced Earthquake Damage

Fire Following Earthquake

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. HAZUS uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 2 ignitions that will burn about 0.01 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 3 people and burn about 0 (millions of dollars) of building value.

Debris Generation

HAZUS estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0.00 million tons of debris will be generated. Of the total amount, Brick/Wood comprises 47.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 0 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Social Impact

Shelter Requirement

HAZUS estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates (1,048 households to be displaced due to the earthquake. Of these, 260 people (out of a total population of 70,548 will seek temporary shelter in public shelters.

Casualties

HAZUS estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 11 provides a summary of the casualties estimated for this earthquake

Table 11: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	1	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	1	0	0	0
	Industrial	3	1	0	0
	Other-Residential	76	18	1	3
	Single Family	122	30	2	3
	Total	**202**	**50**	**4**	**6**
2 PM	Commercial	72	21	3	7
	Commuting	0	0	0	0
	Educational	31	10	2	3
	Hotels	0	0	0	0
	Industrial	19	6	1	2
	Other-Residential	17	4	0	1
	Single Family	29	7	1	1
	Total	**169**	**48**	**7**	**13**
5 PM	Commercial	65	19	3	6
	Commuting	1	1	2	0
	Educational	2	1	0	0
	Hotels	0	0	0	0
	Industrial	12	4	1	1
	Other-Residential	28	7	1	1
	Single Family	49	12	1	1
	Total	**157**	**44**	**7**	**10**

Economic Loss

The total economic loss estimated for the earthquake is 395.29 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 248.68 (millions of dollars); 8 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 75 % of the total loss. Table 12 below provides a summary of the losses associated with the building damage.

Table 12: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Loses							
	Wage	0.00	0.42	4.34	0.20	0.22	5.18
	Capital-Related	0.00	0.19	3.88	0.12	0.06	4.25
	Rental	4.09	3.13	2.35	0.05	0.10	9.73
	Relocation	0.45	0.11	0.13	0.01	0.03	0.73
	Subtotal	**4.54**	**3.85**	**10.71**	**0.37**	**0.41**	**19.89**
Capital Stock Loses							
	Structural	23.44	8.05	7.20	1.23	1.40	41.32
	Non_Structural	84.63	32.23	18.39	4.66	2.76	142.68
	Content	22.94	7.22	9.03	2.86	1.48	43.54
	Inventory	0.00	0.00	0.51	0.64	0.10	1.26
	Subtotal	**131.02**	**47.50**	**35.14**	**9.39**	**5.74**	**228.80**
	Total	**135.56**	**51.36**	**45.85**	**9.76**	**6.15**	**248.68**

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, HAZUS computes the direct repair cost for each component only. There are no losses computed by HAZUS for business interruption due to lifeline outages. Tables 13 & 14 provide a detailed breakdown in the expected lifeline losses.

HAZUS estimates the long-term economic impacts to the region for 15 years after the earthquake. The model quantifies this information in terms of income and employment changes within the region. Table 15 presents the results of the region for the given earthquake.

Table 13: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	2,088.11	$19.47	0.93
	Bridges	2,148.09	$57.55	2.68
	Tunnels	0.00	$0.00	0.00
	Subtotal	**4236.20**	**77.00**	
Railways	Segments	298.33	$1.04	0.35
	Bridges	0.00	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	14.78	$1.58	10.67
	Subtotal	**313.10**	**2.60**	
Light Rail	Segments	0.00	$0.00	0.00
	Bridges	0.00	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Bus	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Ferry	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Port	Facilities	7.13	$0.63	8.84
	Subtotal	**7.10**	**0.60**	
Airport	Facilities	49.27	$5.08	10.32
	Runways	351.20	$11.43	3.26
	Subtotal	**400.50**	**16.50**	
	Total	**4956.90**	**96.80**	

Table 14: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.00	$0.00	0.00
	Facilities	37.60	$3.86	10.25
	Distribution Line	199.40	$1.49	0.74
	Subtotal	**237.02**	**$5.34**	
Waste Water	Pipelines	0.00	$0.00	0.00
	Facilities	451.50	$31.70	7.02
	Distribution Line	119.60	$1.17	0.98
	Subtotal	**571.18**	**$32.88**	
Natural Gas	Pipelines	0.00	$0.00	0.00
	Facilities	2.50	$0.15	6.14
	Distribution Line	79.80	$1.26	1.57
	Subtotal	**82.22**	**$1.41**	
Oil Systems	Pipelines	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**$0.00**	
Electrical Power	Facilities	497.20	$10.14	2.04
	Subtotal	**497.20**	**$10.14**	
Communication	Facilities	2.70	$0.05	1.84
	Subtotal	**2.71**	**$0.05**	
	Total	**1,390.34**	**$49.82**	

Table 15. Indirect Economic Impact with outside aid
(Employment as # of people and Income in millions of $)

	LOSS	Total	%
First Year			
	Employment Impact	0	0.00
	Income Impact	(2)	-0.31
Second Year			
	Employment Impact	0	0.00
	Income Impact	(7)	-0.93
Third Year			
	Employment Impact	0	0.00
	Income Impact	(9)	-1.20
Fourth Year			
	Employment Impact	0	0.00
	Income Impact	(9)	-1.20
Fifth Year			
	Employment Impact	0	0.00
	Income Impact	(9)	-1.20
Years 6 to 15			
	Employment Impact	0	0.00
	Income Impact	(9)	-1.20

Appendix A: County Listing for the Region

Umatilla,OR

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
Oregon					
	Umatilla	70,548	3,224	612	3,837
Total State		**70,548**	**3,224**	**612**	**3,837**
Total Region		**70,548**	**3,224**	**612**	**3,837**

HAZUS-MH: Earthquake Event Report

Region Name: ***Umatilla County***

Earthquake Scenario: ***2500yr Probable Scenario M6.5 Driving***

Print Date: ***March 22, 2007***

Disclaimer:
The estimates of social and economic impacts contained in this report were produced using HAZUS loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific earthquake. These results can be improved by using enhanced inventory, geotechnical, and observed ground motion data.

Table of Contents

General Description of the Region

HAZUS is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of HAZUS is to provide a methodology and software application to develop earthquake losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from earthquakes and to prepare for emergency response and recovery.

The earthquake loss estimates provided in this report was based on a region that includes 1 county(ies) from the following state(s):

Oregon

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 3,222.72 square miles and contains 15 census tracts. There are over 25 thousand households in the region and has a total population of 70,548 people (2000 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 23 thousand buildings in the region with a total building replacement value (excluding contents) of 3,837 (millions of dollars). Approximately 99.00 % of the buildings (and 84.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 4,956 and 991 (millions of dollars) , respectively.

Building and Lifeline Inventory

Building Inventory

HAZUS estimates that there are 23 thousand buildings in the region which have an aggregate total replacement value of 3,837 (millions of dollars) . Appendix B provides a general distribution of the building value by State and County.

In terms of building construction types found in the region, wood frame construction makes up 75% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

HAZUS breaks critical facilities into two (2) groups: essential facilities and high potential loss (HPL) facilities. Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 3 hospitals in the region with a total bed capacity of 154 beds. There are 32 schools, 4 fire stations, 14 police stations and 0 emergency operation facilities. With respect to HPL facilities, there are 14 dams identified within the region. Of these, 2 of the dams are classified as 'high hazard'. The inventory also includes 6 hazardous material sites, 0 military installations and 0 nuclear power plants.

Transportation and Utility Lifeline Inventory

Within HAZUS, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 2 and 3.

The total value of the lifeline inventory is over 5,947.00 (millions of dollars). This inventory includes over 541 kilometers of highways, 280 bridges, 19,939 kilometers of pipes.

Table 2: Transportation System Lifeline Inventory

System	Component	# locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	280	2,148.10
	Segments	104	2,088.10
	Tunnels	0	0.00
		Subtotal	**4,236.20**
Railways	Bridges	0	0.00
	Facilities	6	14.80
	Segments	247	298.30
	Tunnels	0	0.00
		Subtotal	**313.10**
Light Rail	Bridges	0	0.00
	Facilities	0	0.00
	Segments	0	0.00
	Tunnels	0	0.00
		Subtotal	**0.00**
Bus	Facilities	0	0.00
		Subtotal	**0.00**
Ferry	Facilities	0	0.00
		Subtotal	**0.00**
Port	Facilities	3	7.10
		Subtotal	**7.10**
Airport	Facilities	8	49.30
	Runways	10	351.20
		Subtotal	**400.50**
		Total	**4,956.90**

Table 3: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	199.40
	Facilities	1	37.60
	Pipelines	0	0.00
		Subtotal	**237.00**
Waste Water	Distribution Lines	NA	119.60
	Facilities	6	451.50
	Pipelines	0	0.00
		Subtotal	**571.20**
Natural Gas	Distribution Lines	NA	79.80
	Facilities	2	2.50
	Pipelines	0	0.00
		Subtotal	**82.20**
Oil Systems	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**0.00**
Electrical Power	Facilities	4	497.20
		Subtotal	**497.20**
Communication	Facilities	24	2.70
		Subtotal	**2.70**
		Total	**1,390.30**

Earthquake Scenario

HAZUS uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.

Scenario Name	2500yr Probable Scenario M6.5 Driving
Type of Earthquake	Probabilistic
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	2,500.00
Longitude of Epicenter	NA
Latitude of Epicenter	NA
Earthquake Magnitude	6.50
Depth (Km)	NA
Rupture Length (Km)	NA
Rupture Orientation (degrees)	NA
Attenuation Function	NA

Building Damage

Building Damage

HAZUS estimates that about 6,809 buildings will be at least moderately damaged. This is over 29.00 % of the total number of buildings in the region. There are an estimated 2,600 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the HAZUS technical manual. Table 4 below summaries the expected damage by general occupancy for the buildings in the region. Table 5 summaries the expected damage by general building type.

Table 4: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	6	0.05	3	0.05	2	0.07	1	0.09	1	0.04
Commercial	66	0.59	31	0.60	34	1.07	17	1.64	22	0.85
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	7	0.06	3	0.05	2	0.08	1	0.09	1	0.04
Industrial	7	0.06	4	0.07	5	0.17	3	0.30	4	0.17
Other Residential	1,569	13.88	1,103	21.24	1,515	47.29	733	72.98	922	35.44
Religion	3	0.02	1	0.02	1	0.03	0	0.03	0	0.01
Single Family	9,648	85.33	4,051	77.98	1,644	51.31	250	24.87	1,650	63.46
Total	**11,306**		**5,195**		**3,204**		**1,005**		**2,601**	

Table 5: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	9,875	87.34	4144	79.77	1,662	51.86	239	23.81	1,680	64.58
Steel	36	0.32	13	0.25	20	0.62	11	1.07	12	0.46
Concrete	38	0.33	17	0.33	19	0.60	9	0.85	10	0.39
Precast	12	0.10	5	0.09	8	0.25	6	0.60	5	0.20
RM	4	0.03	1	0.02	2	0.06	1	0.12	1	0.04
URM	99	0.88	59	1.14	62	1.95	32	3.22	43	1.66
MH	1,243	10.99	956	18.41	1,431	44.66	707	70.33	850	32.67
Total	**11,306**		**5,195**		**3,204**		**1,005**		**2,601**	

*Note:
RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Essential Facility Damage

Before the earthquake, the region had 154 hospital beds available for use. On the day of the earthquake, the model estimates that only 48 hospital beds (31.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 57.00% of the beds will be back in service. By 30 days, 80.00% will be operational.

Table 6: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	3	2	0	1
Schools	32	0	0	9
EOCs	0	0	0	0
PoliceStations	14	0	0	3
FireStations	4	0	0	1

Transportation and Utility Lifeline Damage

Table 7 provides damage estimates for the transportation system.

Table 7: Expected Damage to the Transportation Systems

System	Component	Number of Locations				
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	104	0	0	104	104
	Bridges	280	22	0	260	280
	Tunnels	0	0	0	0	0
Railways	Segments	247	0	0	247	247
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	6	0	0	6	6
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	0	0	0	0	0
Ferry	Facilities	0	0	0	0	0
Port	Facilities	3	0	0	3	3
Airport	Facilities	8	0	0	8	8
	Runways	10	0	0	10	10

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 8-10 provide information on the damage to the utility lifeline systems. Table 8 provides damage to the utility system facilities. Table 9 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, HAZUS performs a simplified system performance analysis. Table 10 provides a summary of the system performance information.

Table 8 : Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	1	0	0	1	1
Waste Water	6	0	0	0	6
Natural Gas	2	0	0	2	2
Oil Systems	0	0	0	0	0
Electrical Power	4	0	0	2	4
Communication	24	0	0	24	24

Table 9 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (kms)	Number of Leaks	Number of Breaks
Potable Water	9,970	343	648
Waste Water	5,982	271	512
Natural Gas	3,988	290	547
Oil	0	0	0

Table 10: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	25,195	7,302	6,477	4,785	0	0
Electric Power		0	0	0	0	0

Induced Earthquake Damage

Fire Following Earthquake

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. HAZUS uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 4 ignitions that will burn about 0.06 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 24 people and burn about 1 (millions of dollars) of building value.

Debris Generation

HAZUS estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0.00 million tons of debris will be generated. Of the total amount, Brick/Wood comprises 46.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 0 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Social Impact

Shelter Requirement

HAZUS estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates (2,957 households to be displaced due to the earthquake. Of these, 740 people (out of a total population of 70,548 will seek temporary shelter in public shelters.

Casualties

HAZUS estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 11 provides a summary of the casualties estimated for this earthquake

Table 11: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	3	1	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	6	2	0	0
	Industrial	7	2	0	1
	Other-Residential	220	55	5	8
	Single Family	330	82	5	9
	Total	**565**	**142**	**11**	**19**
2 PM	Commercial	228	70	11	22
	Commuting	0	0	0	0
	Educational	87	27	4	8
	Hotels	1	0	0	0
	Industrial	51	16	3	5
	Other-Residential	48	12	1	2
	Single Family	77	19	2	2
	Total	**492**	**144**	**21**	**39**
5 PM	Commercial	203	62	10	19
	Commuting	3	9	9	2
	Educational	6	2	0	1
	Hotels	2	0	0	0
	Industrial	32	10	2	3
	Other-Residential	82	21	2	3
	Single Family	133	33	3	4
	Total	**461**	**136**	**26**	**32**

Economic Loss

The total economic loss estimated for the earthquake is 1,072.74 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 736.64 (millions of dollars); 8 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 75 % of the total loss. Table 12 below provides a summary of the losses associated with the building damage.

Table 12: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Loses							
	Wage	0.00	3.03	12.79	0.74	0.45	17.00
	Capital-Related	0.00	1.36	11.20	0.44	0.18	13.17
	Rental	11.95	10.75	6.18	0.23	0.22	29.33
	Relocation	1.32	0.32	0.35	0.02	0.06	2.08
	Subtotal	**13.27**	**15.46**	**30.52**	**1.43**	**0.91**	**61.59**
Capital Stock Loses							
	Structural	68.54	23.01	19.84	4.62	4.06	120.07
	Non_Structural	243.89	99.42	53.41	18.87	7.31	422.89
	Content	63.98	21.85	25.76	11.89	4.04	127.51
	Inventory	0.00	0.00	1.43	2.78	0.35	4.57
	Subtotal	**376.41**	**144.28**	**100.44**	**38.16**	**15.75**	**675.05**
	Total	**389.68**	**159.74**	**130.96**	**39.59**	**16.66**	**736.64**

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, HAZUS computes the direct repair cost for each component only. There are no losses computed by HAZUS for business interruption due to lifeline outages. Tables 13 & 14 provide a detailed breakdown in the expected lifeline losses.

HAZUS estimates the long-term economic impacts to the region for 15 years after the earthquake. The model quantifies this information in terms of income and employment changes within the region. Table 15 presents the results of the region for the given earthquake.

Table 13: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	2,088.11	$43.30	2.07
	Bridges	2,148.09	$130.51	6.08
	Tunnels	0.00	$0.00	0.00
	Subtotal	**4236.20**	**173.80**	
Railways	Segments	298.33	$1.89	0.63
	Bridges	0.00	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	14.78	$3.56	24.11
	Subtotal	**313.10**	**5.50**	
Light Rail	Segments	0.00	$0.00	0.00
	Bridges	0.00	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Bus	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Ferry	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Port	Facilities	7.13	$1.65	23.20
	Subtotal	**7.10**	**1.70**	
Airport	Facilities	49.27	$11.53	23.40
	Runways	351.20	$8.18	2.33
	Subtotal	**400.50**	**19.70**	
	Total	**4956.90**	**200.60**	

Table 14: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.00	$0.00	0.00
	Facilities	37.60	$5.03	13.36
	Distribution Line	199.40	$7.16	3.59
	Subtotal	**237.02**	**$12.19**	
Waste Water	Pipelines	0.00	$0.00	0.00
	Facilities	451.50	$58.80	13.02
	Distribution Line	119.60	$5.66	4.73
	Subtotal	**571.18**	**$64.46**	
Natural Gas	Pipelines	0.00	$0.00	0.00
	Facilities	2.50	$0.24	9.58
	Distribution Line	79.80	$6.05	7.59
	Subtotal	**82.22**	**$6.29**	
Oil Systems	Pipelines	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**$0.00**	
Electrical Power	Facilities	497.20	$52.30	10.52
	Subtotal	**497.20**	**$52.30**	
Communication	Facilities	2.70	$0.24	8.79
	Subtotal	**2.71**	**$0.24**	
	Total	**1,390.34**	**$135.48**	

Table 15. Indirect Economic Impact with outside aid
(Employment as # of people and Income in millions of $)

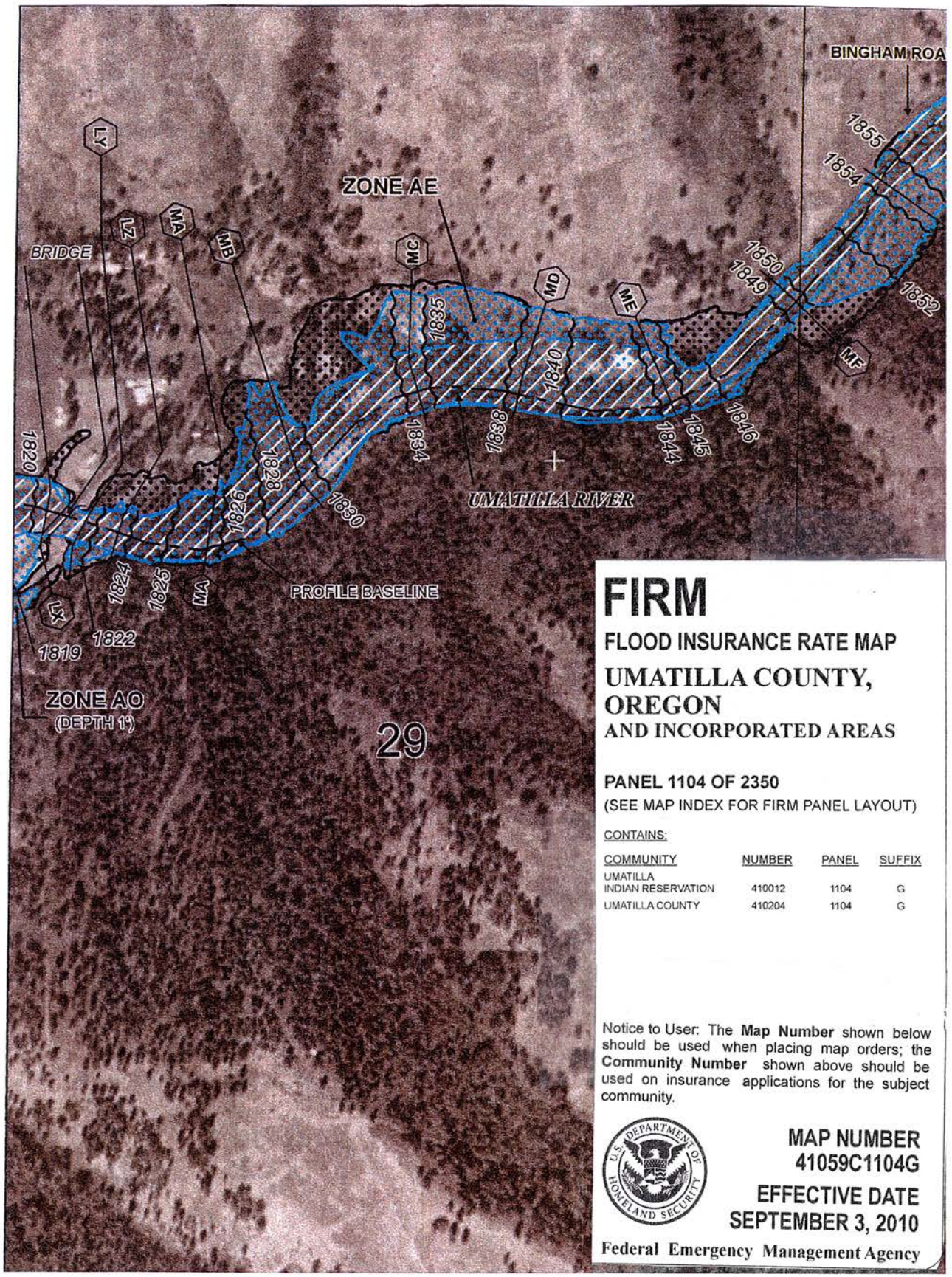
	LOSS	Total	%
First Year			
	Employment Impact	0	0.00
	Income Impact	(7)	-0.90
Second Year			
	Employment Impact	0	0.00
	Income Impact	(20)	-2.75
Third Year			
	Employment Impact	0	0.00
	Income Impact	(26)	-3.54
Fourth Year			
	Employment Impact	0	0.00
	Income Impact	(26)	-3.54
Fifth Year			
	Employment Impact	0	0.00
	Income Impact	(26)	-3.54
Years 6 to 15			
	Employment Impact	0	0.00
	Income Impact	(26)	-3.54

Appendix A: County Listing for the Region

Umatilla,OR

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
Oregon					
	Umatilla	70,548	3,224	612	3,837
Total State		**70,548**	**3,224**	**612**	**3,837**
Total Region		**70,548**	**3,224**	**612**	**3,837**



FIRM

FLOOD INSURANCE RATE MAP

UMATILLA COUNTY, OREGON AND INCORPORATED AREAS

PANEL 1104 OF 2350

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
UMATILLA INDIAN RESERVATION	410012	1104	G
UMATILLA COUNTY	410204	1104	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
41059C1104G

EFFECTIVE DATE
SEPTEMBER 3, 2010

Federal Emergency Management Agency

U.S. Department of Homeland Security
500 C Street, SW
Washington, DC 20472

FEMA

MAR 03 2011

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

RECEIVED
MAR 07 2011
TRIBAL PLANNING
OFFICE

Elwood Patawa
Chairman, Board of Trustees
Confederated Tribe of the
Umatilla Indian Reservation
46411 Timine Way
Pendleton, Oregon 97801

Dear Mr. Patawa:

I am happy to announce that the Department of Homeland Security's Federal Emergency Management Agency (FEMA) has approved the Confederated Tribe of the Umatilla Indian Reservation's application to participate in the National Flood Insurance Program (NFIP). In accordance with Section 1336 of the National Flood Insurance Act of 1968, the Confederated Tribes of the Umatilla Indian Reservation is eligible to participate in the Regular Phase of the NFIP effective on February 14, 2011. Flood insurance is now available to local property owners and may be purchased from any insurance agent or broker licensed to do business in the State where the insurable property is located.

I am enclosing a copy of the news release announcing the Confederated Tribe of the Umatilla Indian Reservation's eligibility to participate in the NFIP. I hope it assists you in your efforts to publicize the availability of this important coverage. The Confederated Tribe of the Umatilla Indian Reservation's property owners will want to know about this opportunity to obtain insurance protection against losses from future flooding. The buildings and contents coverage is now available to building owners and tenants.

There is a 30-day waiting period before a newly purchased flood insurance policy takes effect or for any additional coverage or endorsement that may increase policy limits. The waiting period ends and the policy takes effect at 12:01 a.m. on the 30th calendar day after the insurance policy application date and payment of premium.

There are 10 exceptions to the 30-day waiting period. However, I am only explaining the two most frequently used exceptions in this letter. The two most frequently used exceptions are: (1) when the initial purchase of flood insurance is in connection with the making, increasing, extension, or renewal of a loan, there is no waiting period and coverage is effective immediately; and (2) when the purchase of flood insurance is related to a revision or update of a Flood Hazard Boundary Map or Flood Insurance Rate Map (FIRM), there is a one-day waiting period. Flood insurance coverage takes effect at 12:01 a.m. on the day after the coverage is purchased for a structure located in a Special Flood Hazard Area (SFHA), an area subject to inundation by the base (1-percent-annual-chance) flood, on the revised flood map, which was not previously located in an SFHA prior to the revision. This exception is limited to a 13-month period and begins on the date the revised map is issued. The information on the remaining eight exceptions is contained in the enclosed NFIP "Policy Issuance 5-98" dated October 1, 1998.

The FIRM, which shows the Base Flood Elevations (BFEs) established for the Confederated Tribe of the Umatilla Indian Reservation, became effective on September 3, 2010. This FIRM date indicates the effective date for the authorization of the sale of first and second layer flood insurance coverage at actuarial rates for all new construction and substantial improvements to existing structures within the Confederated Tribe of the

Umatilla Indian Reservation. The first layer coverage on structures built prior to September 3, 2010, will be available at subsidized rates unless improvements are made to the structure.

Please be aware that the increase or decrease of flood insurance costs for a structure is based on the location of the structure's first floor and its relationship to the BFEs for the Confederated Tribe of the Umatilla Indian Reservation. In addition, on the effective FIRM date, the FIRM supersedes all previous maps for the purpose of determining whether individual properties are located inside or outside the SFHA. After the effective FIRM date, new construction will be charged actuarial rates, which may be higher, if the structure is not built in compliance with the NFIP floodplain management requirements.

Under the Flood Disaster Protection Act of 1973, as amended, flood insurance must be purchased by property owners seeking any Federal financial assistance for construction or acquisition of buildings in SFHAs. This financial assistance includes certain federally guaranteed mortgages and direct loans, federal disaster relief loans and grants, as well as other similarly described assistance from FEMA and other agencies.

In addition, all loans individuals obtain from Federally regulated, supervised, or insured lending institutions that are secured by improved real estate located in SFHAs are also contingent upon the borrower obtaining flood insurance coverage on the building. However, purchasing and maintaining flood insurance coverage on a voluntary basis is frequently recommended for properties located outside SFHAs.

If you need additional assistance or information, I recommend you contact Christine Shirley, CFM, the NFIP State Coordinator, by telephone at (503) 373-0050, extension 250, in writing at the Oregon Department of Land Conservation and Development, 635 Capitol Street, Northeast, Suite 150, Salem, Oregon 97301-2540, or by electronic mail at christine.shirley@state.or.us. The FEMA Regional staff in Bothell, Washington, is also available to assist you. You may contact the Regional staff by telephone at (425) 487-4600 or in writing. Please send your written inquiries to the Director, Federal Insurance and Mitigation Division, FEMA Region X, at 130 228th Street, Southwest, Bothell, Washington 98021-9796.

Sincerely,

Sandra K. Knight, PhD, PE
Deputy Federal Insurance and
Mitigation Administrator, Mitigation

Enclosures

cc: Kenneth Murphy, Regional Administrator, FEMA Region X
Christine Shirley, CFM, NFIP State Coordinator, Department of Land Conservation and Development
Jim Beard, Floodplain Administrator/Comprehensive Planning Director, Confederated Tribe of the Umatilla Indian Reservation

SAMPLE NEWS RELEASE

FEDERAL FLOOD INSURANCE NOW AVAILABLE
IN THE CONFEDERATED TRIBE OF THE UMATILLA INDIAN RESERVATION

Washington, D.C. – The Confederated Tribe of the Umatilla Indian Reservation has joined over 21,000 communities nationwide that are allowed to purchase federally backed flood insurance. This availability follows the community's adoption and enforcement of ordinances to reduce flood losses and acceptance by the National Flood Insurance Program (NFIP).

The Confederated Tribe of the Umatilla Indian Reservation is now a participant in the NFIP effective on February 14, 2011. Residents of the Confederated Tribe of the Umatilla Indian Reservation will be able to purchase flood insurance up to the limits under the Regular Phase of the program. However, there is a 30-day waiting period before flood insurance coverage goes into effect. For single-family dwellings, the building coverage limit is $250,000, and the contents coverage limit is $100,000. Renters can also protect their belongings by purchasing contents coverage. For commercial properties, the building and contents coverage limits are both $500,000.

Lenders must require borrowers whose properties are located in a designated flood hazard area to purchase flood insurance as a condition of receiving a federally backed mortgage loan in accordance with the Federal Disaster Protection Act of 1973.

The NFIP is implemented through the Federal Emergency Management Agency. There are over 5.5 million flood insurance policies in more than 21,000 participating communities nationwide.

Policy Issuance 5-98

Subject: 30-Day Waiting Period
Effective Date: October 1, 1998

This Policy Issuance updates the Federal Insurance Administation's interpretations of the applicability of the 30-day waiting period to various mortgage lending and insurance underwriting situations in Policy Issuance 8-95 (December 5, 1995). This Policy Issuance supercedes Policy Issuance 8-95 and provides answers to additional questions regarding the 30-day waiting period from Write Your Own companies and insurance agents. These interpretations are intended to serve the Congressional intent for the imposition of the 30-day waiting period for the purchase of flood insurance to prevent abuse (i.e., property owners would purchase insurance only when a flood was imminent) and to facilitate lender compliance with the mandatory purchase of flood insurance.

Policy Decisions

1. The 30-day waiting period will not apply when there is an existing insurance policy and an additional amount of flood insurance is required in connection with the making, increasing, extension, or renewal of a loan, such as a second mortgage, home equity loan, or refinancing. The increased amount of flood coverage will be effective as of the time of the loan closing, provided the increased amount of coverage is applied for and the presentment of additional premium is made at or prior to the loan closing.

Explanation: This interpretation is consistent with a basic objective of the National Flood Insurance Reform Act of 1994 (NFIRA), namely, to facilitate lender compliance with the statutory requirements for flood insurance. The 30-day waiting period was established to prevent abuse by insureds from increasing coverage when flooding was imminent. The exemptions to the waiting period on the other hand were for loan closing situations and to facilitate lender compliance with the flood insurance purchase requirements. [Note: This policy interpretation has been retained from Policy Issuance 8-95 (December 5, 1995) and has not changed.]

2. The 30-day waiting period will not apply when an additional amount of insurance is required as a result of a map revision. The increased amount of coverage will be effective 12:01 a.m. on the first calendar day after the date the increased amount of coverage is applied for and the presentment of additional premium is made.

Explanation: This interpretation is also consistent with a basic objective of the NFIRA to facilitate lender compliance with the statutory requirements for flood insurance. The purchase of additional flood insurance is to comply with the statutory requirement for flood insurance in an amount equal to the outstanding principal balance of the loan for a property owner who was prudent enough to buy voluntarily flood insurance but now must increase the amount to comply with statutory requirements for flood insurance resulting from a Federal Emergency Management Agency map change. [Note: This policy interpretation has been retained from Policy Issuance 8-95 (December 5, 1995) and has not changed.]

3. The 30-day waiting period will not apply when flood insurance is required as a result of a lender determining that a loan which does not have flood insurance coverage should be protected by flood insurance as required by Section 102(e) of the Flood Disaster Protection Act of 1973, as amended by NFIRA, because the building securing a loan is located in a Special Flood Hazard Area. The coverage will be effective upon completion of an application and the presentment of payment of premium.

7. Unless the contents are part of the security for a loan, the 30-day waiting period applies to the purchase of only contents coverage by a condominium unit owner at the time of the loan, i.e., where building coverage is not being purchased by the unit owner.

Explanation: Since the mandatory purchase of flood insurance applies only to property--real improved and/or any personal property--which is securing a loan, then a condominium unit owner who exercises his or her own option to buy insurance and is not responding to a lender's mandatory purchase decision is subject to the 30-day waiting period. This interpretation is consistent with other situations where an exemption to the 30-day waiting period applies only in situations to facilitate lender compliance with NFIRA.

8. Provided that the application and premium are received before an anniversary date, the 30-day waiting period does not apply to a cancel/rewrite of a 3-year policy at an anniversary date to obtain Increased Cost of Compliance (ICC) coverage.

Explanation: ICC coverage became effective for all new or renewal policies with effective dates on and after June 1, 1997. Those policyholders with 3-year policies without being able to cancel and rewrite in order to obtain ICC coverage would be delayed unnecessarily from obtaining coverage that Congress mandated under the NFIRA.

9. The insurer may rely on an agent's representation on the application that the loan exception applies unless there is a loss during the first 30 days of the policy period. In that case, the insurer must obtain documentation of the loan transaction, such as settlement papers, before adjusting the loss.

Explanation: It would be inconsistent with the intent of Congress for the NFIP to impose burdensome and time-consuming documentation requirements for the agent during the application process, in the case of loan transactions which Congress specifically wanted to exempt from the 30-day waiting period. Requiring documentation if a loss occurs during the first 30 days, however, assures that there will be no abuse of the rule.

10. The 30-day waiting period does not apply to a reduction of the deductible effective as of the renewal date.

Explanation: The amounts involved are comparable to the modest inflation adjustments recommended by the insurer at renewal.

In order to provide a reasonable period of time for the insurers to comply with the new Policy Decisions (5 through 10), the effective date for Policy Decisions 5 through 10 is October 1, 1998.

REPORT OF

FLOOD FIGHT POTENTIAL SITES

in

UMATILLA COUNTY, OREGON

Prepared By: Jerry R. Gardenhire
CENWP-EC-DC
7/25/00
Rev. 1 11/3/03

Flood Fight Planning - Umatilla County

I. General. This report documents findings regarding potential flood fight locations in the portion of Umatilla County that is within the Portland District, Corps of Engineers (COE) boundary. The northeast corner of the county is within the boundary of the Walla Walla District. Primarily, that area is the watershed of the Walla Walla River and its two forks. In addition, approximately the eastern half of the county is located within the Confederated Tribes of the Umatilla Indian Reservation (CTUIR). Primary responsibility for flood fighting lies with the affected city and/or county. The Corps can assist in flood fight efforts if the city, county, and state are fully involved with flood response and require additional assistance. Advance planning is required to mount an effective flood fight. For example, a conceptual plan of action must be determined, easements obtained over potential work areas, material sources need to be identified, construction equipment needs to be located and identified, and elevation bench marks must be identified and/or established. COE flood fighting in Umatilla County depends upon having enough time to mobilize needed forces to conduct the flood fight. A potential flooding scenario involving conditions like a heavy snow pack in the watershed above the floodlight site and notification of an approaching warm and wet rainstorm would probably afford enough mobilization time. Notification of the approach of a thunderstorm wouldn't afford the needed mobilization time.

II. Methodology.

A. The COE does not flood fight agricultural areas and we usually cannot demonstrate economic justification for most rural areas because of the extensive measures that would need to be taken over a large area to protect scattered infrastructure. Therefore, I limited my evaluations to "urban infrastructure" such as hospitals, potable water treatment plants, sanitary sewage treatment plants, schools, access points to those facilities, and residential areas of more than one or two homes.

B. The methodology I used was to first collect the FEMA flood plain mapping for the county and any included communities. I inspected the flood plain maps to see if flood plains existed within the communities and in the unincorporated part of the county. In unincorporated areas of the county, I looked for road crossings that could possibly stop access to a town. I attempted to establish landmarks and mileages to specific areas I wanted to visit in the field. I then spent 2-1/2 days driving to the sites identified on the flood plain mapping to see if it was possible to mount a flood fight or if there was a need to make such a flood fight.

III. Inspection Findings.

A. Adams.

1. **Community Description:** Adams, Oregon is a small farming/ranching community located approximately 10 miles northeast from Pendleton, the Umatilla County seat. The town is situated immediately west of State Highway 11, on the way to Walla Walla, WA. No commercial transportation services are

available in Adams. Commercial rail service is available in Pendleton, OR. Commercial air service is available in Pendleton, OR and Walla Walla, WA.

2. **Flood Plain Description:** Adams is potentially affected by flooding from a short piece of Sand Hollow Creek and Wildhorse Creek. Sand Hollow Creek empties into Wildhorse Creek, just upstream from town. Sand Hollow Creek is an ephemeral creek, that is, one that runs part of the year, depending upon weather conditions. Wildhorse Creek is a permanent flowing stream that starts in the Blue Mountains east of Adams and south of Weston, Oregon. The town of Adams is quite flat; therefore, flooding from either stream can affect approximately half of the town. The majority of flood flows can be attributed to Wildhorse Creek. The flood plain for the 100-year flood extends approximately 400 - 600 feet from the stream in the north portion of town and 100 - 200 feet from the stream in the south portion of town. The main development of Adams has historically taken place west of the stream, but more homes have been built east of Wildhorse Creek. In addition, construction of a new subdivision has begun at the east end of William Street, in the abbreviated flood plain of Sand Hollow Creek. See Photos 1 and 2.

3. **Type of Flooding:** Due to the flood plain of approximately 600 feet wide, flooding in Adams can be characterized as *widespread.* For a large area in town, the west edge of the creek could be bermed to stop further flooding, if started early enough. However, that would likely cause increased flooding on the east side of the creek, exacerbating the problems for the people living on that side of the creek. Access to the town from Highway 11 is by a road crossing bridges at the north and south end of town. There is little that could be done to protect these bridges, except to patrol them for debris clogging their openings. It is likely that back roads into and out of Adams could be used in case both roads to Highway 11 are blocked. Flooding at Adams is not preventable without pre-flood measures and those measures do include moving of some houses in the southern part of town along Wildhorse Creek. A levee built along Wildhorse Creek would probably prevent flooding along this channel. The bridges should be replaced at a higher elevation appropriate to the 100-year flood elevation. A levee along Sand Hollow Creek to its confluence with Wildhorse Creek would probably prevent flooding along this channel. Given enough time, flood fighting in Adams could be done to protect the areas affected by Wildhorse Creek.

B. Athena.

1. **Community Description:** Athena, Oregon is a small farming/ranching community located approximately 16 miles northeast from Pendleton, the Umatilla County seat. The town is situated immediately west of State Highway 11, on the way to Walla Walla, WA. No commercial transportation services are available in Athena. Commercial rail service is available in Pendleton, OR. Commercial air service is available in Pendleton, OR and Walla Walla, WA.

2. **Flood Plain Description:** Athena is potentially affected by flooding from Waterman Creek/Gulch that subsequently empties into Wildhorse Creek and Wildhorse Creek. Waterman Creek is a permanent flowing stream that starts northwest of town. Wildhorse Creek is a permanent flowing stream that starts in the Blue Mountains east of Adams and south of Weston, Oregon. The town of Athena is somewhat "flume" shaped in cross section, from north to south. Waterman Creek formed this "channel". The majority of flood flows can be attributed to Waterman Creek. The flood plain for the 100-year flood extends approximately 400 - 600 feet from the stream in the north portion of town and 100 - 200 feet from the stream in the south portion of town. The main development of Athena has historically taken place east of the stream. However, with the abandonment of the railroad track into town paralleling Waterman Creek, the "industrial" section of town has been depleted. Wildhorse Creek is an integral part of the city park adjacent to the school complex. The remainder of Wildhorse Creek flows in farm fields. See Photos 3 - 17.

3. **Type of Flooding:** Due to the flood plain of approximately 600 feet wide, flooding in Athena can be characterized as *widespread.* However, the flood plain is mostly empty, ex-industrial property. The creek has a berm/dike along most of the east bank protecting some newer homes. The west edge of the creek could be bermed to stop further flooding westward, if started early enough. However, that would likely cause increased flooding on the east side of the creek, exacerbating the problems for the people living on that side of the creek. Access to the town from Highway 11 is by several roads, only one of which crosses a bridge at the south end of town. There is little that could be done to protect this bridge, except to patrol it for debris clogging the opening. It is likely that back roads into and out of Athena could be used in case the roads to Highway 11 are blocked. A dike/levee built along the east side of Waterman Creek could prevent flooding at Athena. This might require new, higher bridges to clear the 100-year flood. A dike/levee built along Wildhorse Creek would prevent flooding along this channel, but construction might require some structures to be moved. Given enough time, flood fighting in Athena could be done to protect the areas affected by Wildhorse Creek.

C. Cayuse. This community is located on the CTUIR and will be covered under the CTUIR report.

D. Echo.

1. **Community Description:** Echo, Oregon is a small farming/ranching community located approximately 23 miles west from Pendleton, the Umatilla County seat. The town is situated 1 mile south of Interstate Highway 84, south of Stanfield, Oregon. Commercial rail service is available here, in Pendleton, Stanfield and Hermiston. Commercial air service is available in Pendleton, OR and Pasco, WA.

2. **Flood Plain Description:** Echo is potentially affected by flooding from the Umatilla River and at least two main supply irrigation canals. There are two areas from Umatilla River flooding that affect town. One area is from the south and the other is from the west. The Umatilla River is a permanent flowing stream that starts east of town in the Blue Mountains. A majority of Echo is not threatened directly by flooding. On the south end, the town sits approximately 6 - 8 feet above farm fields that are directly exposed to the river flood flows. Bank erosion during flood times, however, can cause trouble to the town. An arm of the southern flooding extends along the Union Pacific Railroad tracks into town, but there are few homes in this area. There is a small area affected by 100 - 500 year flows adjacent to the County Road Bridge to Lexington. Currently, this area is the city park commemorating Fort Henrietta of Oregon Trail fame. A new bridge was built in late 1999 and early 2000 and presumably was built to the correct elevation. It is about 7 - 8 feet higher than the old bridge, which was being removed on 7/11/00. There has been a flood caused by breaching of the irrigation canal along the hillside north of town. The canal flow quickly flooded the residential area downhill of the canal. This flooded area is a bowl, so floodwater could not escape, except by pumping or evaporation. See Photos 18 - 22.

3. **Type of Flooding:** Due to the lack of a flood plain in town, flooding in Echo can be characterized as *limited.* However, the flood plain south of town could be flood fought if erosion is considered a problem. The irrigation canal flood problem was a unique problem that probably won't be repeated, as the canal is no longer used, with the advent of the Bureau of Reclamation (BOR) Umatilla Basin Project. Access to Echo off I-84 would not be affected by flooding. A levee/dike built along the south and west edges of Echo (from the UPRR tracks on the east to the new bridge on the west) and armoring the riverward slope with riprap, could prevent flooding. Given enough time, flood fighting in Echo could be done to protect the areas affected by the Umatilla River.

E. Gibbon. This community is located on the CTUIR and will be covered under the CTUIR report.

F. Helix.

1. **Community Description:** Helix, Oregon is a small farming/ranching community located approximately 12 miles north from Pendleton, the Umatilla County seat. The town is situated approximately 10 miles west of State Highway 11, at Athena. No commercial transportation services are available in Helix. Commercial rail service is available in Pendleton, OR. Commercial air service is available in Pendleton, OR and Walla Walla, WA.

2. **Flood Plain Description:** Helix is potentially affected by flooding from Greasewood Creek in the approximate center of town and from the "Southwest Drainage" a channel that carries runoff along the county road to Holdman, Oregon. Greasewood Creek is an ephemeral stream that starts east of town. The

water table is quite high, so water exists in the creek channel, but not always on the surface. Most of Helix is affected by Greasewood Creek flooding. Berming along Greasewood Creek could be done if known early enough. Sandbagging could also be effective in parts of town. A recent flood was caused by frozen ground covered by snow, and then a warm rain melted the snow. At that time, the town received about 3 - 4 inches of floodwater and mud in most of the town. The city hall/library were flooded. An advance measure could be to deepen the Greasewood Creek channel. Sediment from adjacent farm fields has run off the fields and deposited in the creek channel, thereby decreasing its carrying capacity. See Photos 23 - 36.

3. **Type of Flooding:** Due to the flood plain in town, flooding in Echo can be characterized as *widespread.* If known about early enough an effective flood fight could be done here along Greasewood Creek by berming or by sandbagging some parts of town. Townsfolk are experienced at this type of work due to the recent flood. Dredging the Greasewood Creek channel to increase the channel capacity and building a levee/dike along the east side of the creek to help direct the floodwater away from downtown Helix, could prevent flooding at Helix. Enlarging the channel to its confluence with Greasewood Creek could prevent flooding from the adjacent Southwest Drainage along the county road to Holdman. Flood fighting in Helix would probably be only by local interests.

G. Hermiston.

1. **Community Description:** Hermiston, Oregon is a moderately-sized farming/ranching community located approximately 30 miles northeast from Pendleton, the Umatilla County seat. The town is situated approximately 6 miles north of I-84 and approximately 4 miles east of I-82. Commercial rail service is available in here. Commercial air service is available in Pendleton, OR and Pasco, WA.

2. **Flood Plain Description:** Hermiston itself is not potentially affected by any flooding. However, the surrounding area does have some places where the Umatilla River flood plain may affect local residents and/or access to the city of Hermiston. Between Umatilla and Hermiston, there is one place where floodwater from the Umatilla River would block River Road. South of town there are several places where county roads would be blocked by Umatilla River floodwater. There is one large area along the Umatilla River and the Stanfield Meadows Road that is completely within the Umatilla River flood plain. There are scattered homes in the area and in one place I-84 is affected.

2. **Type of Flooding:** Due to the lack of a flood plain in town, flooding in Hermiston can be characterized as *nonexistent.* However, flooding in adjacent areas can be characterized as both *limited* in the case of scattered road blockages and *widespread* in the Stanfield Meadows Road area. Berming or sandbagging could be effective along River Road to keep it open or to protect local residents.

South of Hermiston, there is little that can be done. Perhaps local sandbagging or berming would help protect the individual homes. Definitely, berming along I-84 would help to keep that important road open for travel. Flood fighting in Hermiston is probably going to be limited to local efforts.

H. Holdman.

1. **Community Description:** Holdman, Oregon is a remnant of a small farming/ranching community located approximately 15 miles northeast from Pendleton, the Umatilla County seat. The town is situated on Cold Springs Creek in a narrow canyon along State Highway 37 and approximately 11 miles south of the Columbia River. The community consists of probably 1 - 2 families located around the old school building plus associated farm buildings on both sides of the creek. No commercial transportation services are available in Holdman. Commercial rail service is available in Pendleton, Umatilla, and Hermiston, OR and Wallula, WA. Commercial air service is available in Pendleton, OR and Pasco, WA.

2. **Flood Plain Description:** Holdman does not have FEMA flood plain mapping either for the community or for a larger area. However, there is evidence of erosion damage by high water in the creek both upstream and downstream of the community.

3. **Type of Flooding.** Flooding in Holdman can be characterized as *limited*, because it is such a small community. Access along Highway 37 can be affected by high water from Cold Springs Creek and its forks, plus other waterways that the highway follows. It is likely that flooding events are short term and rapidly forming and dissipating, although the flooding caused by frozen ground and rapid snowmelt probably also affects the flood flows. It is probably not a good candidate for COE flood fighting assistance. Building a levee/dike around the buildings could prevent flooding in Holdman.

I. Milton-Freewater. This town is located within the Walla Walla District and it will not be discussed further.

J. Mission. This community is located on the CTUIR and will be covered under the CTUIR report.

K. Pendleton.

1. **Community Description:** Pendleton, Oregon is a moderately sized farming/ranching/commercial center community located approximately 212 miles east from Portland and is the Umatilla County seat. The town is situated on I-84/US Highway 30, US Highway 395, State Highways 11 and 37, numerous Umatilla County roads, the UPRR, and has scheduled commercial air service provided by Horizon Airlines.

2. **Flood Plain Description:** Pendleton is potentially affected by flooding from: the Umatilla River (See Photos 37 - 41 and 51 - 52), McKay Creek (See Photos 53 - 56), Tutuilla Creek (See Photos 45 - 50), and Nelson Creek (See Photos 42 - 44). Most of the downtown part of town is protected by a levee along the south bank of the river. The levee starts near the eastern city limit at a rock bluff and proceeds downstream to US Highway 30 and the UPRR mainline tracks, and switches to the western bank of the river until it reaches the I-84 bridge over the Umatilla River. Two further levee segments along both banks downstream, protect the city's sewage treatment plant from both the Umatilla River and McKay Creek and an industrial site dominated by Pendleton Grain Growers (PGG) McKennon Station grain elevator, a travel trailer plant, and a plastic pipe plant. The second flood plain is from the previously mentioned McKay Creek, from the Bureau of Reclamation reservoir south of town to the mouth on the Umatilla River by the sewage treatment plant. A residential area called the Montee Addition is situated along both banks of McKay Creek and has been subjected to flooding in the past, even though the dam regulates the stream flow. Flooding was caused by cloudbursts the last two times flooding occurred. One time it was upstream of the reservoir, which was full at the time, and it caused the dam operators to release more water than the stream banks could contain. The second time the cloudburst happened between the dam and the residential area, also increasing the flow beyond the carrying capacity of the banks. The third area is Tutuilla Creek, which is a small drainage north of McKay Creek. There is a small residential area in town that is subject to flooding when Tutuilla Creek experiences high water events. The houses are built very close to the creek, leaving no room for protective devices. The last flood plain is from a small ravine on the northwest edge of town, called Nelson Creek. This valley follows State Highway 37. This small creek is essentially an ephemeral stream handling only runoff, but probably any frozen ground/rapid snow melt floods like the Helix event, also. This creek exits into the Umatilla River by the US Highway 30 bridge.

3. **Type of Flooding:** Umatilla River flooding can be characterized as *widespread*, if the downtown levee overtops an/or breaches. Otherwise there is no flood threat. McKay Creek flooding can also be characterized as *widespread* flooding along McKay Creek in the residential area, including one elementary school and a new assisted living center for senior citizens. Tutuilla Creek and Nelson Creek flooding can both be characterized as *limited* flooding, due to their small flood plain areas. However, this shouldn't minimize the disruption to those families affected by the flooding. Floods fighting can be effective if the downtown levee overtops and/or breaches, given enough time to mobilize the COE. Of course local efforts can be undertaken. Flood fighting can be effective along parts of McKay Creek, given enough time to mobilize. It is possible to flood fight the Tutuilla Creek and Nelson Creek flooding, also, given enough time to mobilize. Flash flooding in any drainage would make flood fighting by the COE unlikely. The existing downtown levee will control flooding in Pendleton,

as long as it remains in place and operable. Clearing the channel and/or building a dike/levee along the sides of Tutuilla Creek with homes could prevent flooding along this channel. Building levees along the creek upstream and downstream from Quinney Avenue could prevent flooding along McKay Creek. This will be difficult due to the houses built close to the creek. There is a flash flood potential along the hillside in the southwest part of the Montee Addition. Deepening existing ditches or constructing new ditches along the roads, providing a bigger catchment areas for runoff, and possibly by increasing the size of the culvert under the road into the existing drainage channel could prevent flooding in this part of Montee Addition. Building a levee along the Umatilla River to protect the entire area could prevent flooding in the Riverside area. The existing levees around the sewage treatment plant and the industrial area by McKennon Station will control flooding in those locations as long as they are maintained and are operable.

L. Pilot Rock.

1. **Community Description:** Pilot Rock, Oregon is a small farming/ranching community located approximately 14 miles south from Pendleton, the Umatilla County seat. The town is situated on US Highway 395, State Highway 74, numerous Umatilla County roads, and a little used UPRR spur. Commercial air service is available in Pendleton, OR.

2. **Flood Plain Description:** Pilot Rock is potentially affected by flooding from: the West Fork of Birch Creek (See Photos 57 - 58), the East Fork of Birch Creek, and Birch Creek (See Photos 58 - 59) downstream from the confluence of the two forks. The main stem of Birch Creek has a concrete bridge at the US Highway 395 crossing and passes by a trailer park on the east bank, which experiences flooding. There is a relatively new (3 years old) fish ladder adjacent to the trailer park. The West Fork has a bridge that Main Street crosses. Buildings were constructed right on the creek banks, eliminating any possible flood fighting construction along the banks. The East Fork has a bridge near the junction of Cedar Street and US Highway 395. Houses were built very close to the creek banks, also eliminating any flood fighting construction along this fork of Birch Creek.

3. **Type of Flooding:** Flooding from the two forks of Birch Creek can be characterized as *limited*, until they merge to for Birch Creek, where it becomes *widespread* flooding. Some limited sandbagging may be possible along streets to stop the spread of localized flooding. The only infrastructure threatened by flooding is the fish ladder and it has little to be damaged. Both schools are located high above the creeks. Flash flooding in any drainage would make flood fighting by the COE unlikely. Without major moving of buildings and the bridges, flooding in Pilot Rock probably can't be prevented.

M. Stanfield.

1. **Community Description:** Stanfield, Oregon is a small farming/ranching community located approximately 24 miles west from Pendleton, the Umatilla County seat. The town is situated on US Highway 395, several Umatilla County roads, and the UPRR. Commercial air service is available in Pendleton, OR and Pasco, WA.

2. **Flood Plain Description:** Stanfield is potentially affected by flooding from Stage Gulch and the Umatilla River backing up into Stage Gulch. The majority of historic flooding has come from Stage Gulch. Generally, this stream is an overflow channel for irrigation canals, but with the advent of the BOR's Umatilla Basin Project, it has become a small stream in it's own right. The city of Stanfield has been working on flood protection activities for several years. They have moved some mobile homes situated on the creek banks and widened the stream channel downstream of the US Highway 395. The creek slopes have been cut back to a very flat grade and grassed. The area has become a park and athletic fields. Some houses that were built very close to the creek banks, are still there. There is generally room to build a berm or do sandbagging along the creek banks or on some of the streets, if need be. Flooding from the Umatilla River directly is unlikely, because the UPRR railroad fill acts as a dike, except for the Stage Gulch channel. See Photos 60 - 73.

3. **Type of Flooding:** Flooding in Stanfield can be characterized as *widespread* flooding. Some limited sandbagging may be possible along streets to stop the spread of localized flooding. No infrastructure is threatened by flooding. Both schools are located high above the main part of town in the "valley" of Stage Gulch. Berm construction is possible if enough time is given to mobilize. Flash flooding in any drainage would make flood fighting by the COE unlikely. Building a levee along both sides of Stage Gulch throughout Stanfield could prevent flooding here.

N. Ukiah.

1. **Community Description:** Ukiah Oregon is a small logging/ranching community located approximately 50 miles south from Pendleton, the Umatilla County seat. The town is situated on US Highway 395, a USFS highway, and State Highway 244. No commercial transportation services are available in Adams. Commercial rail service is available in Pendleton, OR. Commercial air service is available in Pendleton, OR.

2. **Flood Plain Description:** Ukiah has been historically affected by flooding from Camas Creek. Although the FEMA flood mapping shows only two small areas affected by flooding, historical flooding experience indicates that more of the adjoining area is affected. Flooding comes from typical high water events and from ice dams formed on the gravel bars formed upstream of the Soap Hill Road

bridge on the south edge of town. There is a low height levee along the creek in town that was maintained by Umatilla County for several years. They stopped sponsoring the levee in favor of the local community forming a special levee district however, the local residents failed to reach an agreement to form such a district. As a result, no maintenance has been performed on the levee. The area affected by historic flooding is residential only. See Photo 74 for a view of the Ukiah area.

3. **Type of Flooding:** Flooding in Ukiah can be characterized as *limited* flooding. Some limited sandbagging or berming may be possible along streets (or on the existing levee) to stop the spread of localized flooding. No infrastructure is threatened by flooding. Both schools are located high above the main part of town. Berm construction is possible if enough time is given to mobilize. Flash flooding in any drainage would make flood fighting by the COE unlikely. Maintaining the existing levee and dredging the existing gravel bar along the levee in town could prevent flooding in Ukiah.

O. Umapine. This town is located within the Walla Walla District and it will not be discussed further.

P. Umatilla.

1. **Community Description:** Umatilla, Oregon is a farming community located approximately 40 miles north from Pendleton, the Umatilla County seat. The town is situated on US Highway 730, Interstate I-82, a state highway, and a UPRR spur. No commercial transportation services are available in Umatilla. Commercial rail service is available in Hermiston and Pendleton. Commercial air service is available in Pendleton, OR and Pasco, WA.

2. **Flood Plain Description:** Umatilla is potentially affected by flooding from the Umatilla and Columbia Rivers. Umatilla River flooding affects only a small area, currently containing athletic fields and part of the city park. Columbia River flooding affects an area along the north edge of town, currently not developed, probably due to the FEMA flood mapping. River Road between Umatilla and Hermiston has several places where Umatilla River high water could possibly block the road. However, I-82 is higher than that area and could provide a bypass in case of floodwater blocking River Road. There are several residential sites that would be affected by flooding or flooding blocked access.

3. **Type of Flooding:** Flooding in Umatilla can be characterized as *limited* flooding. Sandbagging or berming may be possible along River Road to stop the spread of localized flooding. Except for short parts of River Road, no other infrastructure is threatened by flooding. Schools are located high above the rivers and the sewage treatment plant is built higher than the 100-year flood. Flooding from the Columbia River would affect only the COE park/marina. Raising the flood-prone segments of River Road above the flood elevation could prevent

flooding here. A levee and/or floodwalls built along the Columbia River could protect the threatened north part of Umatilla from flooding. Flood fighting in Umatilla is unlikely.

Q. Weston.

1. **Community Description:** Weston, Oregon is a small farming/ranching community located approximately 20 miles northeast from Pendleton, the Umatilla County seat. The town is situated immediately east of State Highway 11, on the way to Walla Walla, WA. It is also located on State Highway 244. No commercial transportation services are available in Weston. Commercial rail service is available in Pendleton, OR. Commercial air service is available in Pendleton, OR and Walla Walla, WA.

2. **Flood Plain Description:** Weston is potentially affected by flooding from Pine Creek. Pine Creek is a permanent flowing stream that starts in the Blue Mountains southeast of Weston. The town of Weston is shaped like a "flume" caused no doubt by Pine Creek therefore, flooding from the stream can affect approximately three-fourths of the town. The flood plain for the 100-year flood extends approximately 300 feet from the stream in the middle portion of town and 100 - 200 feet from the stream in the north and south portions of town. The main development of Weston historically has taken place along the stream. Houses were built along and in one case on top of the creek, preventing flood-fighting construction in those areas. It is possible that some limited sandbagging could be effective in stopping some localized flooding. See Photos 75 - 77.

3. **Type of Flooding:** Due to the flood plain being in the middle of town, flooding in Weston can be characterized as *widespread.* Limited sandbagging or berm construction could be effective in small areas, but in general, flood fighting in Weston is probably not a priority. Without major moving of buildings, construction of levees, and raising bridges, flooding in Weston probably can't be prevented. COE flood fighting is possible from the Walla Walla District but questionable from the Portland District because the distance from Portland to Weston is about 300 miles vs. about 20 miles to Walla Walls, WA.

R. Unincorporated Areas.

1. **Community Description:** The unincorporated areas visited were road crossings. The crossing structures varied from corrugated metal culverts (CMP) to concrete box culverts, to bridges of various kinds.

2. **Flood Plain Description:** Flood plains varied depending upon the waterway crossing the road. In most cases, the crossing structures probably wouldn't be directly damaged, but perhaps the abutments or the road immediately before and after the bridges would be. One specific site that I visited was the Wildhorse Creek bridge south of Helix. It currently has a fence across the creek below the

bridge that presents a debris-clogging problem and would be a problem during high water events. Birch Creek, south of the Umatilla River, has many bridges that appear to be within the flood plain. In addition, some of the county roads that provide access into and across Birch Creek have several places, especially in the lower valley, closer to the Umatilla River that appear to be in danger of having floodwater blocking them. The area of the Stanfield and Echo Meadows Roads appear to be entirely within the Umatilla River 100-year flood plain with little potential for flood fighting because the area is very flat. Access though or into these areas will be severely restricted during a flood. See Photos 78 - 88.

3. **Type of Flooding:** Due to the small area for each of the crossings, flooding would be characterized as *limited.* Flooding cannot be prevented over the entire area of unincorporated part of Umatilla County due to the extensive area to protect. Most of the flood prone areas are also too big to protect in their entirety. Bridges could be raised, obstructions removed, trash racks built, and levees built to protect abutments to prevent blocking of the roads at the crossings. COE flood fighting in the unincorporated part of Umatilla County is unlikely, regardless of the District involved.

IV. Conclusions and Recommendations.

A. Conclusions.

1. There are 6 areas that I considered as having *widespread* flooding threat: Adams, Athena, Helix, Holdman, Stanfield, and Weston. Of these 6 sites, 6 have a good potential for flood fighting, if time permits. Those communities are: Athena, Helix, and Stanfield. The other 3 sites with widespread flooding have limited potential for flood fighting due to the community's location in relation to the waterway and development along the waterway (Adams, Holdman, and Weston).

2. Because at least some of the flooding problems are caused by rapidly developing storms and because the Portland District lies about 200 miles away from the area, the likelihood of flood fighting by the COE is severely limited.

3. The only site in the unincorporated area that presented a potential for stopping access to a community is the Wildhorse Creek bridge, south of Helix.

4. The areas between I-84 and the Umatilla River south of Hermiston and Hinkle and between I-84 and the road from Echo to Lexington are almost entirely covered by the 100-year flood. Reportedly in the past, I-84 has been threatened by flooding from the Umatilla River south of the highway and just west of the I-84/Umatilla River bridge.

5. Birch Creek has numerous bridges for county roads that will probably be damaged or covered in the event of a flood. In this event, access from one side of the creek to the other will be severely restricted.

6. The county has a flood plan written that covers many of these sites and items discussed above.

B. Recommendations.

1. Provide Umatilla County with this report and solicit their input and comments.

2. Determine if the county is interested in developing site-specific flood response plans for the sites identified (and for the Umatilla River Water Control District 1, Zone 2 and the Riverside-Mission Water Control District).

Appendix A - Summary Spreadsheet

Umatilla County Flood Fight Preparation
(Summary of Findings)

Name of Community	Flooding Character				Remarks
	Widespread	Limited	None	Preventable (Y/N)	
Adams	X			Y	Limited flood fight potential. To be truly preventable, houses will probably need to be moved.
Athena	X			Y	Good flood fight potential.
Cayuse	X			Y	Small community on CTUIR, located at S-curve of Umatilla River that is flood-prone to 3 - 4 families. Good flood fight potential.
Echo		X		Y	Good flood fight potential.
Gibbon	X			Y	Small community on CTUIR in Umatilla River canyon u/s of Pendleton. Located at confluence of Umatilla River and Meacham Creek. Good flood fight potential.
Helix	X			Y	Good flood fight potential.
Hermiston			X	N/A	
Holdman	X			Y	Location of old community. Now only 1 - 2 families live there. Located in canyon 13 miles east of Umatilla on Cold Springs Creek. Limited flood fight potential.
Milton-Freewater	N/A	N/A	N/A	N/A	Located in Walla Walla District. Not visited.
Mission	X			Y	Small community related to CTUIR headquarters. Several flood-prone areas for up to 5 - 6 families along Umatilla River. Good flood fight potential.
Pendleton		X		Y	Good flood fight potential. Floods along most of McKay Creek will be preventable only with movement of some houses.
Pilot Rock		X		N	Limited flood fight potential. Flooding not preventable without moving buildings.
Stanfield	X			Y	Good flood fight potential.
Ukiah		X		Y	Good flood fight potential.
Umapine	N/A	N/A	N/A	N/A	Located in Walla Walla District. Not visited.
Umatilla		X		Y	Area with flood potential doesn't need flood fighting. To prevent flooding on River Road, need to raise the road.
Weston	X			N	Limited flood fight potential due to development along creek. Need to move a lot of buildings to make flooding preventable.
Unincorporated Areas		X		N	Visited several road crossings. Bridge on road from SH11 to Helix could be a problem due to a fence across Wildhorse Creek.
					Stanfield Meadows and Echo Meadows Roads will be covered by 100-year floods of Umatilla River. Prevents access into or though the areas.
					Flood fight potential is very limited due to the large area to be protected and little opportunity to do so.

Appendix B - Typical Site Photos

Photo No. 1: View looks southwest (upstream) at bridge on William St. over Sand Hollow Creek on north edge of town.

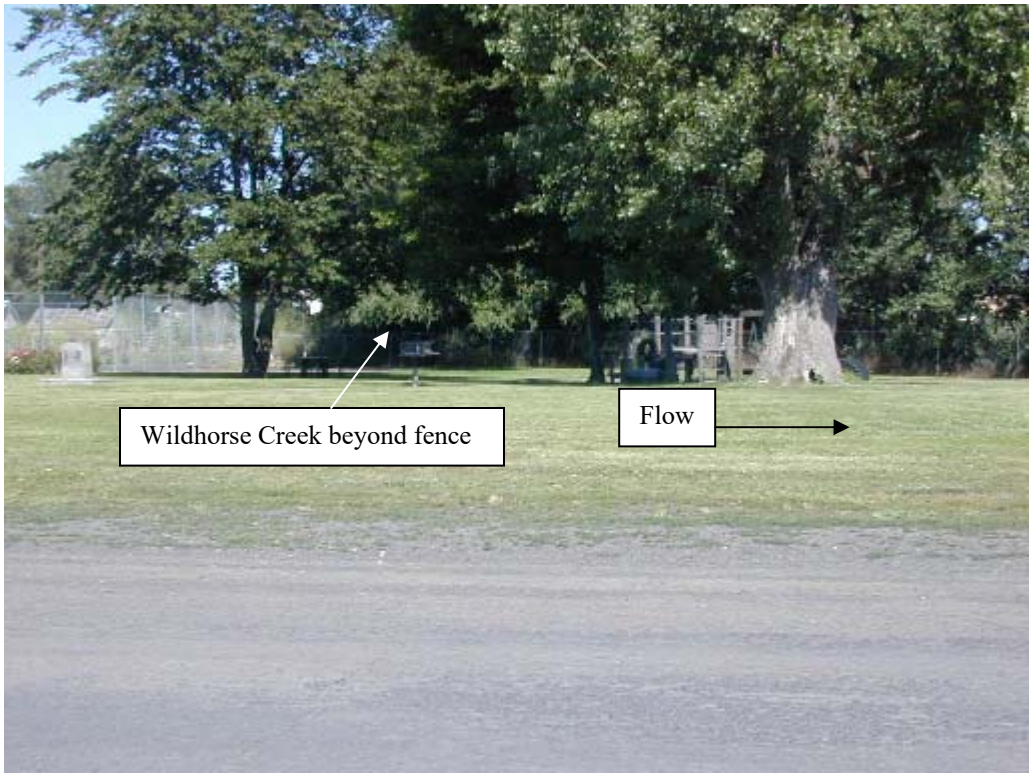


Photo No. 2: View looks east at City Park along Wildhorse Creek taken from Center and Morrison Sts.

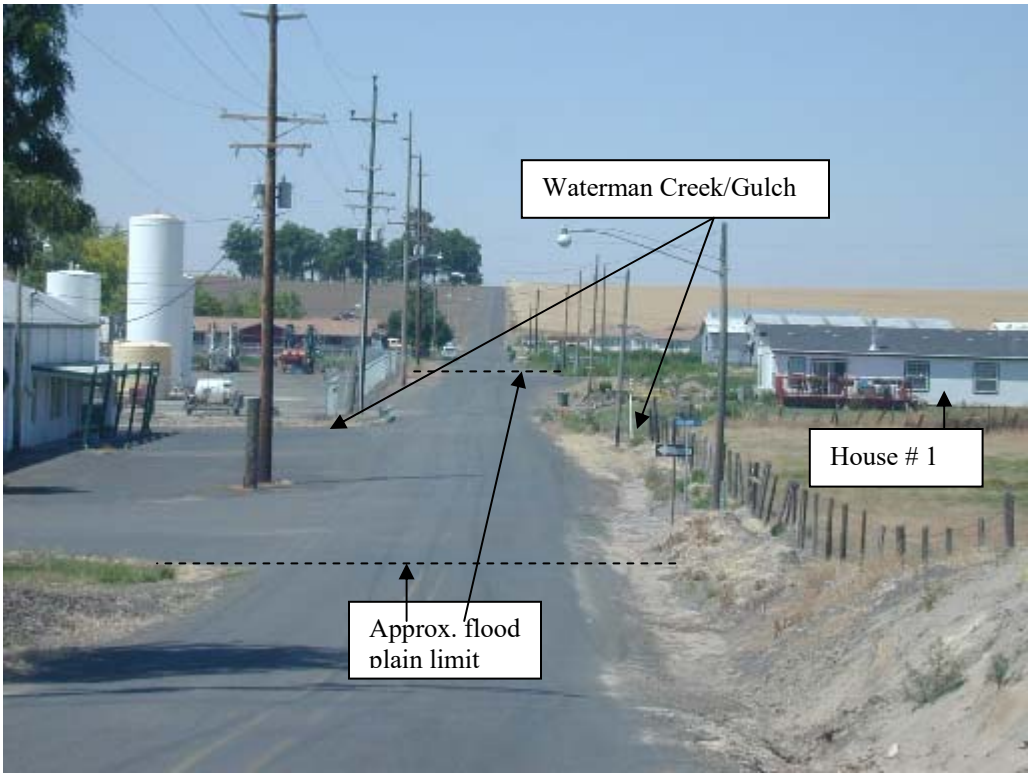


Photo No. 3: View looks west at crossing and flood plain of Waterman Creek/Gulch.

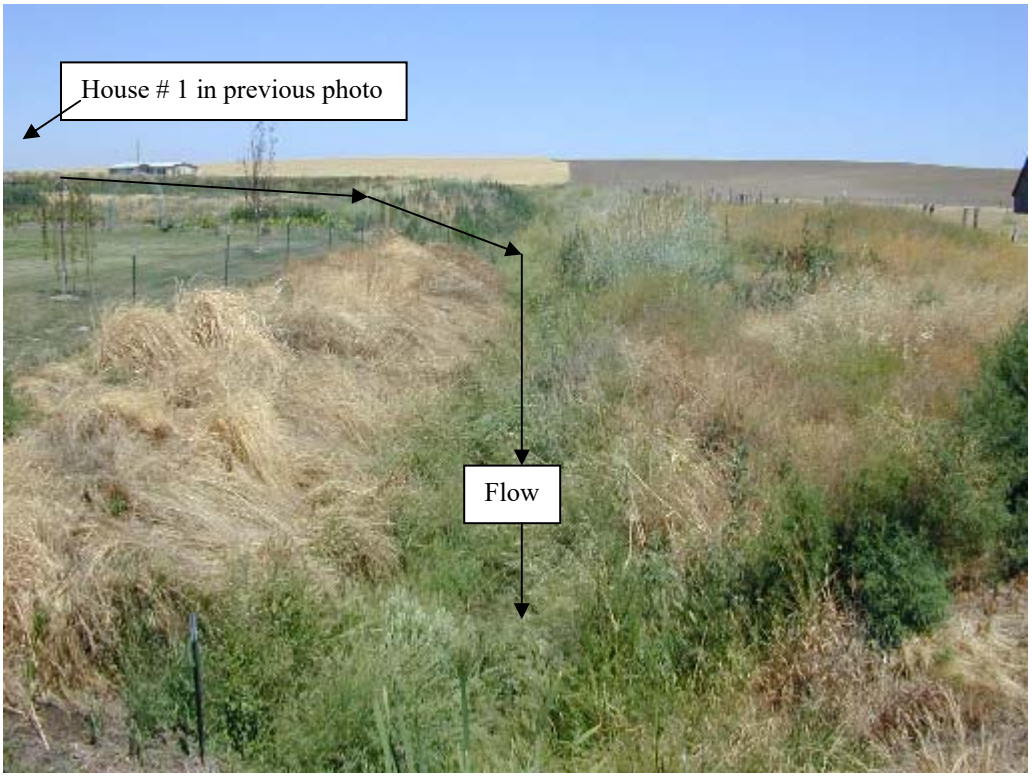


Photo No. 4: View looks upstream at Waterman Creek/Gulch from bridge on Sherman St. along north edge of town.

Photo No. 5: View looks downstream (south) at Waterman Creek from bridge on Sherman St. on north edge of town.

Photo No. 6: View looks downstream at the upstream face of the Sherman St. bridge.

Photo No. 7: View looks downstream at Waterman Creek/Gulch bridge north of town.

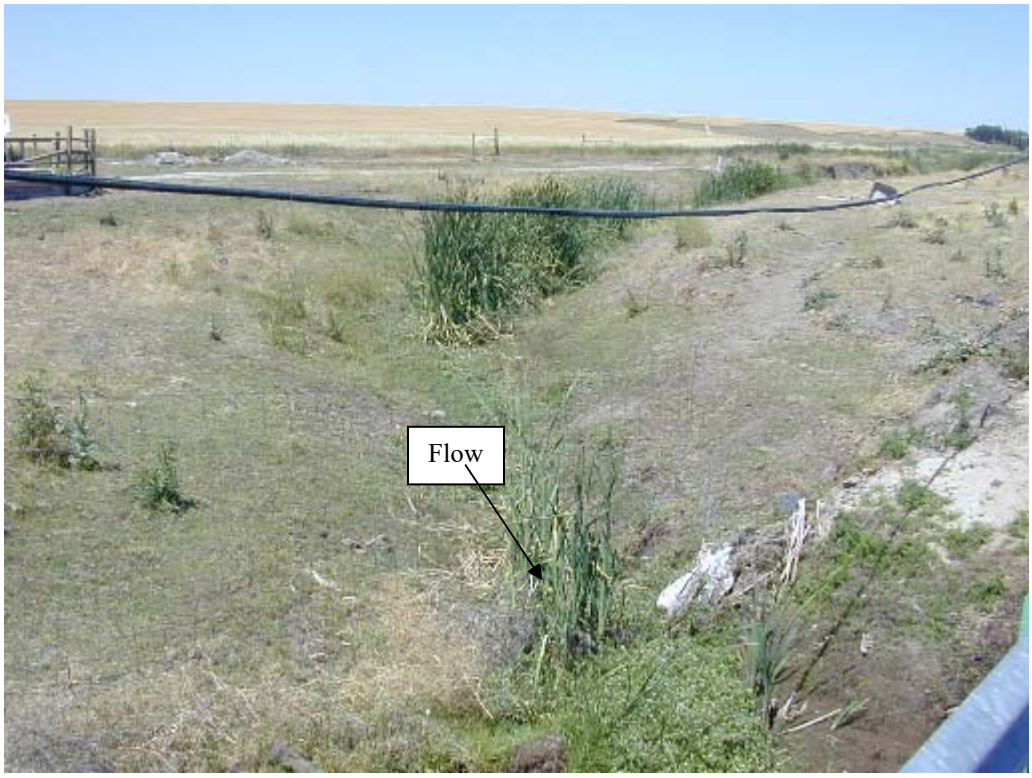


Photo No. 8: View looks upstream (north) at Waterman Creek/Gulch from bridge north of town.

Photo No. 9: View looks at upstream face of bridge over Waterman Creek/Gulch north of town.

Photo No. 10: View looks downstream (south) at Waterman Creek/Gulch from Main St. bridge/concrete box culvert.

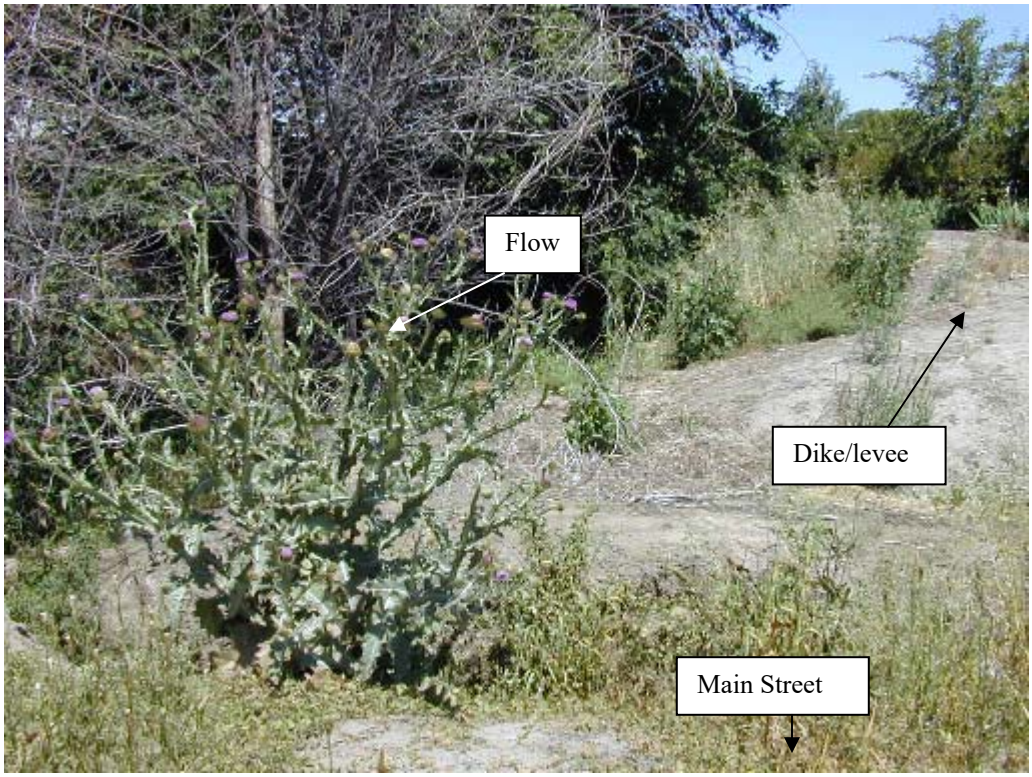


Photo No. 11: View looks upstream at Waterman Creek/Gulch from Main St., showing a dike/levee behind homes along east bank of the creek.

Photo No. 12: View looks southeast at homes along east bank of Waterman Creek/Gulch, taken from bridge in middle of town.

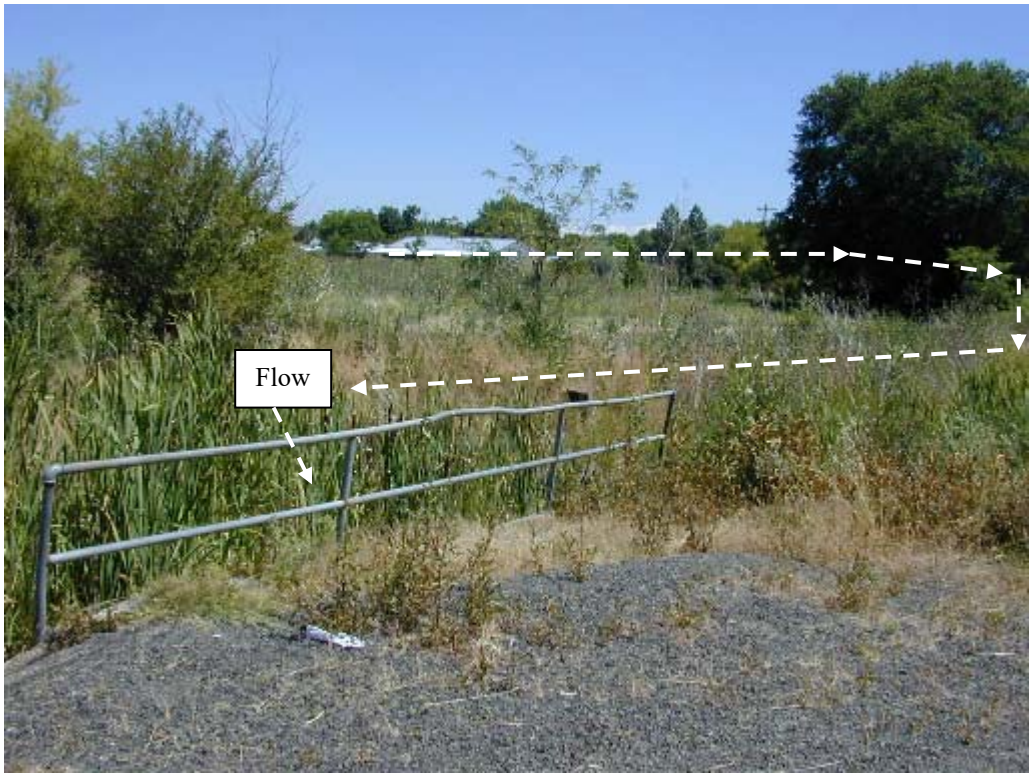


Photo No. 13: View looks upstream (north) at Waterman Creek/Gulch from bridge/concrete box culvert on Main St.

Photo No. 14: View looks southeast at upstream face of Main St. box culvert/bridge.

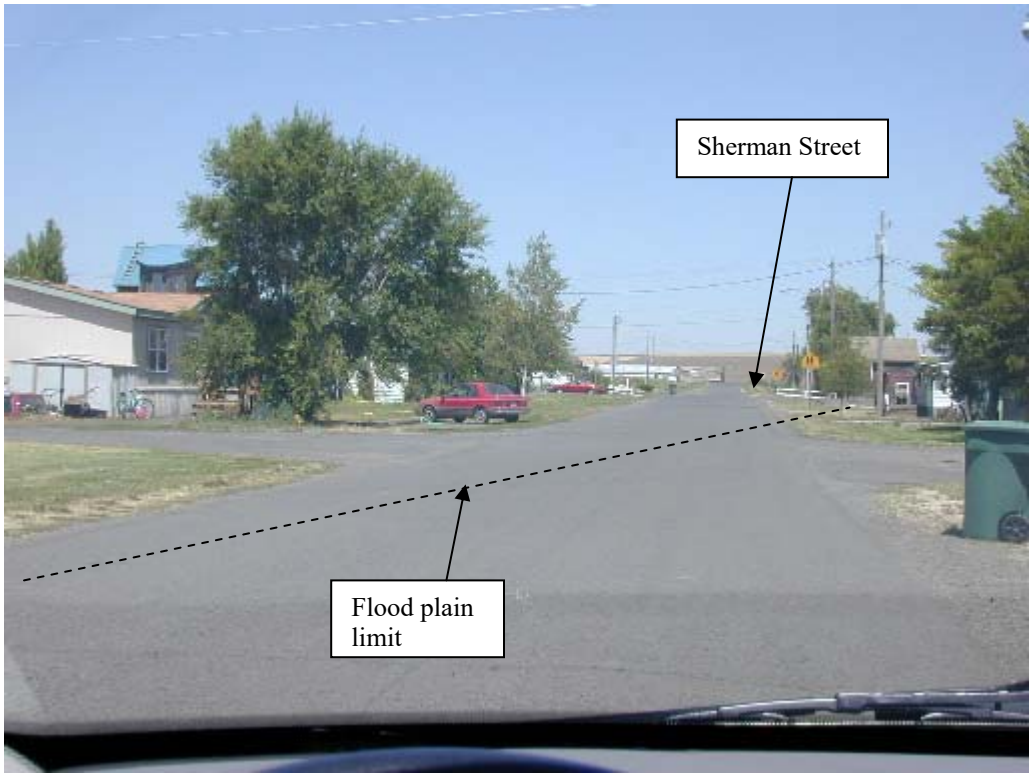


Photo No. 15: View looks upstream (north) at Waterman Creek/Gulch flood plain at College Street and 2nd Street.

Photo No. 16: View looks upstream (north) at combined Waterman Creek/Wildhorse Creek south of town.

Photo No. 17: View looks at upstream face of bridge.

Photo No. 18: View looks upstream (south) at old county road bridge being destroyed and gravel bar buildup west of town. Taken from new bridge.

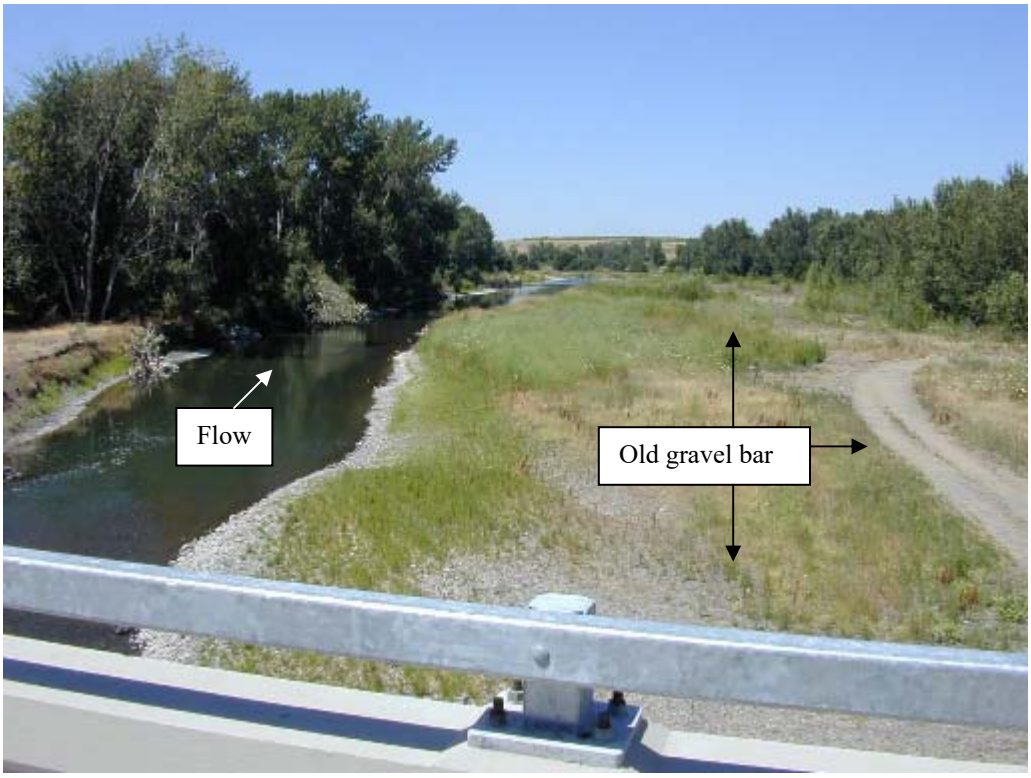


Photo No. 19: View looks downstream (north) at gravel bar downstream from bridge site.

Photo No. 20: View looks north at equipment removing old bridge and downtown area (not in flood plain except lower right corner).

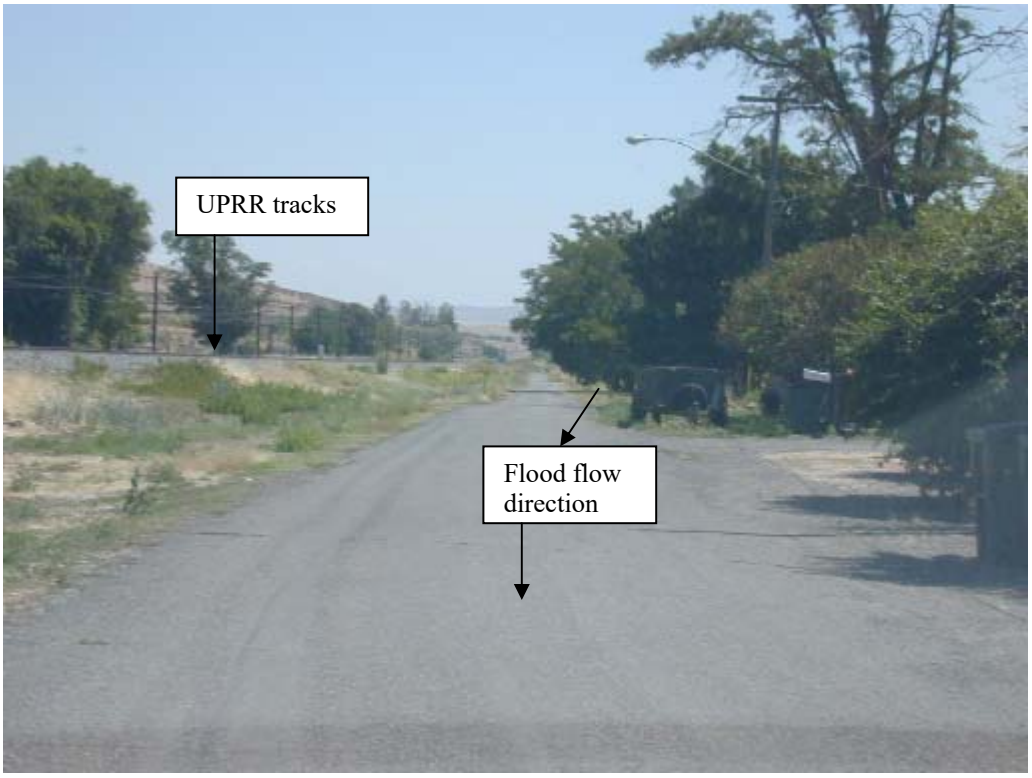


Photo No. 21: View looks southeast at flood plain area in southeast part of town showing UPRR tracks on left. Taken from Kennedy and Railroad Sts. Photo point is in flood plain.

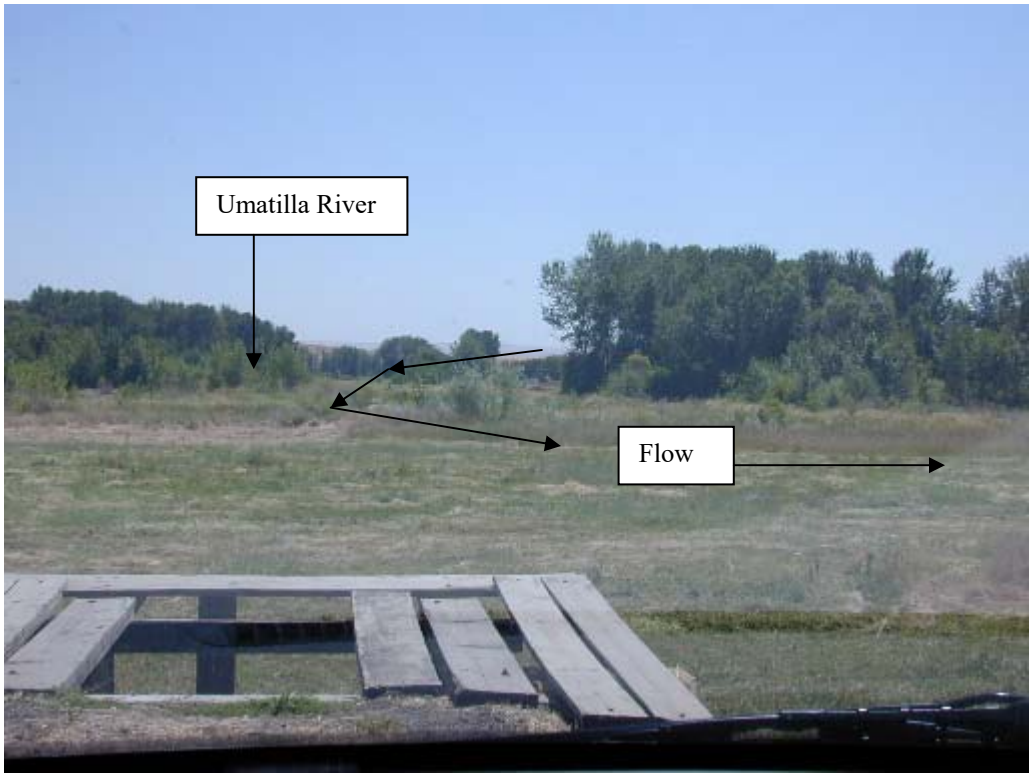


Photo No. 22: View looks south are area directly affected by flooding from bank on south edge of town. Taken from Dale and Halstead Sts.

Photo No. 23: View looks downstream from bridge across Greasewood Creek at middle part of creek in town.

Photo No. 24: View looks downstream from "middle" bridge at upstream face of bridge.

Photo No. 25: View looks northeast (downstream) at Greasewood Creek, south of Helix.

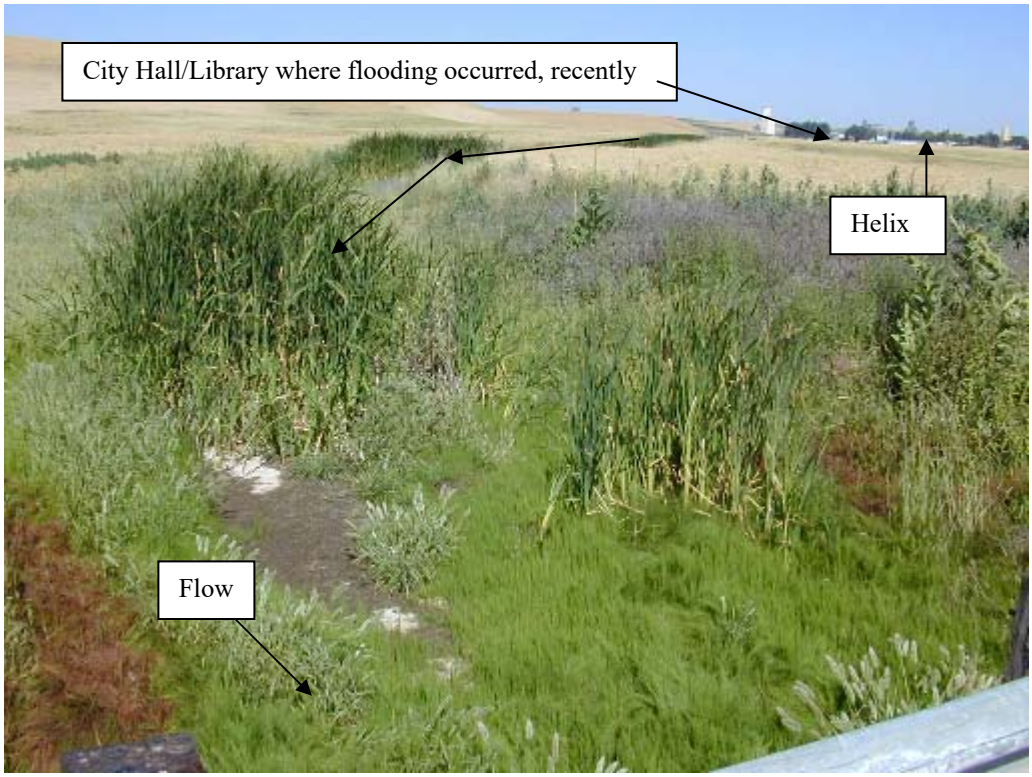


Photo No. 26: View looks northwest at Greasewood Creek crossing from south of Helix.

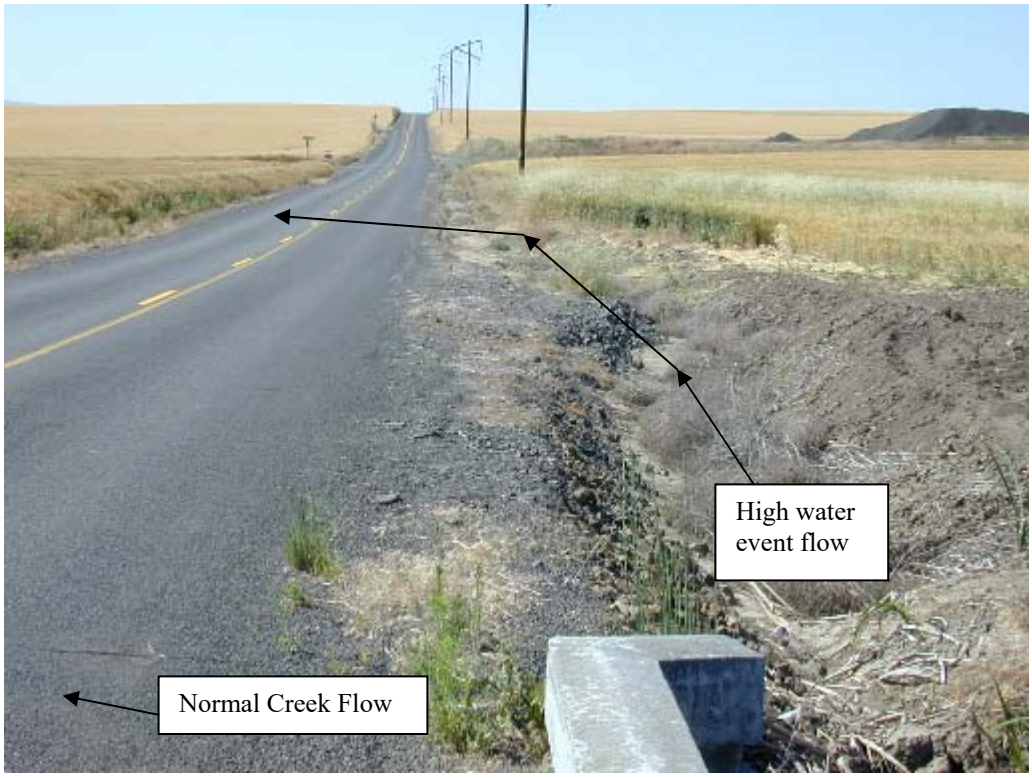


Photo No. 27: View looks south from Greasewood Creek crossing south of Helix. During high water events, water flows across road here.

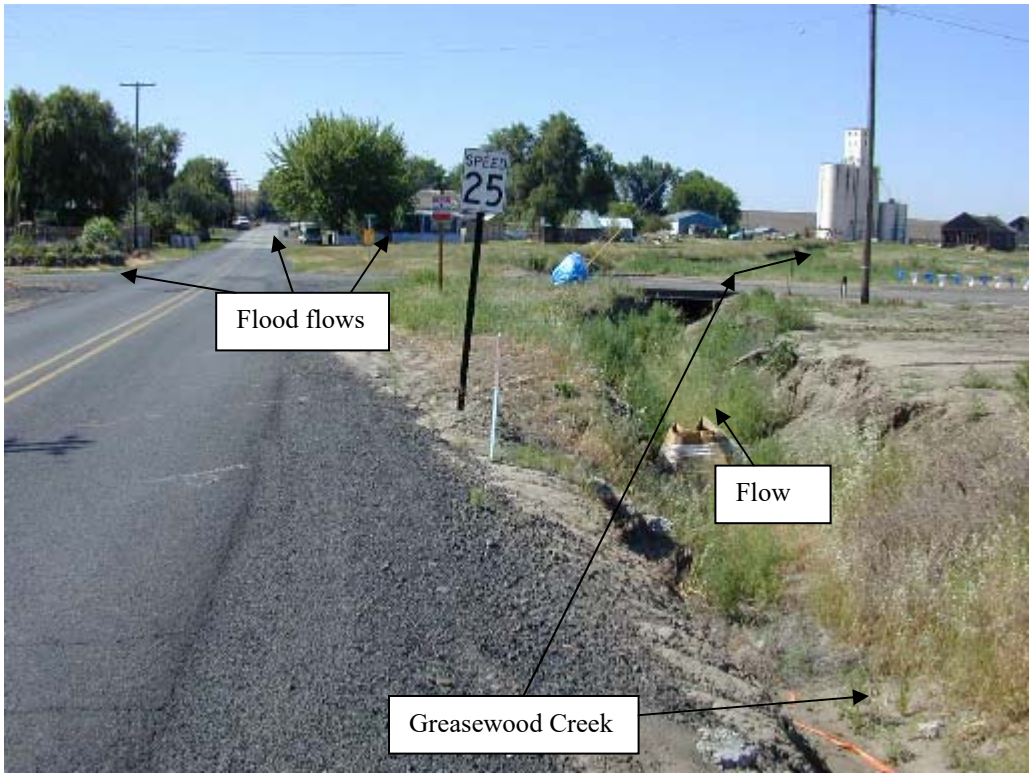


Photo No. 28: View looks south from north side of town.

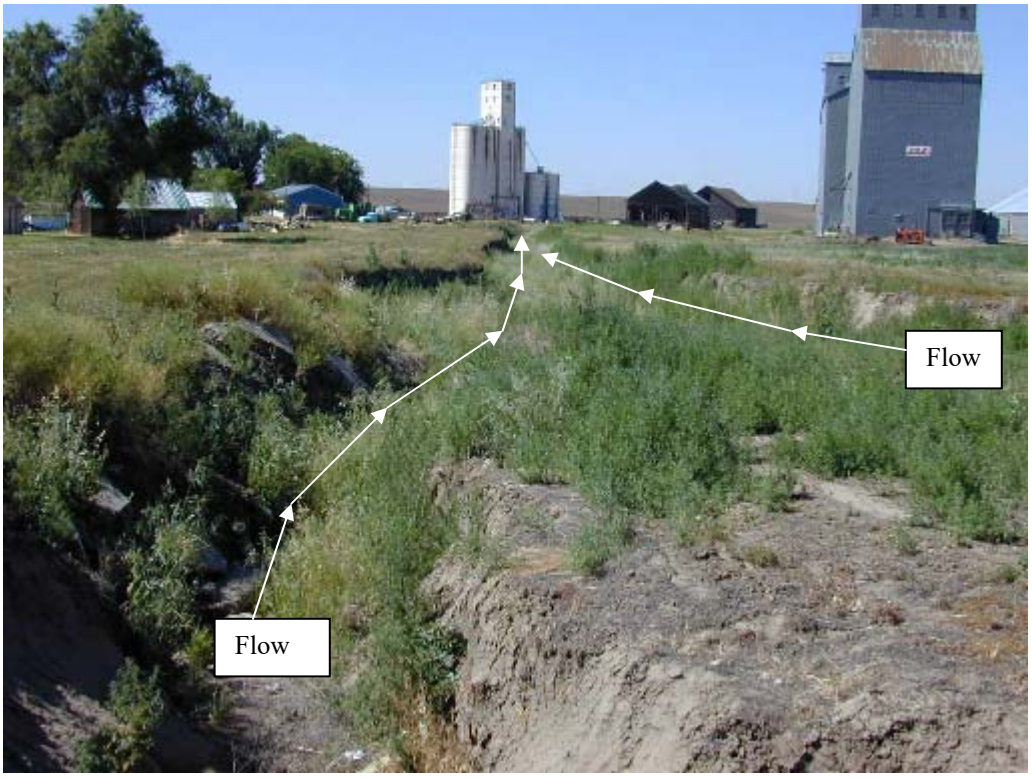


Photo No. 29: View looks south at confluence of two branches of Greasewood Creek at north edge of town.

Photo No. 30: View looks southeast at area flooded on north edge of town.

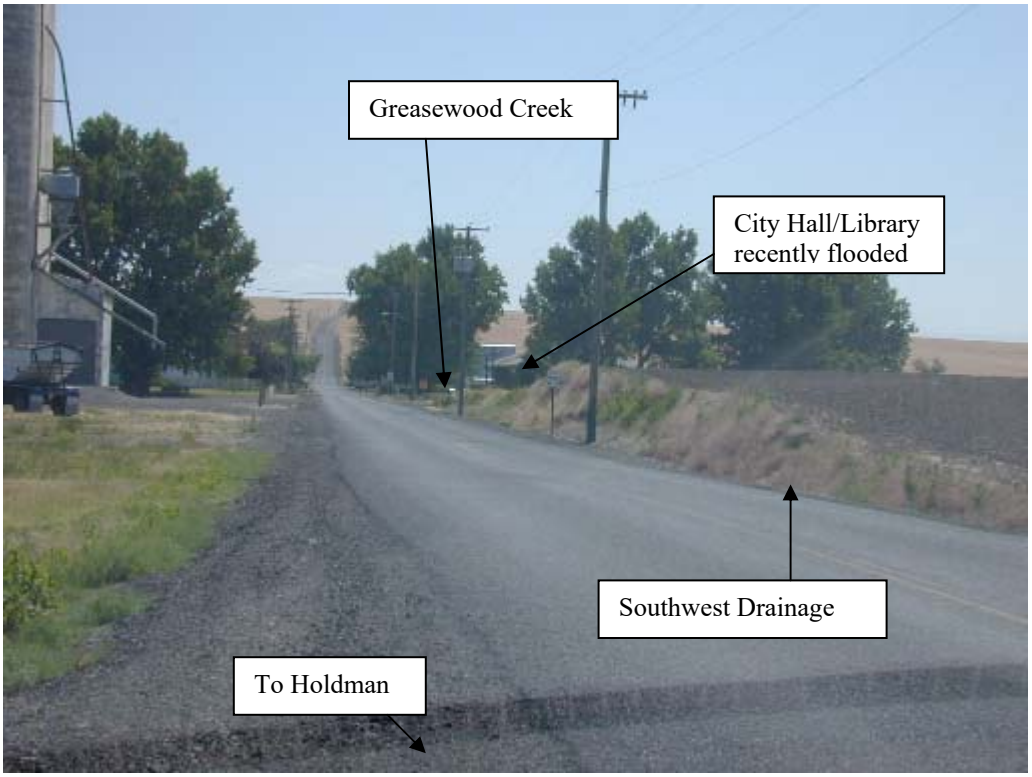


Photo No. 31: View looks southeast at Southwest Drainage and Greasewood Creek on west edge of town.

Photo No. 32: View looks northwest at Greasewood Creek upstream from bridge on road to Holdman

Photo No. 33: View looks south at upstream side of Greasewood Creek bridge at west edge of town.

Photo No. 34: View looks southeast at Greasewood Creek, looking downstream.

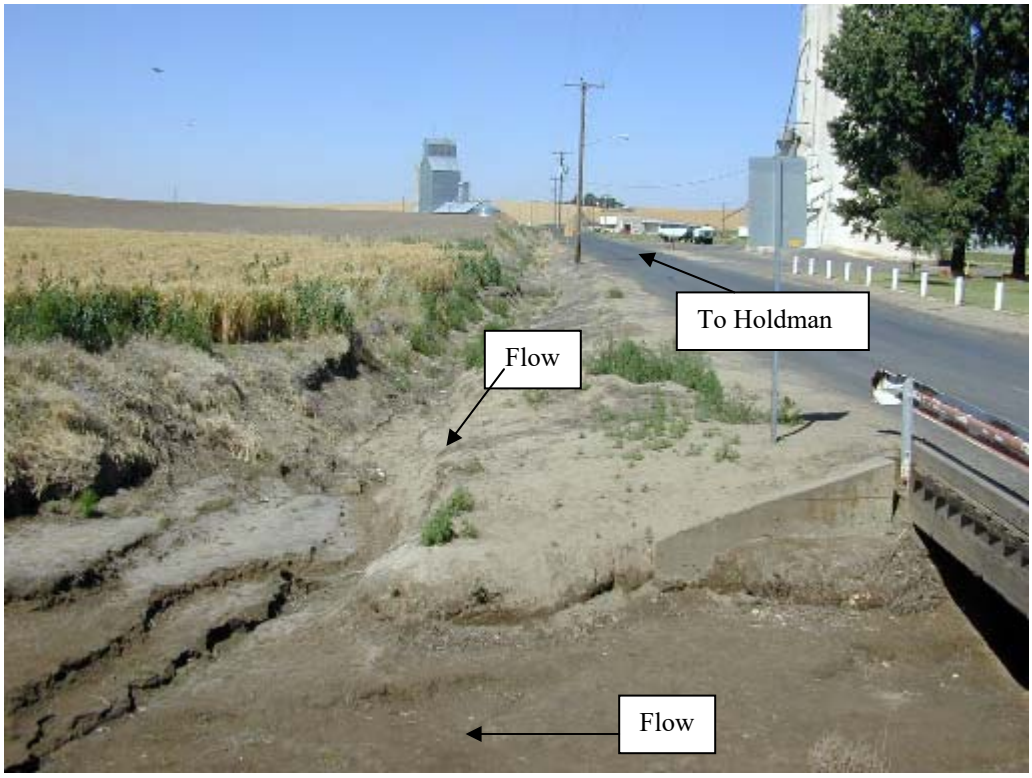


Photo No. 35: View looks west at Southwest Drainage at confluence with Greasewood Creek.

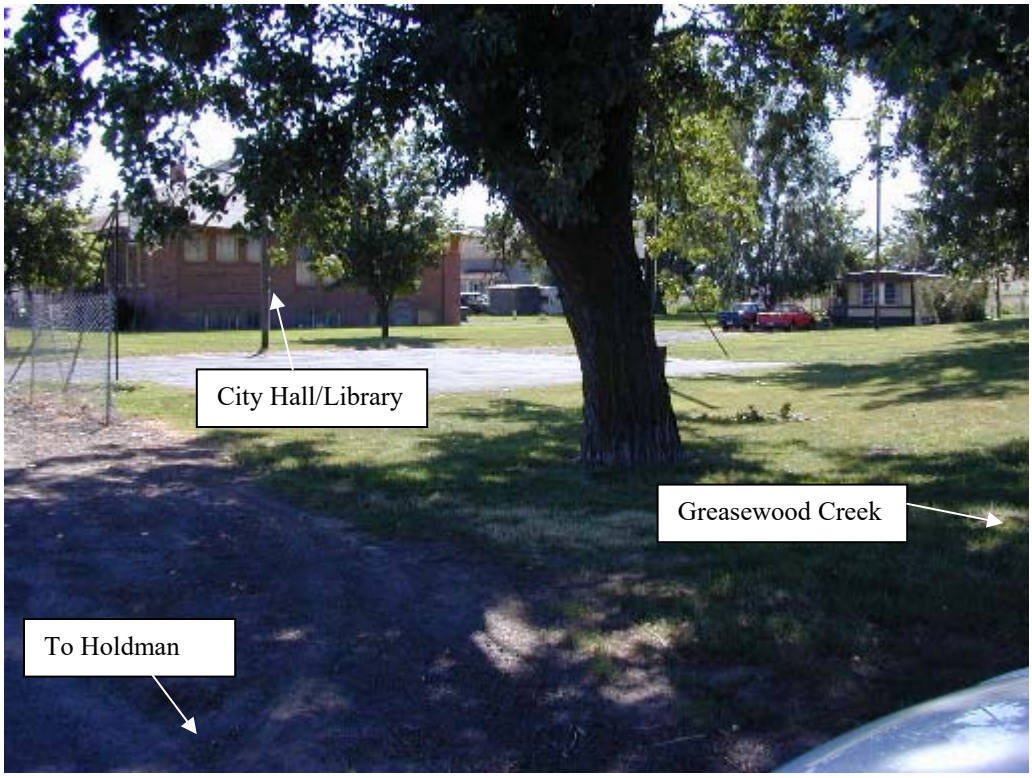


Photo No. 36: View looks east at City Hall/Library recently flooded, immediately downstream from Greasewood Creek.

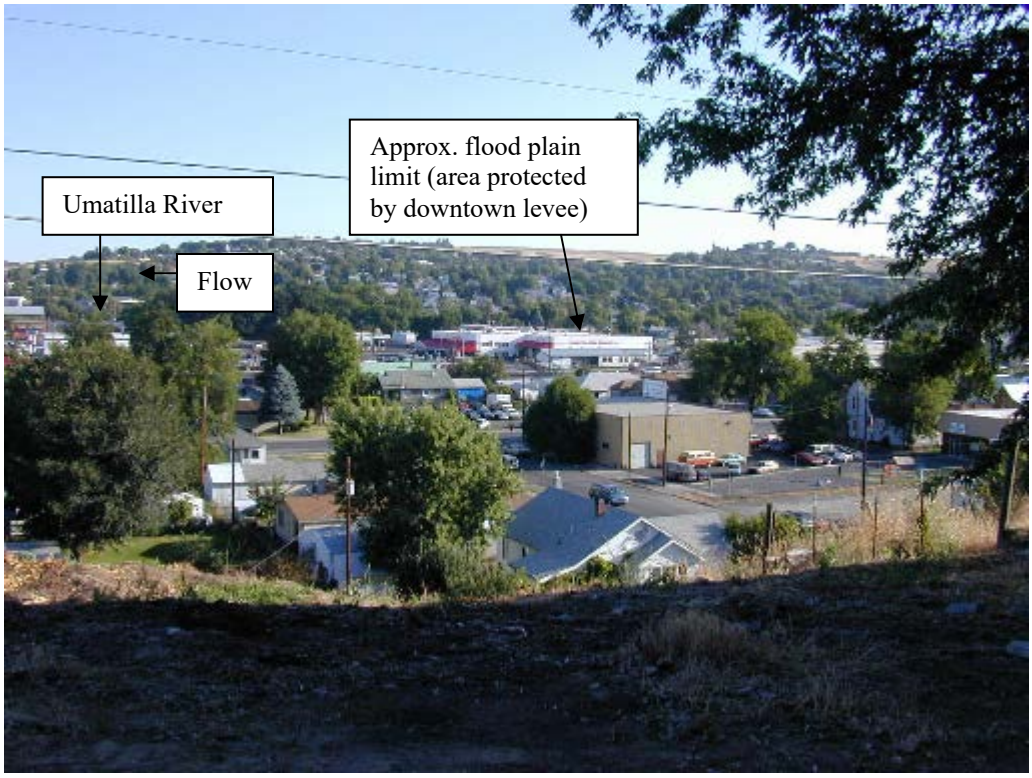


Photo No. 37: View looks north at downtown Pendleton, taken from hill on south side of town. Flood plain limit is approx. at white and red building in background.

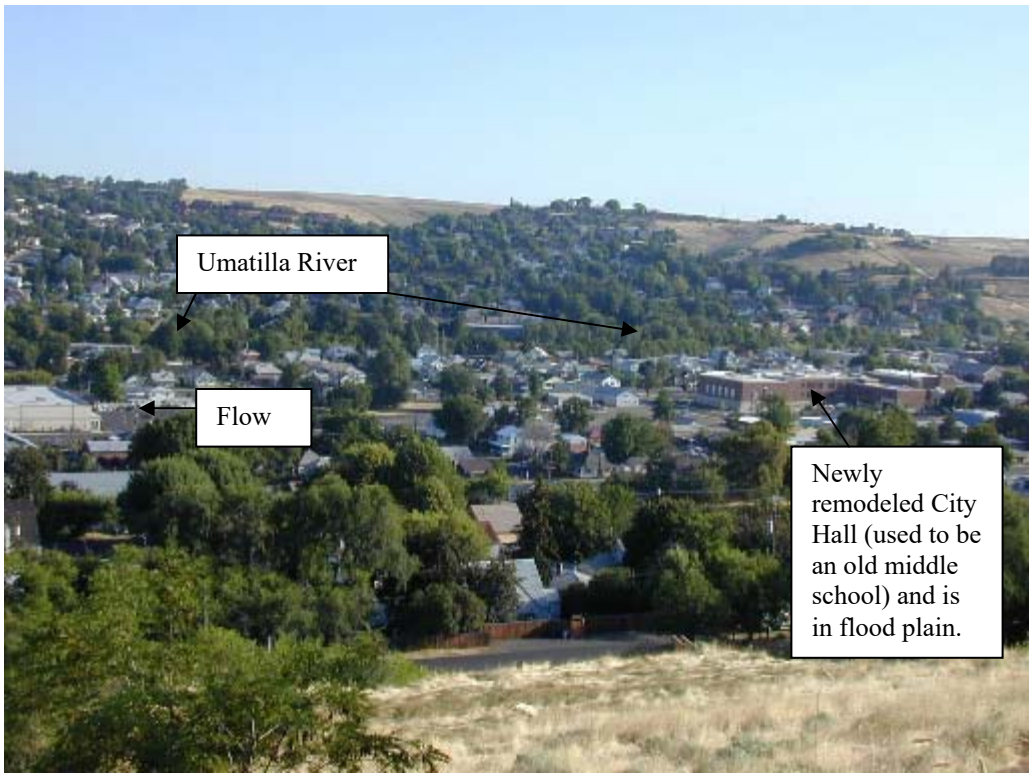


Photo No. 38: View looks northeast at downtown Pendleton. Brick building (new City Hall) in right center of photo is in flood plain. Protected by downtown levee.

Photo No. 39: View looks southwest at Montee Addition, along McKay Creek mostly in Pendleton. Area has been flooded in recent past.

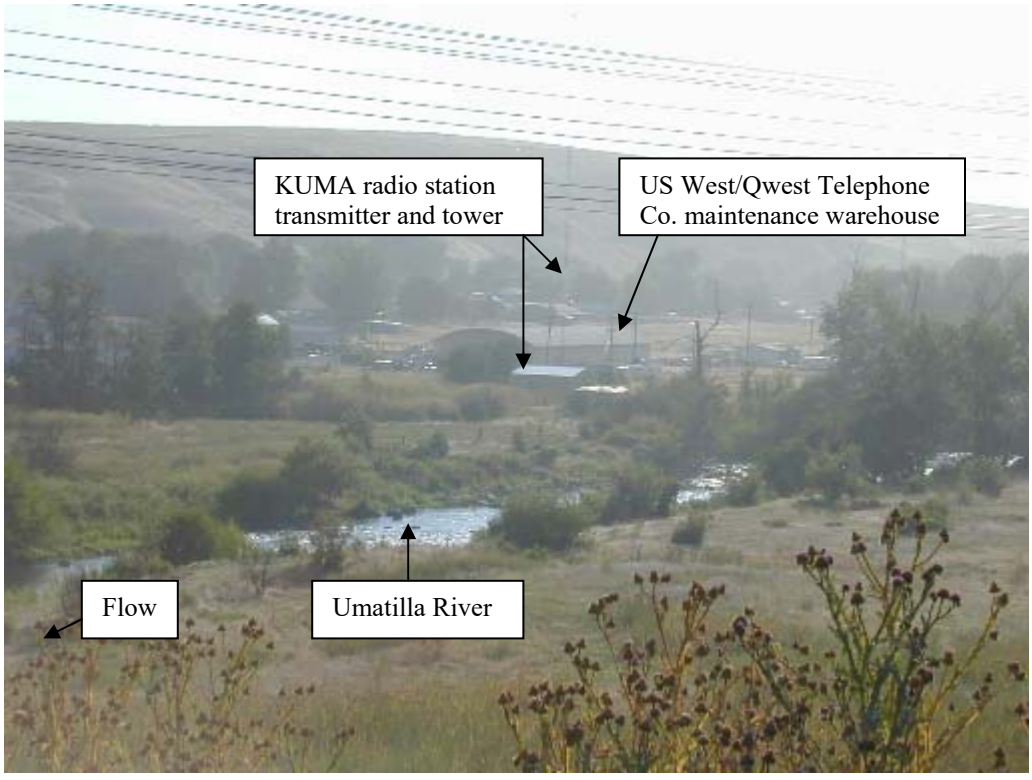


Photo No. 40: View looks northeast at Riverside area. Area has been flooded in recent past.

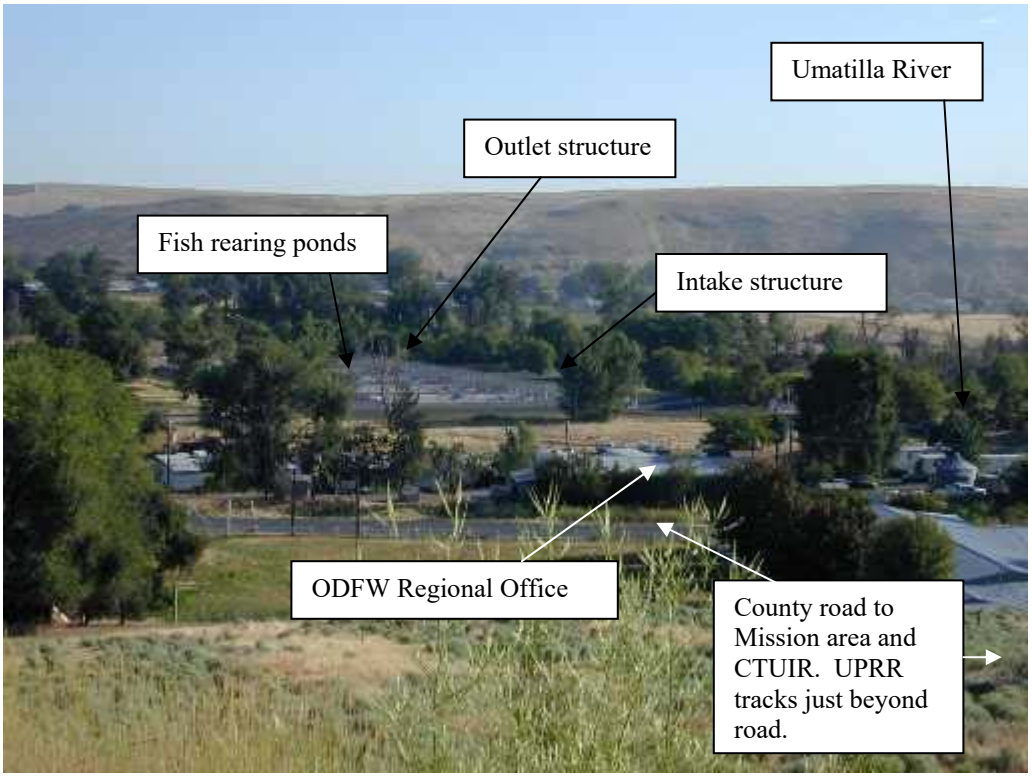


Photo No. 41: View looks north at new CTUIR/ODFW fish rearing pond facility. Intake and outlet structure could act as groins, directing flood flows toward north bank and the Riverside area.

Photo No. 42: View looks north at Nelson Creek crossing under State Highway 37 in northwest part of Pendleton.

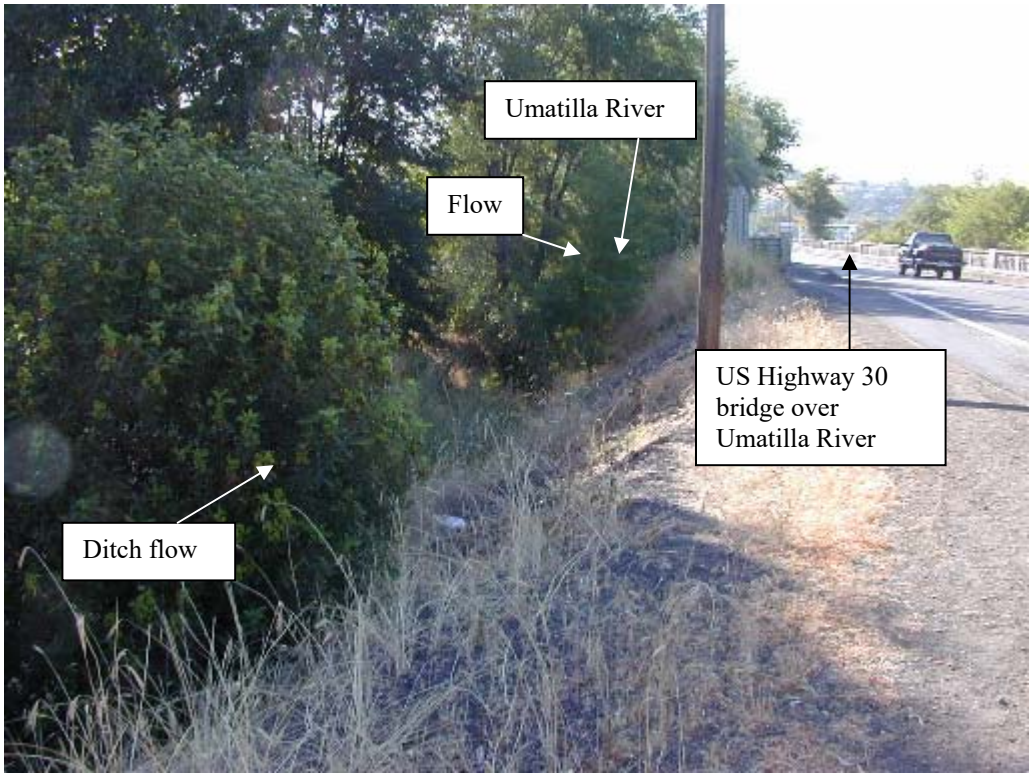


Photo No. 43: View looks east at Nelson Creek ditch to Umatilla River.

Photo No. 44: View looks north at Nelson Creek concrete box culvert under SH 37.

Photo No. 45: View looks upstream (east) at Tutuilla Creek from bridge on Hailey Ave.

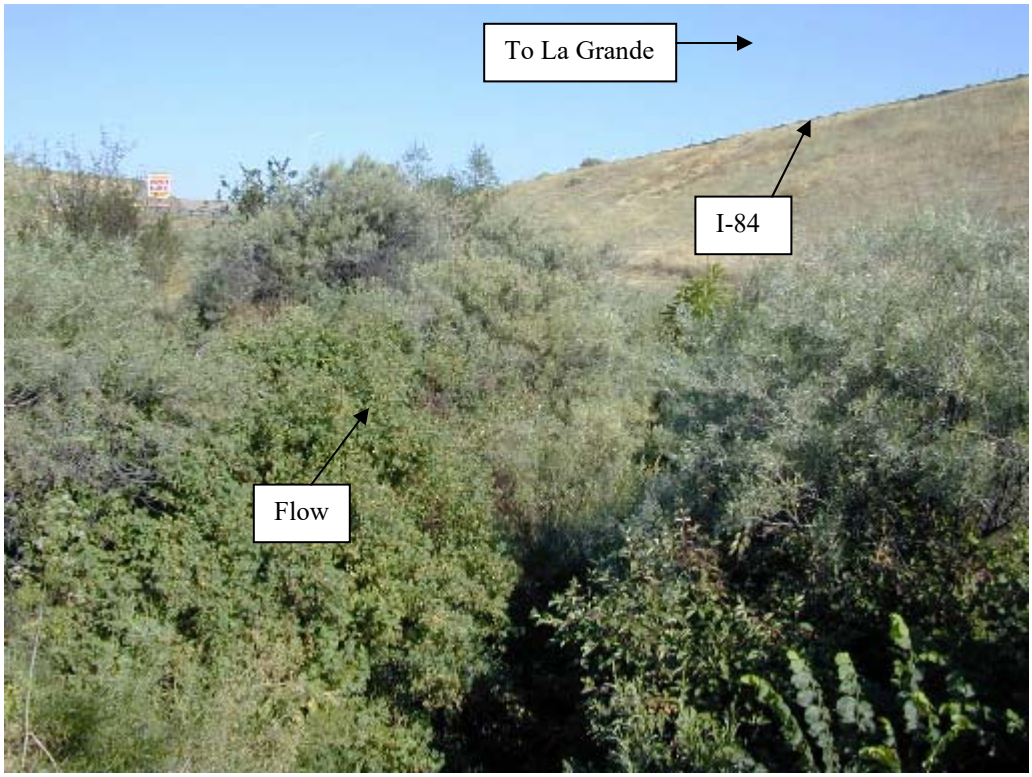


Photo No. 46: View looks downstream (west) at Tutuilla Creek from bridge on Hailey Ave. Shows typical brush along Tutuilla Creek.

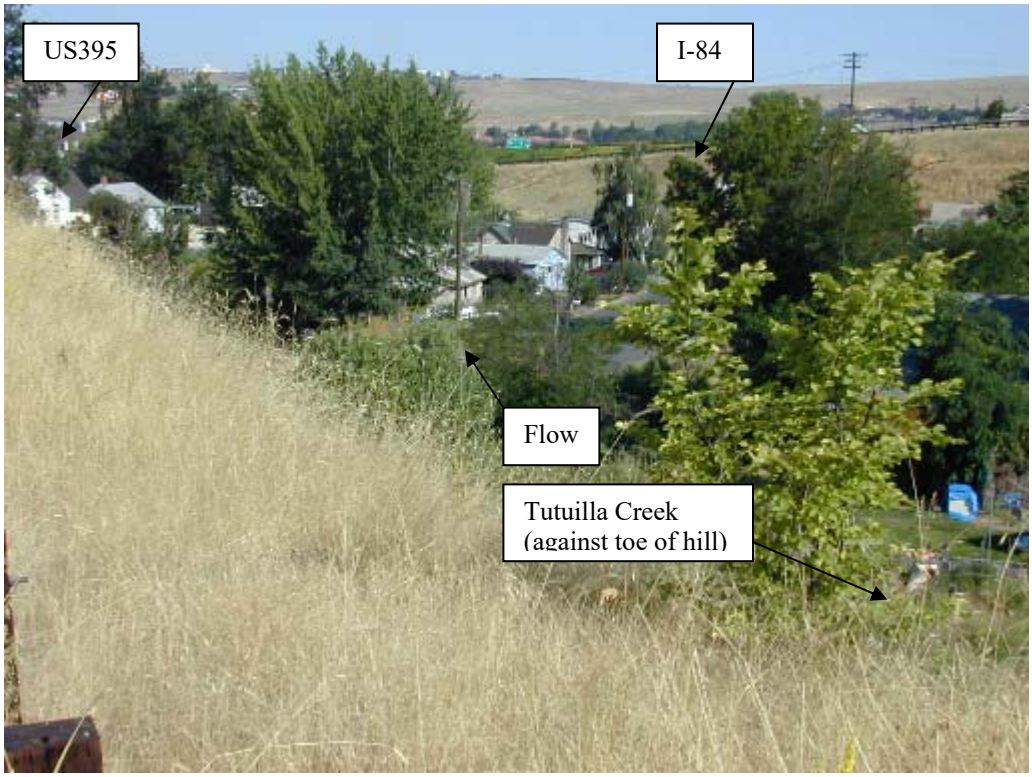


Photo No. 47: View looks northwest at Tutuilla Creek area near US395/I-84 junction. Shows houses and brush along Tutuilla Creek.

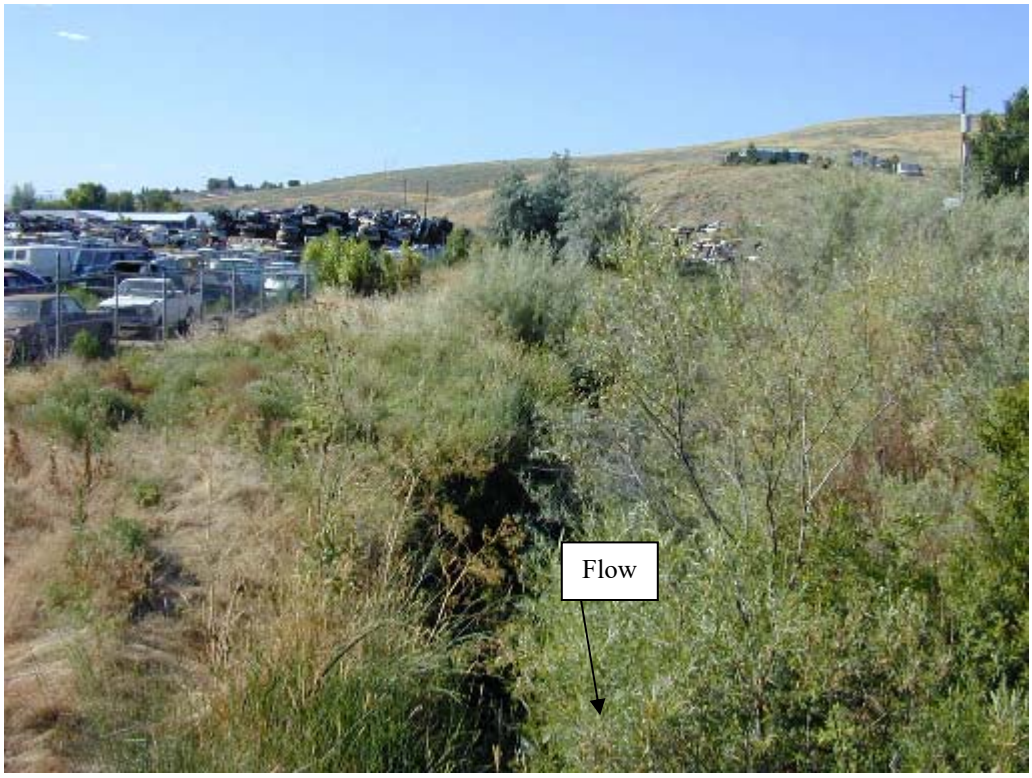


Photo No. 48: View looks upstream (southeast) at Tutuilla Creek from bridge on Tutuilla Creek Road. Shows typical brush along upper creek.

Photo No. 49: View looks downstream from bridge on Tutuilla Creek Road.

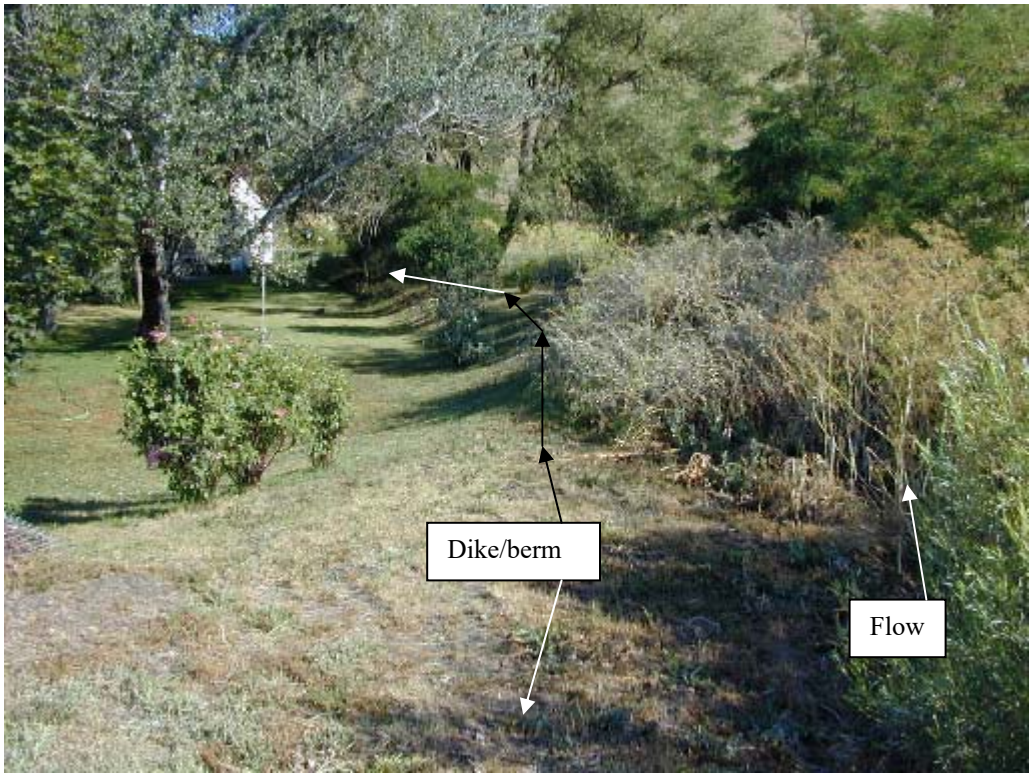


Photo No. 50: View looks downstream from bridge on Tutuilla Creek Road. Shows rudimentary dike/berm along left bank.

Photo No. 51: View looks west at STP area and McKennon Station in background.

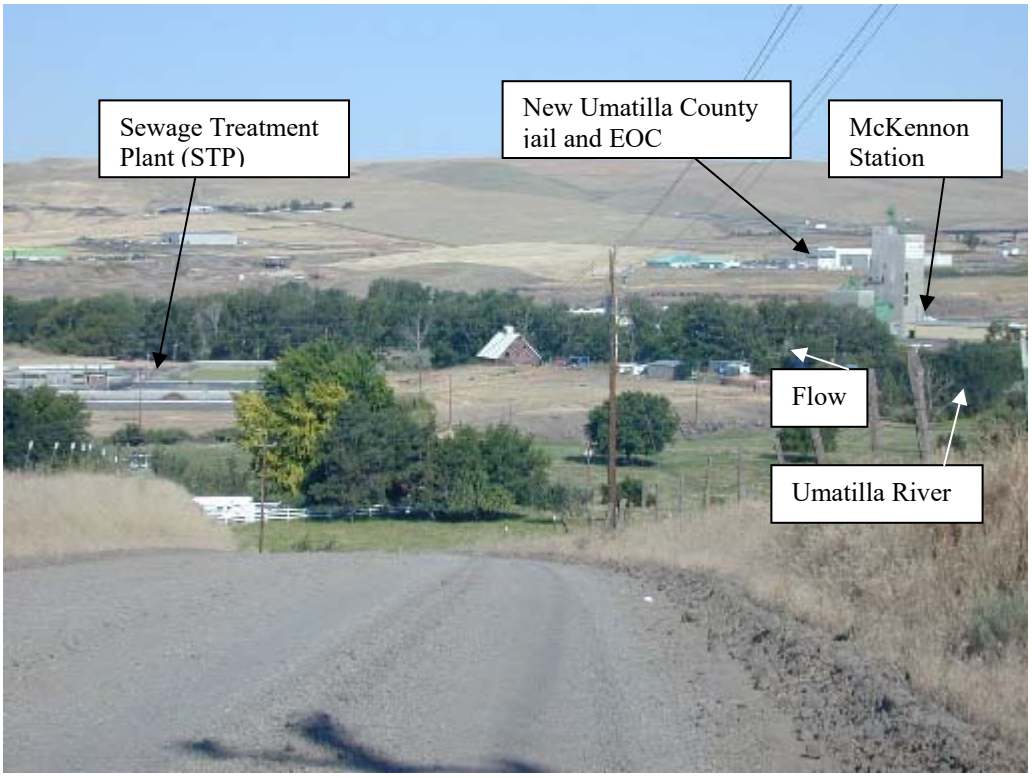


Photo No. 52: View looks west at STP area and McKennon Station in background.

Photo No. 53: View looks southwest at Montee Addition where flooding has occurred in the recent past.

Photo No. 54: View looks upstream (south) at McKay Creek, taken from bridge on Quinney Ave.

Photo No. 55: View looks downstream (north) at McKay Creek, taken from bridge on Quinney Ave.

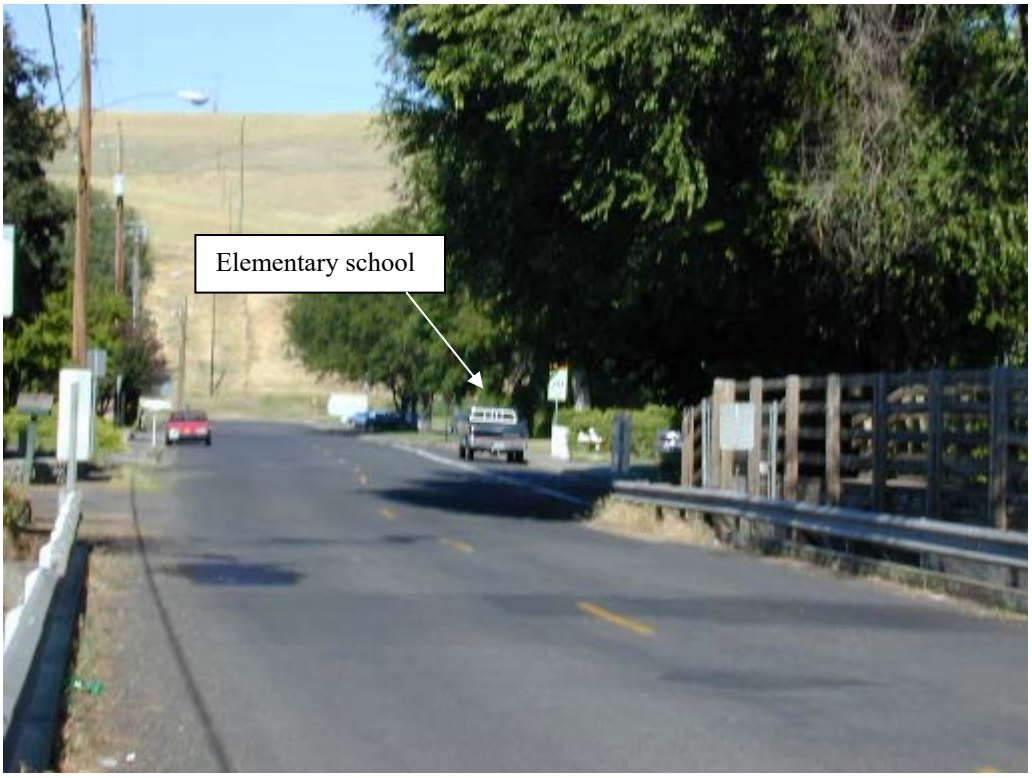


Photo No. 56: View looks west at Quinney Ave. from McKay Creek bridge.

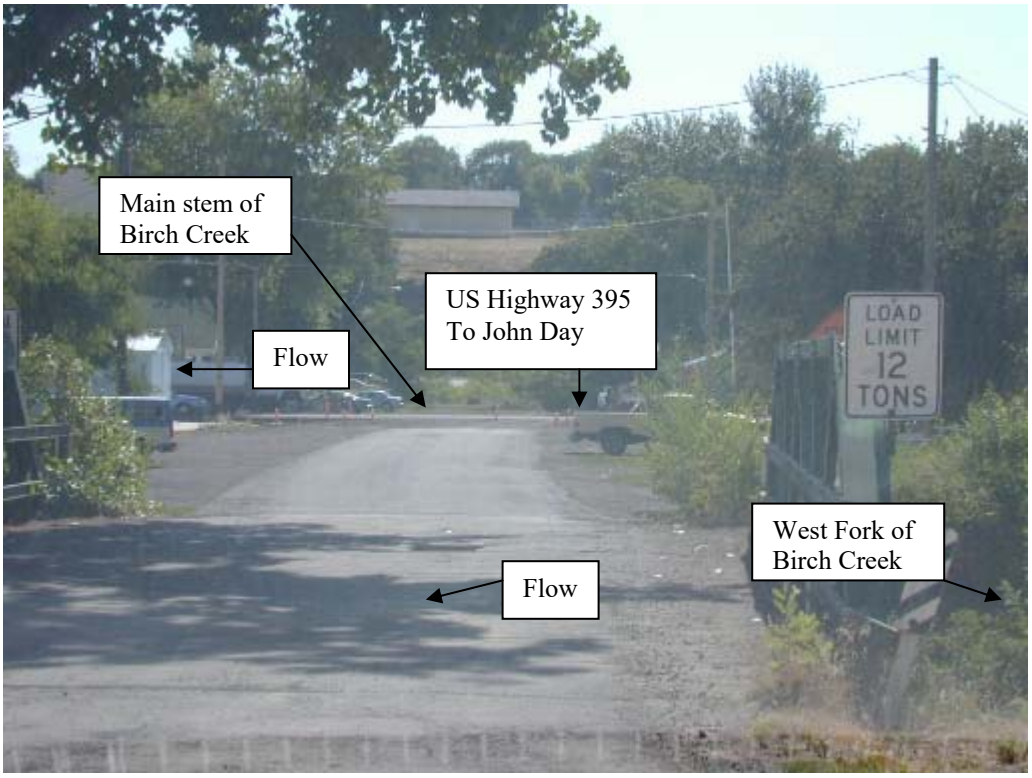


Photo No. 57: View looks east at bridge over West Fork of Birch Creek from 2nd St. and Delwood Ave.

Photo No. 58: View looks downstream (north) at the main stem of Birch Creek from Main St. bridge.

Photo No. 59: View looks upstream (south) at the main stem of Birch Creek from Main St. bridge, showing building encroachment.

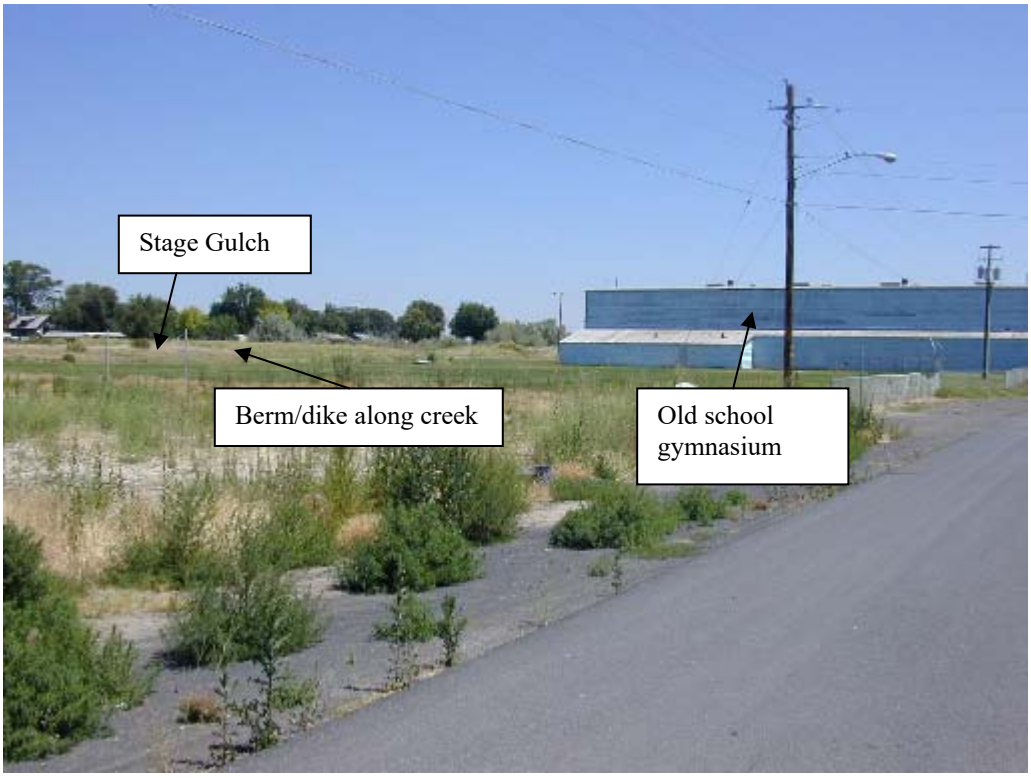


Photo No. 60: View looks northeast (upstream) at old school used as a church, located immediately south of Stage Gulch.

Photo No. 61: View looks upstream at Stage Gulch and encroaching building along Edwards Road on the east edge of town.

Photo No. 62: View looks downstream (west) at Stage Gulch from Edwards Road bridge.

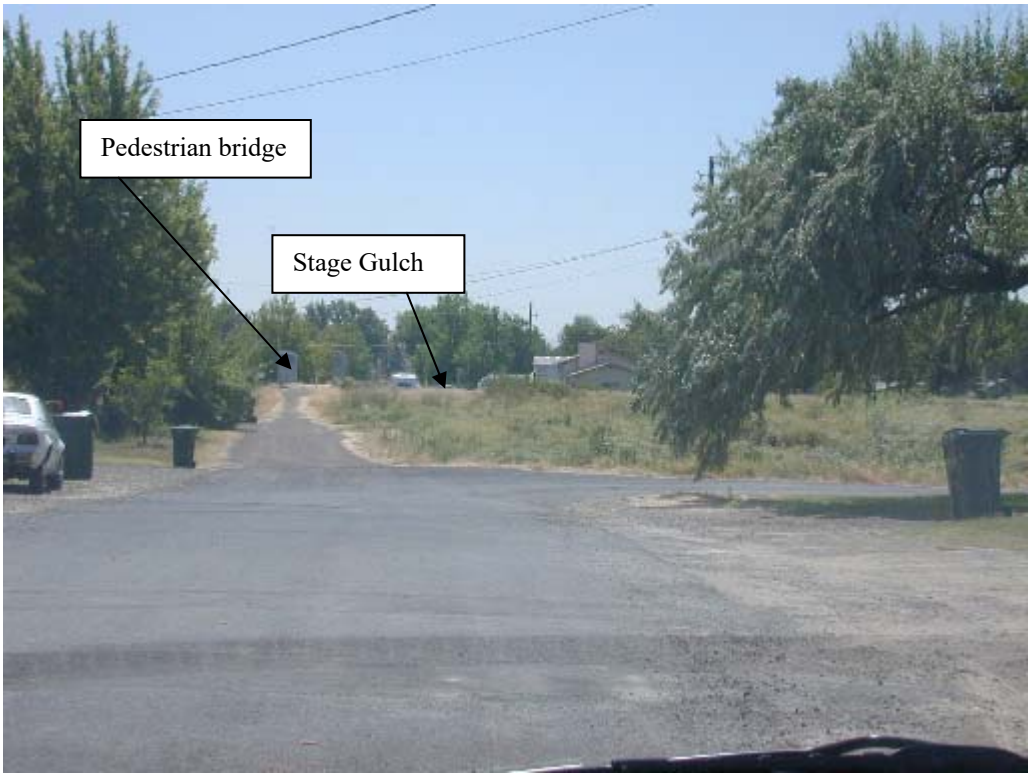


Photo No. 63: View looks south at Stage Gulch flood plain. Taken from NE Wayne St. and Harding Ave. on north side of Stage Gulch.

Photo No. 64: View looks upstream (east) from bridge on Dunne St.

Photo No. 65: View looks south from bridge on Dunne St.

Photo No. 66: View looks downstream (west) from Dunne St. bridge.

Photo No. 67: View looks upstream (east) from US Highway 395 bridge.

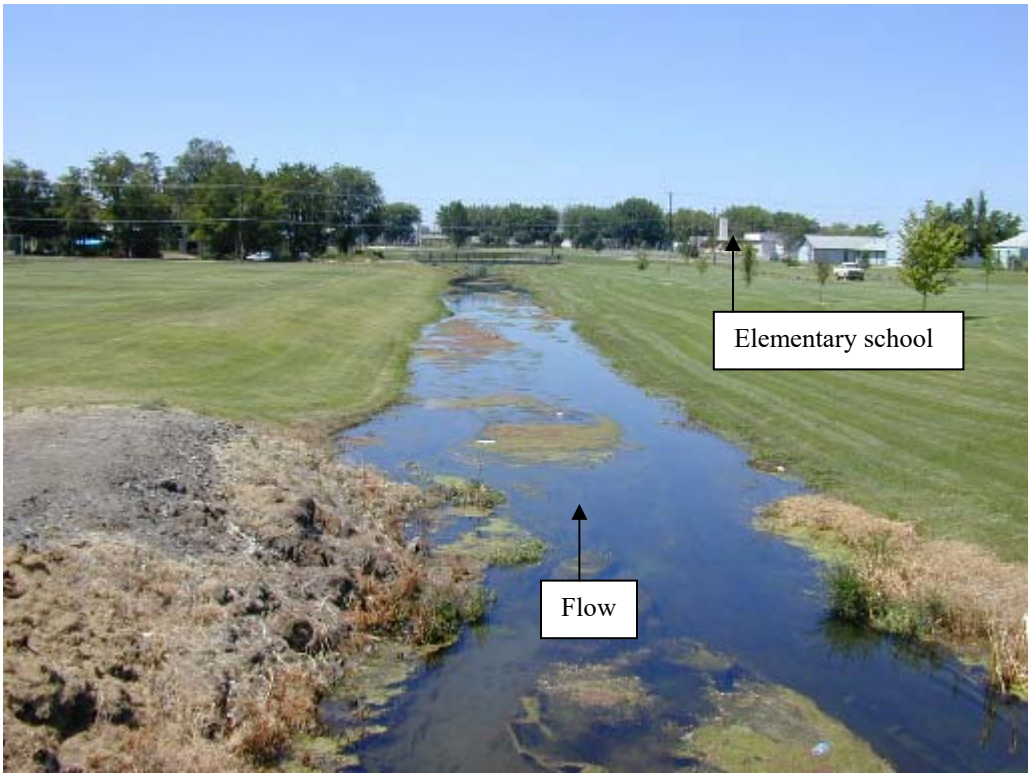


Photo No. 68: View looks downstream from US Highway 395 bridge.

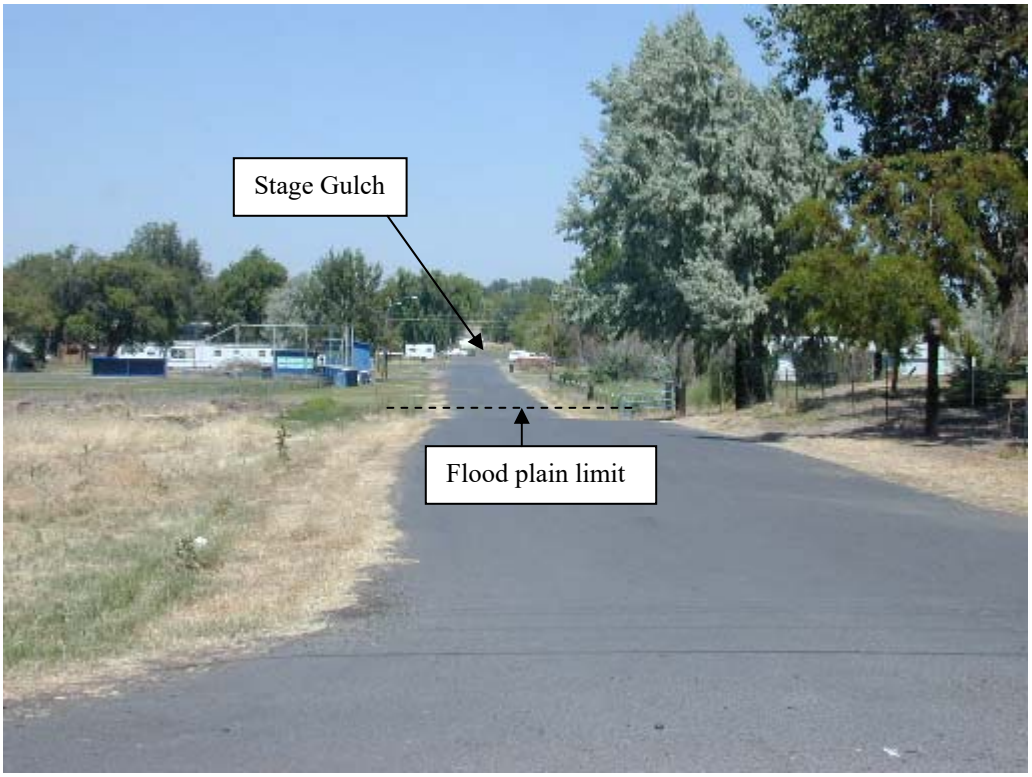


Photo No. 69: View looks north at flood plain from SE Ball Ave. down SE Wayne St.

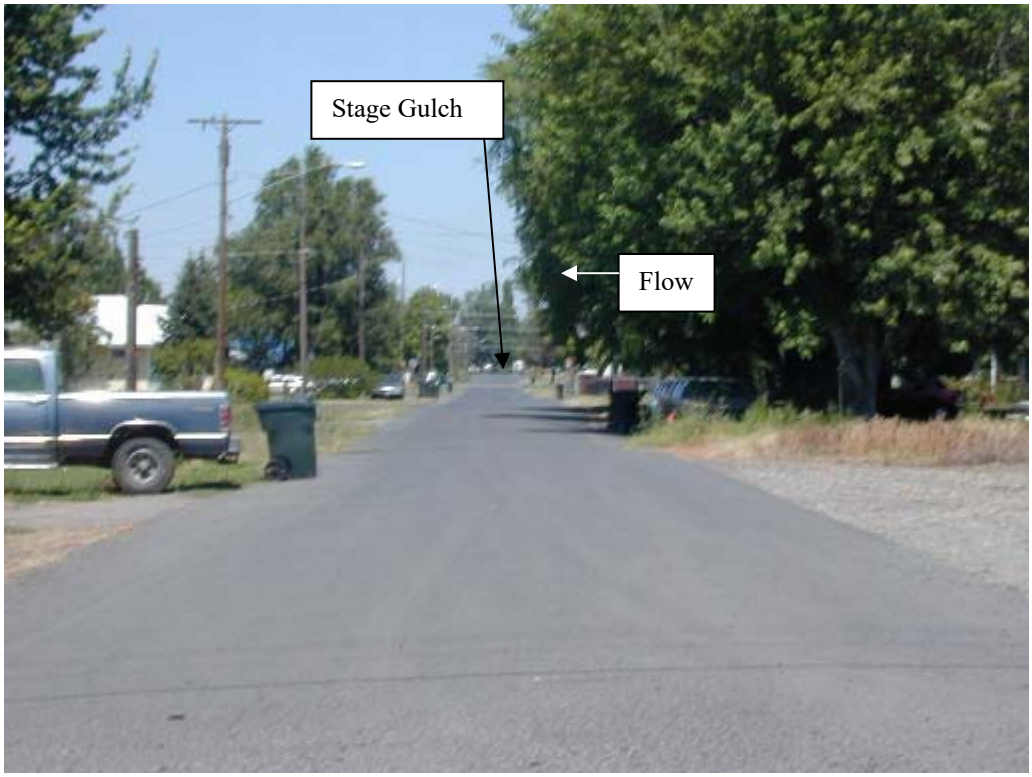


Photo No. 70: View looks north at flood plain on SE Dunne St. from SE Ball Ave. Photo point is approx. flood plain limit.

Photo No. 71: View looks downstream (northwest) at upstream face of bridge on SW Sherman St. along west edge of town.

Photo No. 72: View looks north from Sherman St. bridge at elementary school.

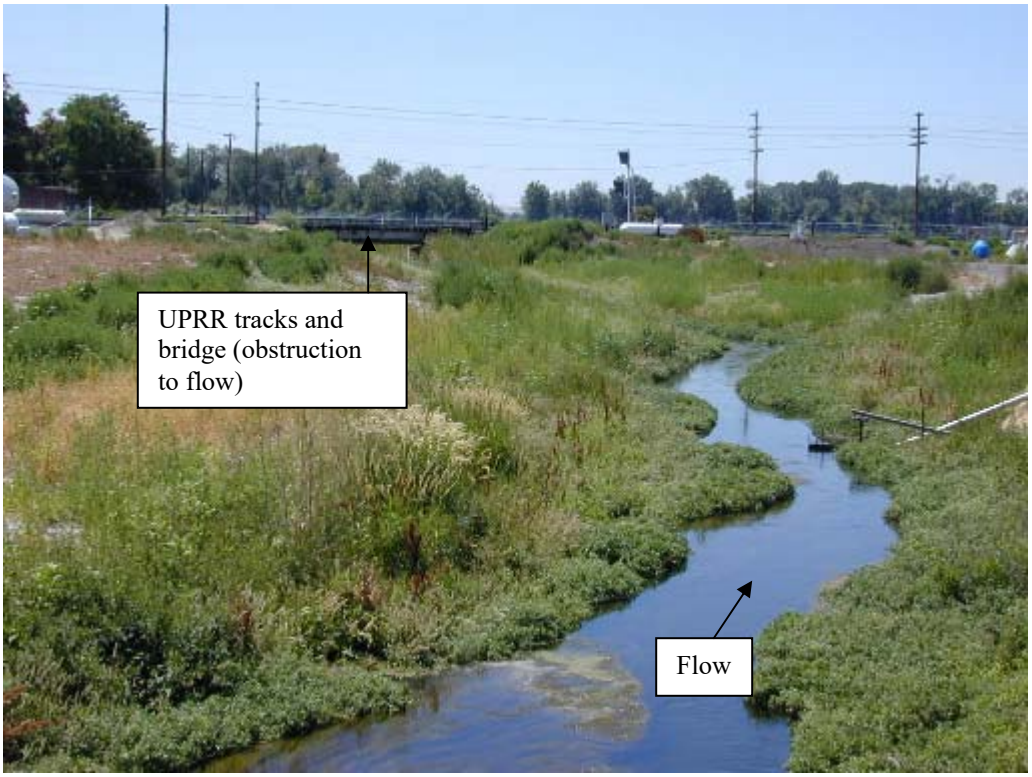


Photo No. 73: View looks downstream (west) at Stage Gulch and UPRR tracks from Sherman St. bridge.

Photo No. 74: View looks east at Camas Creek (on south edge of town). Taken from south end of bridge on Soap Hill Road.

Photo No. 75: View looks upstream (south) at Pine Creek from bridge on Main St.

Photo No. 76: View looks downstream (north) at Pine Creek from bridge on Main St.

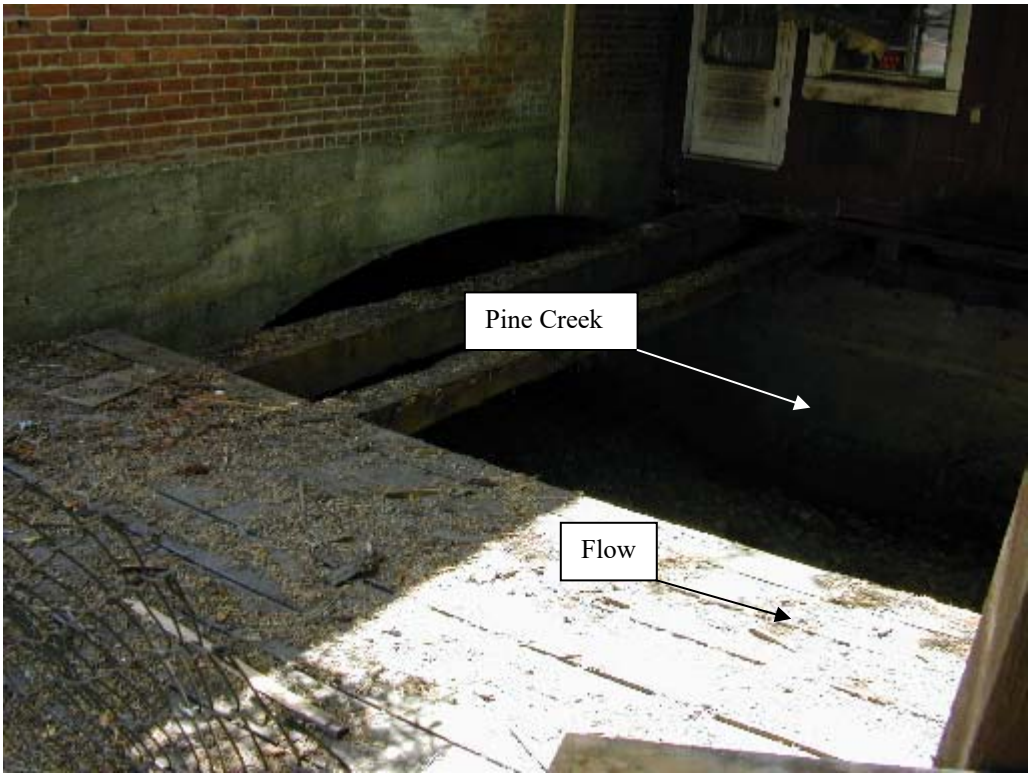


Photo No. 77: View looks upstream at downstream face of bridge on Main St.

Photo No. 78: View of typical northeastern Umatilla County road crossing. (Actually the Little Greasewood Creek crossing, south of Helix). Looks downstream or southeast.

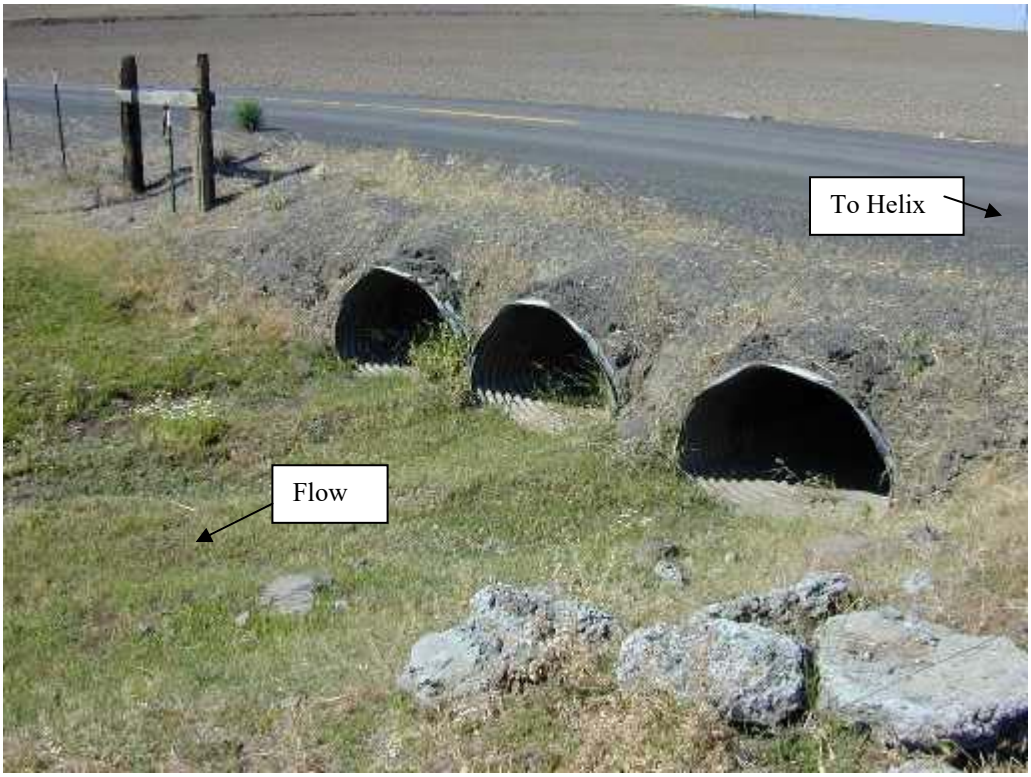


Photo No. 79: View looks at downstream end of culverts under county road to Helix.

Photo No. 80: View looks at upstream side of culverts showing headwall and county road shoulder erosion caused by high water flow in creek.

Photo No. 81: View looks upstream at Wildhorse Creek. Taken from east end of bridge.

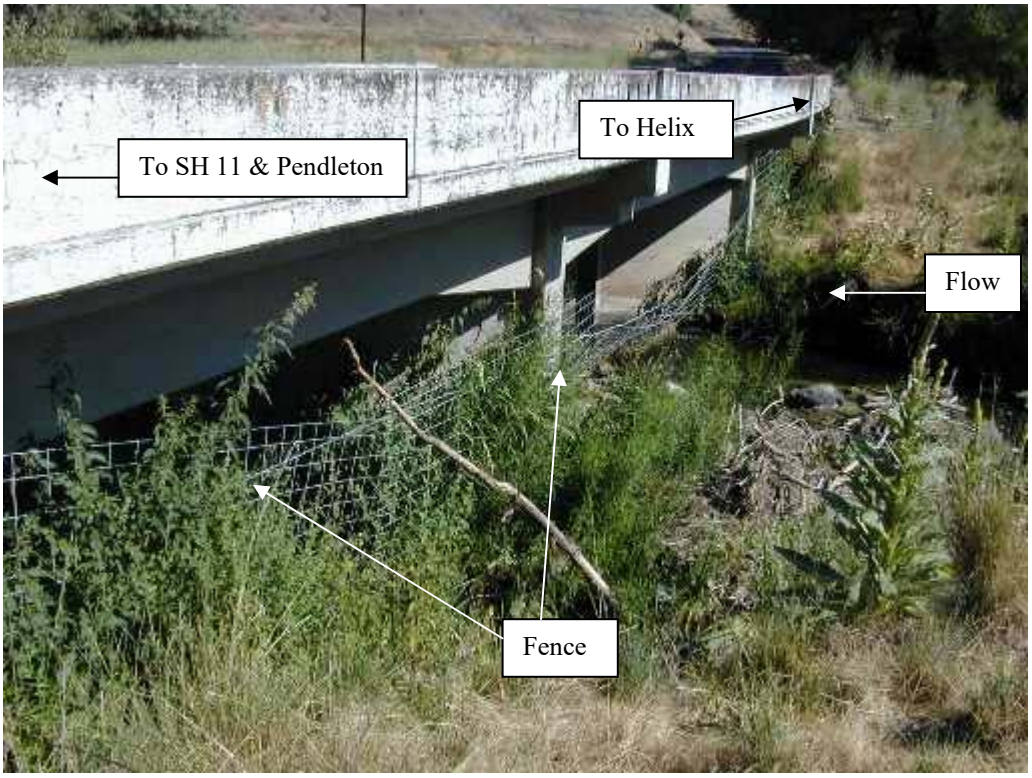


Photo No. 82: View looks downstream at the u/s side of bridge, showing fence, possible obstruction to debris during flood.

Photo No. 83: View looks downstream (southwest) at Wildhorse Creek, taken from middle of bridge south of Helix.

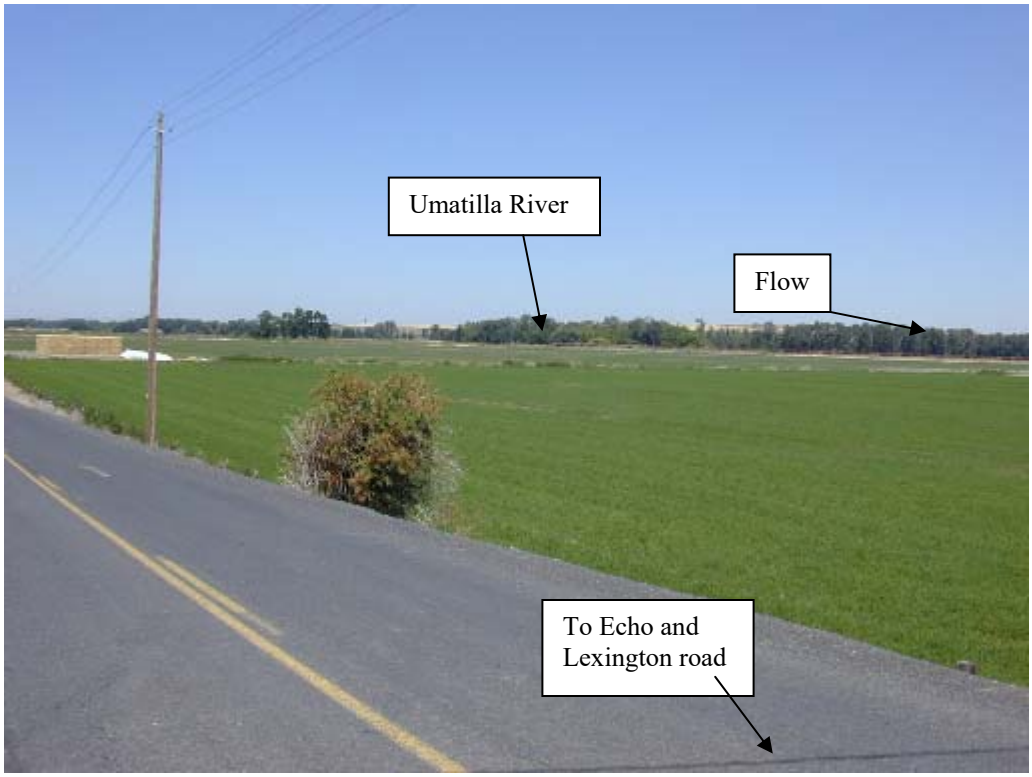


Photo No. 84: View looks northwest at Echo Meadows area from south. Taken from Westland Irrigation District canal crossing county road. Typical of area between Hermiston and Echo along the Umatilla River.

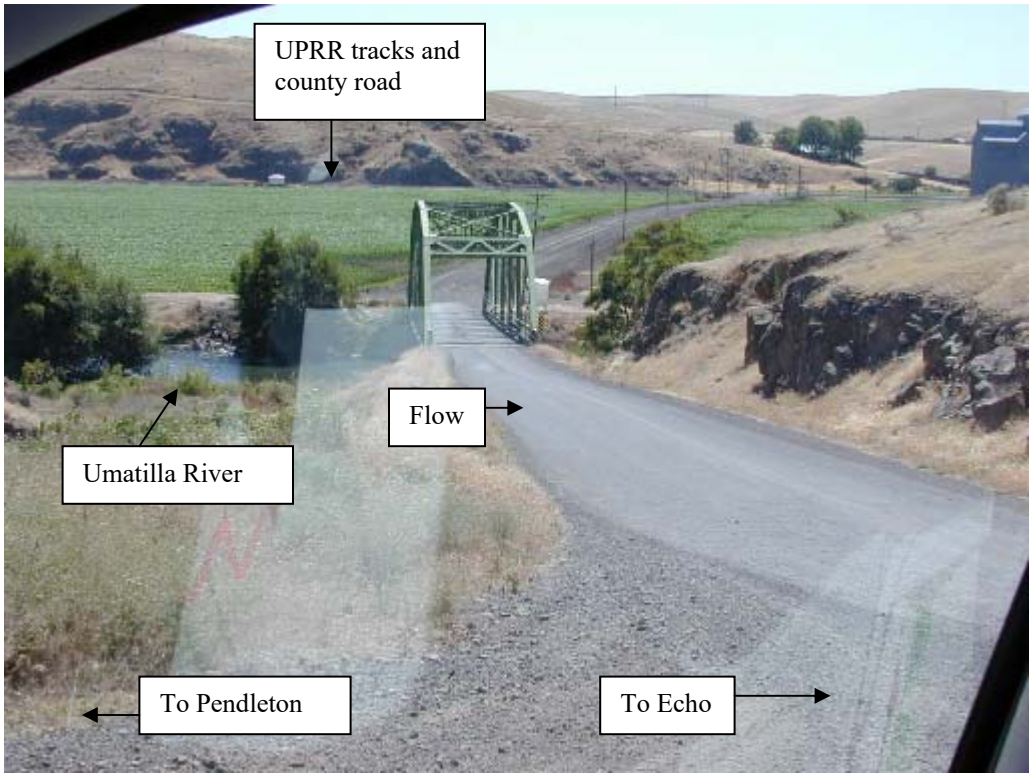


Photo No. 85: View looks south at bridge at Nolin to Cunningham Sheep Ranch. Area repaired during 1996 flood to left but off photo.

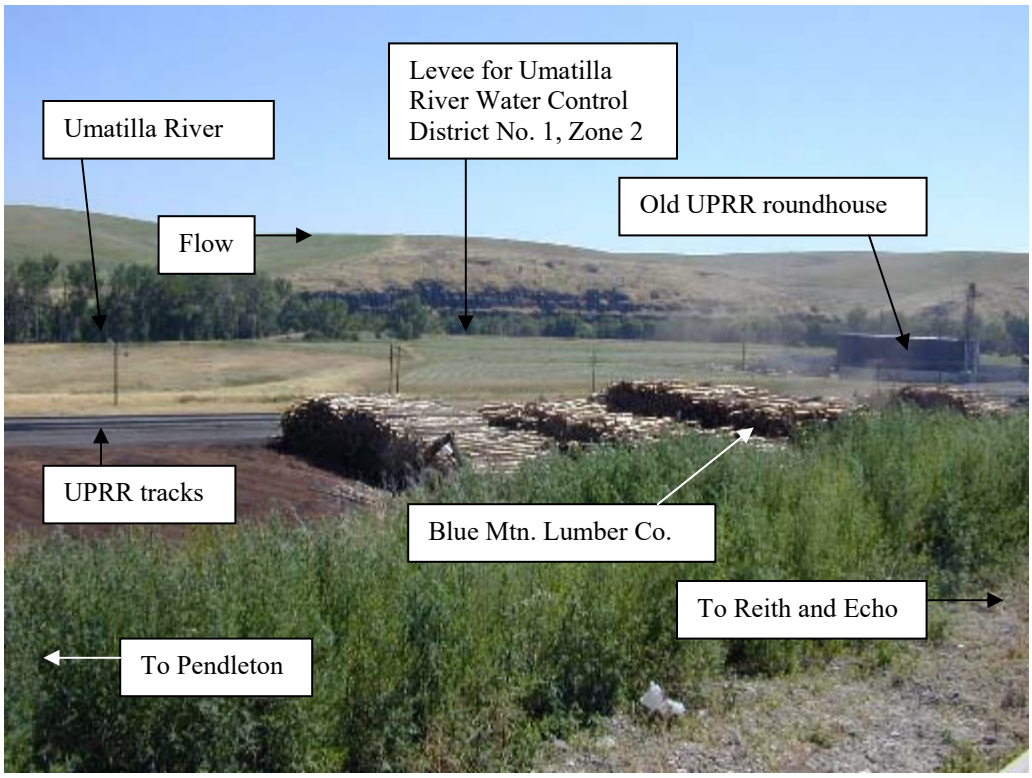


Photo No. 86: View looks southwest at Blue Mountain Lumber Co. and area protected by Seg, 3 of the URWCD1Z2 levee (around old UPRR roundhouse at Reith).

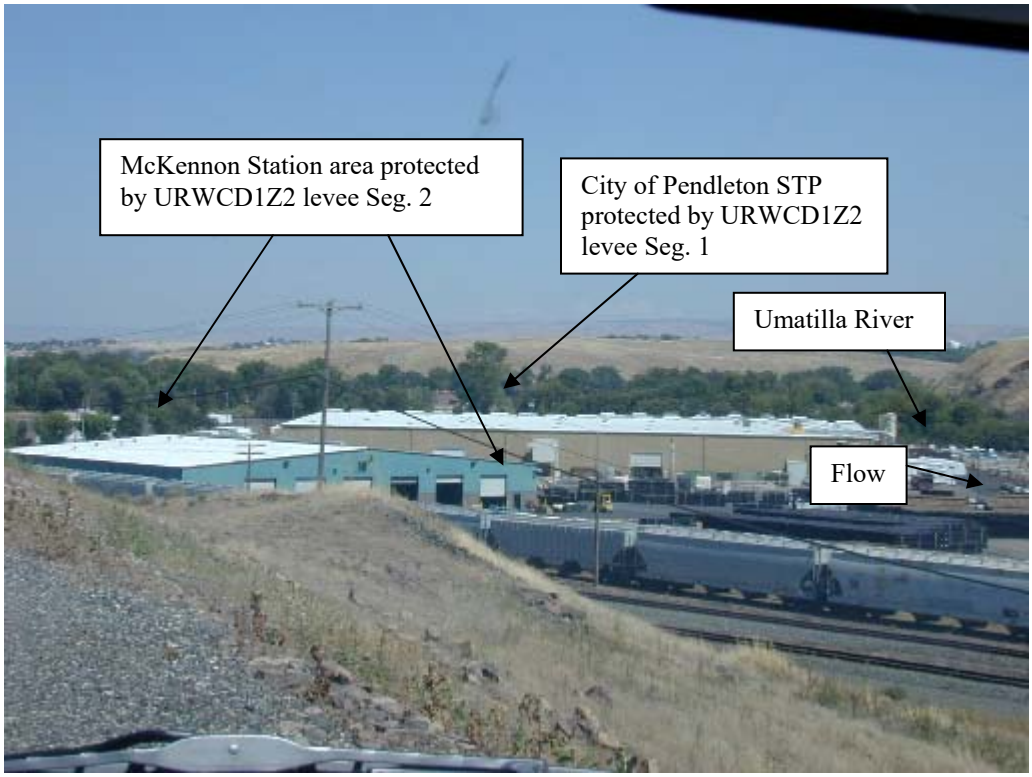


Photo No. 87: View looks east at McKennon Station industrial area southwest of Pendleton. Taken from road to Reith and Echo (Old River Road).

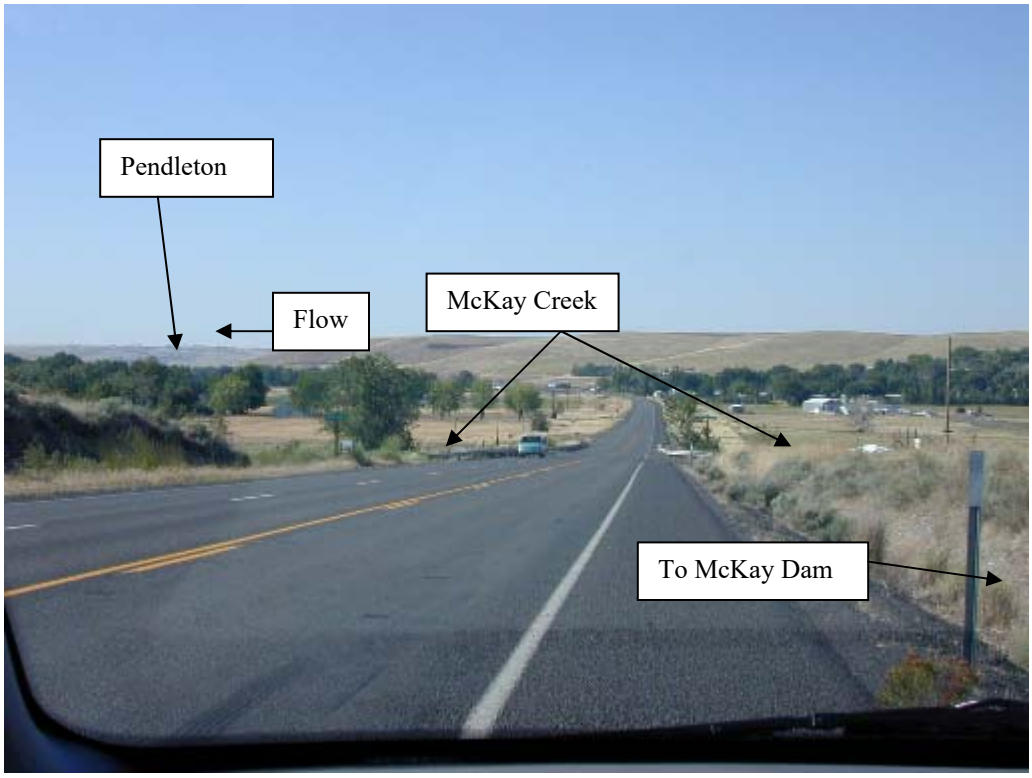


Photo No. 88: View looks north at McKay Creek area downstream from McKay Dam and Reservoir, south of Pendleton.

SUMMARY

"Under the Planning Assistance to States (PAS) Program, Portland District Corps of Engineers (CENWP) has completed this flood evaluation study for several flood-prone streams located within the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), near Pendleton, Oregon. The stream reaches studied include (1) the 26.5-mile reach of Umatilla River located within the boundaries of CTUIR, (2) the lower 1.5-miles of Squaw Creek, and (3) the lower 1.5-miles of Meacham Creek. This study does not include, however, an analysis of flooding from side tributaries.

CENWP completed such major study components as ground surveys of 212 bank-to-bank channel cross-sections (including bridge data) for Umatilla River, Squaw Creek, and Meacham Creek. For this study, CENWP used both a digital terrain model and planimetric maps that was prepared by the mapping contractor Aerial Data Reduction (ADR) Associates, Inc. CTUIR funded the mapping contractor for all completed work items.

In addition, extensive hydrologic analysis was completed for the three study streams. The most important hydrologic product developed includes cumulative frequency curves for maximum annual discharges for two active and one discontinued streamgaging stations on the main stem Umatilla River, and one active streamgaging station on Meacham Creek. In addition, cumulative frequency curves for maximum annual discharges were developed at four locations on Squaw Creek based on a regional analysis. Compared to the Flood Plain Information Report for the Mission-Riverside Area that was prepared by Walla Walla District Corps of Engineers in November 1969, results. of this hydrologic analysis show a substantial increase in the maximum annual discharges for the frequency flood events. At the Mission-Riverside area, the onepercent chance exceedance flood (100-year recurrence interval flood) has increased by about 25 ·percent from 16,500 *refs* to 20,600 refs.

A full river hydraulic analysis was performed for this study reach using as a basis the HEC River Analysis System (HEC-RAS Version 2.2) step-backwater computer program to perform steady flow calculations. A key final product includes flood frequency profiles for the 50,20,10,5,2, 1 and 0.2 percent chance exceedance floods. Another key final product includes floodplain maps for the 1 and 0.2 percent chance exceedance floods and also the outline for the floodway. A floodway based on a zero-foot increase (O.l-ft calculated) was developed for the full study reach. This floodway concept is consistent with the CTUIR flood plain ordinance document, the CTUIR salmon policy, and tribal water program.

A key assumption of the HEC-RAS program is that it is based on an unmovable bed boundary. Hence, it cannot perform one-dimensional sediment transport/movable boundary calculations resulting from scour and deposition. All three streams studied in this report are alluvial streams that carry both floodwaters and sediment materials during major flood events.

Likewise, Meacham Creek originates in the Blue Mountains, and the stream has a vertical drop of about 50-ft through the 1.5-mile study reach from the Union Pacific (UP) Rail'road Bridge to the stream confluence. This corresponds to a slope of about 0.0063. Except for the UP railroad embankment located on the left edge of the floodplain and a fish acclimatization facility on the right bank, this floodplain is mostly undeveloped. The Meacham Creek floodplain is about 300 to 400-ft in width through this reach. The drainage area for this stream at the confluence is about 178 square miles.

Downstream of the confluence with Meacham Creek at about RM 80, the Umatilla River floodplain downstream to RM 79.3 gradually widens to about 500-ft. However, at about RM 79.0, the river narrows to about a 120-ft width as it flows between steep canyon walls. Downstream ofRM 79.0, the floodplain widens to a width of about 500 to 700-ft. Squaw Creek enters the Umatilla River at about RM 79. Steep canyon walls define this drainage basin of 35 square miles. Squaw Creek responds quickly to runoff from both rainfall and snowmelt.

The UP railroad embankment is alternatively on the left side of the floodplain, then the right side, and finally the left side again from RM 80 downstream to the diminished reservation boundary at about RM 58.3. The floodplain gradually widens to 1,200 feet towards the west boundary of CTUIR. This is the most heavily populated part of the reservation. The Umatilla River drops about 650 ft over the 22-mile reach from RM 80 to RM 58, which corresponds to an average slope of about 0.0055.

Umatilla River finally crosses the western boundary of CTUIR at about RM 58.3, which corresponds to the location of the recently installed (1996) USGS Streamgage. Umatilla River at West Reservation Boundary, near Pendleton, Oregon (14020850). This streamgage is located at about elevation 1,130 ft NGVD, and has a contributing drainage area of about 430 square miles.

2.4 Principal Flood Problems

Floods within CTUIR can be divided into two classes based on both hydrologic nature and season of occurrence. Fall, winter, and spring floods are of broad areal extent through CTUIR, and result from heavy rainfall or a combination of rainfall and rapid snowmelt. Late spring and summer flooding is usually of limited areal extent, and results from high intensity, cloudburst-type storms. Flooding on Squaw Creek could especially occur from both flood classifications.

Floods within CTUIR are usually caused by the first classification, i.e., a combination of rainfall and snowmelt that result in floodflows on Umatilla River and tributaries. The melting of low elevation snow on frozen ground has also caused serious floods in the past. When snowmelt augments rain runoff, the floods have both high peaks and large volumes. Floods on the Umatilla River usually stay at or above flood stage for less than two days. During the flood event of January 1965, flood stages at the Umatilla River at Pendleton streamgage (14021000) increased about 6 feet within 54 hours from low flow conditions to crest stage.

Chapter 6 includes a detailed description of flooding problems as relates to specific flood-prone reaches of Um atiI a River and Squaw Creek. Chapter 7 includes an overall description of the flooding problems for all eleven (11) study reaches that pertains to ,Umatilla River, Squaw Creek, and Meacham Creek.

2.5 Discussion of Prior Studies

At the request of the Umatilla County Planning Commission, several Flood Plain Information (FPI) reports have been prepared by the Walla Walla District Corps of Engineers (CENWW) for the Umatilla River and tributaries. Further details are as follows.

2.5.1 FPI Report for Umatilla River, Mission-Riverside Area near Pendleton, OR

In November 1969, CENWW published the first FPI report for the Umatilla River. The report was prepared at the request of the Umatilla County Planning Commission, and then directed through the Oregon State Water Resources Board to the Corps of Engineers. It describes flood problems along Umatilla River in the Mission-Riverside area, upstream from Pendleton, Oregon. The report includes flood profiles and flooded-area outlines for a 7.7-mile reach of the Umatilla River that is partially located within the diminished boundaries of CTUIR. The study starts at the mouth of Wildhorse Creek at River Mile (RM) 56.7 in Pendleton, Oregon, and extends through the Riverside and Mission areas in CTUIR to a location about 3.5 miles above Mission (RM 64.4) in the vicinity of Minthorn.

A key feature about this study is that the one-percent chance exceedance flood (lOO-year recurrence interval flood) was estimated to be 16,500 cfs for the entire study reach. For the current CTUIR flood evaluation study, however, the one-percent chance exceedance flood has been estimated to be 20,600 cfs. A detailed explanation for this large 25 percent increase in discharge is denoted in Section 4.4.4 of this report.

2.5.2 FPI Report for Umatilla River Tributaries - McKay, Tutuilla & Wildhorse Creeks - at Pendleton, Oregon & Vicinity

In March 1971, CENWW published a second FPI report for the same general vicinity. This report was prepared at the request of Umatilla County Planning Commission, and then directed through the Oregon State Water Resources Board to the Corps of Engineers. It provides flood information for three Umatilla River tributaries located just downstream of CTUIR, including McKay, Tutuilla, and Wildhorse Creeks. Although not located within the diminished boundaries of CTUIR, this report does provide general flood information on Umatilla River tributaries that would be applicable to flood-prone streams located within CTUIR, such as Squaw Creek.

2.5.3 FPI Report for Umatilla River, Cayuse-Gibbon, Oregon

In July 1975, CENWW published a third and final FPI report for the general vicinity. This report was prepared at the request of both CTUIR and the Umatilla County Planning Commission, and then directed through the Oregon State Water Resources Board to the Corps of Engineers. Based on River Miles used in this report, the study reach extends about 14 river miles from RM 65.9 upstream to the Meacham Creek confluence at about

the right bank Umatilla River corresponds to RM 68.7, and also corresponds to letter "I" in Figure 2.

,This revetment project is primarily designed to provide bank protection at this exposed upstream location of the community. Furthermore, it does provide some very limited flood protection in that it closes off an overflow channel that feeds the channel parallel to the UPRR tracks, and which leads to the twin culverts under the county access road for Cayuse. During minor flood events such as the 50 percent chance exceedance (2-year recurrence interval) flood, homes upstream from these twin culverts would no longer be flooded specifically from this overflow channel, although those homes are still at great risk from flood flows of the main stem Umatilla River.

6.2.2 Flood Problems

This community located immediately on the right bank Umatilla River is in great danger from flooding. As illustrated by four recent major floods that occurred in 30 January 1965,25 January 1975,23 February 1986, and 9 February 1996, floodflows through this community can fully inundate it, and achieve flood depths and flood velocities that may endanger both human life and property. A study of one major recent flood event through this community illustrates the potential major problems facing this community in terms of both personal safety and property damage.

The flood of 25 January 1975 was the greatest flood in living memory through this reach of the Umatilla River. Reference Section 4.5.1, the USGS stream gage Umatilla River at Cayuse (14020700) measured an annual peak discharge of 22,500 c*f*s on 25 January 1975, and mean daily flow of 14,000 ft3/S for the full 24-hour period on this day. This annual peak flood is equivalent to about a 0.5 percent chance exceedance (200-year recurrence interval) flood. This discontinued stream gage with a contributing drainage area of384 square miles is located at RM 70.7, or just 1.2 miles upstream from the Cayuse county access road bridge.

Depending on bank elevation, flood depths from this major flood reached between 3 and 4 feet through this community. Even more important, flood velocities ranged between 2 and 4 feet per second. As discussed in Section 5.2.1, the moving stream of water is frequently the principal cause of damage in places where simple inundation is merely a nuisance. Velocities of 4 feet per second in depths of 3 feet or more might easily sweep persons off their feet, thus creating a definite drowning hazard. High velocities can damage or destroy bridges, embankments, and paving; undermine and collapse buildings; pile up debris and transport sediment and gravel; and erode areas of land. Abrasive damage is increased when flowing water carries in suspension a heavy load of gritty or suspended material such as at this location. In flowing down a flood plain such as the Umatilla River at the community of Cayuse, floodwaters pile up against buildings or other obstructions in its path with consequent acceleration and concentration of flow around the comers. At such points, scouring action on the ground supporting the structure, and even on the structure itself, is greatly increased.

6.2.3 Possible Recommendations

During a flood event, flood evacuation for all residents would be the best short-term alternative for the community. Although this would not prevent major property damage, it would at least protect the residents from any harm. Although some residents may be on slightly higher ground than others, they too should be evacuated due to the possibility of isolation during a flood event especially at night. Flood proofing would provide some protection for more frequent flood events, but floods with higher velocities would still cause major property damage.

The best long-term solution may consist of permanent evacuation of all residents from the flood plain. Possibly the residents could be re-Iocated to higher ground in the immediate surrounding vicinity.

6.3 Squaw Creek

Squaw Creek is an intermittent, left bank (southern) tributary of the Umatilla River that enters the Umatilla River at RM 78.9. (For reference purposes, Meacham Creek enters the Umatilla River 2 miles upstream at RM 80.9.) This stream is not regulated by any storage project, and flow has never been continuously monitored. However, Squaw Creek has a large contributing drainage area of about 35 square miles that is defined by steep and well-defined ridgelines. With minimal flood losses or percolation into the ground during the winter and spring flood season, the potentially high precipitation and snowfall patterns in the basin could translate into major Squaw Creek floodflows.

6.3.1 General Observations

Table 9 (see page 4-12) is a tabulation of estimated maximum annual discharges for Squaw Creek at the mouth. Plates 5 through 8 illustrate the cumulative frequency curves for the maximum annual discharges for four stream locations in Squaw Creek. Those four locations are respectively at (1) RM 0 or the stream mouth, (2) RM 1.5, (3) RM 3.6 at Bachelor Canyon, and (4) RM 7 at the confluence with Little Squaw Creek. In addition, Table 10 and again in Plate 13 tabulate both maximum annual discharges for frequency floods and also estimated flow diversion over the left bank (western) during major flood events.

Within several hours of intense rainfall and / or rapid snowmelt in this very steep drainage basin, Squaw Creek will respond to this precipitation input, and begin to exceed its channel capacity and flood overbank areas. Major flooding will usually last for less than 24 hours. Besides considerable flooding to the several homes located on the right (or east) bank floodplain, the main impact of Squaw Creek floodflows is isolation to local residents living in the eastern part of CTUIR. Flood depths and stream velocities over the Cayuse county road could be sufficient to stall vehicles and endanger the lives of the occupants. Hence, this major east-west service road for CTUIR could be closed for some time except for emergency vehicles.

downstream or westward to property behind the railrroad embankment. This flooding consists only of shallow sheet flow (i.e., less than one foot). It would occur behind the UPRR embankment from the left bank of Squaw Creek west or downstream for a distance of about 2-miles to where the Cayuse county road intersects the canyon ridge line at about RM 75.1.

Table 10 is a tabulation of estimated annual peak discharges diverted from Squaw Creek for the frequency flood events. Location number one is at a point just upstream on Squaw Creek before any floodflows are diverted over the left bank. Locations two through five describe in downstream order diversions over the left overbank. Location number two denotes the first flow diversion over the left overbank at RM 0.43, and location number four denotes the second and major flow diversion over the left overbank just upstream of the railroad bridge at RM 0.37. Location number six is the flow remaining in Squaw Creek, just downstream ofUPRR bridge following diversions at RM 0.43 and RM 0.37.

6.3.3 Sediment Deposition Patterns in Squaw Creek

,As described in Section 5.3, River Morphology, all three streams studied in this report are alluvial streams that carry both floodwaters and sediment materials during major flood events. In particular, Squaw Creek has the potential for very high stream power that is necessary to carry large sediment volumes, including large gravels. This is evident by the steep stream slope (1.2- percent) through the- 1.6-mile study reach, and the potential for high flood peak and flood volume from this large drainage area of 35 square miles.
The sediments entrained in the water and bouncing along the streambed will then be deposited at a reach where stream velocities are reduced.

Currently, this location is at or near the UPRR Bridge at RM 0.37. Floodwaters based on low flow conditions will quickly rise at this constricted bridge location to "low steel" or bridge invert. At this point, flow conditions will then transition to pressure flow or orifice conditions, and then start to progressively backwater upstream as the stream discharge increases. The resultant drop in stream velocities will cause deposition of gravels located at and just downstream of the UP Railroad Bridge. This is confirmed by a field trip to this location following a major flood event such as February 1996, where extensive gravel deposits are located at or near the bridge.

These gravel deposits will necessarily reduce the opening of the bridge cross-section, and thus reduce the water-carrying capacity of the UpRR Bridge. The estimated reduction in water carrying capacity, however, cannot be easily quantified due to the many variables involved in estimating sediment transport conditions. Results of the HEC-RAS computer simulation model shows, however, that low flow conditions for this bridge extend up to only 350 fe *Is,* and at 650 fe *Is* fully transitions to full pressure conditions. As denoted in Table 11, Squaw Creek channel capacity based on "clean water" or no sediment conditions is only 1,100 *ft3/s* prior to diversion into the left overbank area. Hence, sediment deposition at the UpRR Bridge may further reduce the water carrying capacity of this stream, and divert more floodwaters to the left and inside of the railroad embankment. Debris deposition against the upstream face of this bridge will also further reduce the water-carrying capacity of this structure.

6.3.4 Possible Solutions to the Flooding Problem

Since the highly restrictive UPRR Bridge is a major cause of the flooding problems on Squaw Creek and at downstream locations, then increasing the capacity of this key railroad crossing would be the optimum solution. Other possible solutions to the flooding problem would include evacuation of homes in the floodplain, and possibly a levee structure on the right bank that is tied to high ground on both ends.

6.3.4.1 Raise Union Pacific Railroad Bridge

Excluding costs to Union Pacific Railroad Company, this is the best alternative to reduce flood damages associated with Squaw Creek floodflows. Based on HEC-RAS Version

2.2 computer simulation runs, Table 11 below denotes the increased channel capacity for each incremental increase in "low steel" or invert elevation for the bridge. The column for maximum low flow conditions corresponds to when floodwaters first touch the low bridge chord (el. 1697.52 ft, NGVD) on the west side of bridge. The column for full pressure flow conditions pertain to when floodwater touches the maximum low bridge chord (el. 1698.27 ft, NGVD) on the east side of the bridge, and hence floodwaters are at or above low chord throughout the bridge cross-section. To simplify this comparison, it is assumed that the bridge width for all four alternative bridge configuration designs is the same. As denoted in the column for full pressure flow conditions (with suspended sediment in the water), the bridge design with a two-foot raise could pass the 1 percent chance exceedance flood event. Floodwaters up to the 1 percent chance exceedance event (100-year return interval flood) with suspended sediment would pass through the county road and railroad brides safely with no backwater, and the sediment would be deposited further downstream from the railroad bridge.

Table 11 - Alternative Bridge Designs to Improve Capacity of Union Pacific Railroad Bridge 1/

Alternative Bridge Configuration Designs	"Clean Water" Channel Capacity (excludes effects of sediment deposition)	Maximum Low Flow Conditions (beginning of sediment deposition)	Full Pressure Flow Conditions (full sediment deposition)
1. Existing Conditions	*1,100 fefs* (7 percent chance exceedance)	370 W/s (greater than 50 percent chance exceedance)	650 fe/s (40 percent chance exceedance)
2. Raise RR Bridge by O.5-ft	1,200 ft'/s (5 percent chance exceedance)	600 W/s (30 percent chance exceedance)	1,100 W/s (7 percent chance exceedance)
3. Raise RR Bridge by 1.0-ft	1,400 ft'/s (3.5 percent exceedance)	900 W/s (l0 percent chance exceedance)	1,400 ft'/s (3.5 percent exceedance)
4. Raise RR Bridge by 1.5-ft	1,600W/s (2 percent chance exceedance)	1,300 ft'/s (4 percent chance exceedance)	1,600 ft' /s (2 percent chance exceedance)
5. Raise RR Bridge by 2.0-ft	1,700 ft'/s (1.6 percent exceedance)	1,800 ft'/s (1.3 percent chance exceedance)	1,900 ft'/s (l percent chance exceedance)

Note: " Estimated bridge capacities do not include effects of both debris blockage and sediment depositIOn that would further reduce the water-carrying capacity of this restrictive bridge opening.

cially as pertains to the single home located on the right bank that has historically been inundated by even moderate floodflows. As generally described in Section 5.2, Velocity Considerations, this home is subject to flood damages from both inundation or flood depths and high velocities associated with the stream of water moving down the alluvial fan. Besides erosion damages due to high stream velocity, abrasive damage is increased when flowing water carries in suspension a heavy lo~d of gritty material such as at Squaw Creek.

6.3.4.2 Flood Evacuation

Existing flood plain zoning ordinances should be enforced so that developed property remains outside at least the floodplain of the 1 percent chance exceedance flood event. To assist CTUIR planning staff, flooded-area maps have developed for this study that show the extent of Squaw Creek flooding for the 2, 1, and 0.2 percent chance exceedance flood events. The shallow sheet flooding would extend from the left bank of Squaw Creek west or downstream for a distance of about 2 miles to where the county road intersects the canyon ridgeline at about RM 75.2. Floods less severe than the 2 percent chance exceedance (50-year return interval) flood may cause similar sheet flooding since the study did not include the restrictive effects of debris blockages and sediment deposition that are so common at the UPRR bridge.

6.3.4.3 Build Right Bank Levee for Squaw Creek

CTUIR staff members have recently considered preliminary designs to build levees on both the right (east) and left (west) side of Squaw Creek. The proposed CTUIR levee dimensions are not designed to contain major flood events such as the 1 percent chance exceedance (1 DO-year return interval) flood event, but for lesser flood events such as to about the 10 percent chance exceedance (1 O-year return interval) flood. Since the watercarrying capacity of the right overbank is minimal due to the downstream railroad embankment, a levee on the right bank would certainly be effective in containing floodflows under proper design provisions.

Those provisions would include sufficient height and overall levee template dimensions, and also tied to high ground at both ends of the levee. Other factors that must be considered in the levee design include super-elevation of water surface around the sharp stream bends, and also stability of the water surface profile for this soft bottom and braided channel. A sedimentation study would be a necessary part of the profile stability analysis. Elements of such studies would include bed load, bed material, bed forms, shoaling and scouring tendencies, bank erosion, and so forth. Furthermore, a major technical problem that must be addressed is that the right bank levee must cross the Cayuse county road at sufficient height and tie into high ground at the UPRR embankment.

A left (west) bank levee on Squaw Creek would be much less effective in containing floodwaters. As described in Section 6.3.2, floodflows greater than 1,100 $ft3/_S$ would jump the left bank located just upstream of the UPRR Bridge, and result in sheet flooding

This alternative is certainly the least cost alternative, espe

for a2-mile distance downstream to RM 75.2 for the area enclosed between the river canyon walls and the DPRR embankment. Sheet flooding would predominate in this flooded-area zone, with flood depths rarely greater than I-ft except at local depressions. To prevent flooding upstream of the DPRR Bridge, a short levee must also tie the Cayuse
county road to the DPRR embankment.

6.3.4.4 Combination of Above Alternatives

Some combination of the above possible solutions should be considered. Raising the DPRR Bridge is certainly a preferred but very costly structural solution. However, some combination of a right bank levee structure and flood evacuation / flood plain zoning
alternatives should also be considered.

Table 3-21: Hazardous Material Spill Evacuation Distances

Hazardous Material	Evacuation for Spills	Evacuation for fire
Mixed Loads - Unidentified Cargo - 111		1/2 Mile
Explosives 1-1 through 1.6 and Class A and B-112	1/2 Mile	1 Mile
Flammable (F) Solids - 113	1/3 Mile	1/2 Mile
Explosives Division 1-4 and Class C-114	800 Feet	1/3 Mile
Gases - Flammable - 115	1/2 Mile	1 Mile
Gases - Unstable - 116	1/2 Mile	1 mile
Gases - Toxic - Flammable - Extreme Hazard - 117	See Special Table	See Special Table
Gases - Flammable - Corrosive (C)- 118	1/2 Mile	1 Mile
Gases - Toxic (T) - Flammable - 119	See Special Table	1 Mile
Gases - Inert - 120 and 121	330 feet	1/2 Mile
Gases - Oxidizing - 122	1/3 Mile	1/2 Mile
Gases - Toxic or Corrosive - 123	See Special Table	1/2 Mile
Gases - Toxic or Corrosive - Oxidizing - 124	See Special Table	1/2 Mile
Gases - Corrosive - 125	See Special Table	1 Mile
Gases - Compressed or Liquefied - 126	1/3 Mile	1/2 Mile
Flammable Liquids - Miscible - 127	1000 Feet	1/2 Mile
Flammable Liquids - Immiscible - 128	1000 Feet	1/2 Mile
Flammable Liquids - Miscible - Noxious - 129	1000 Feet	1/2 Mile
Flammable Liquids - Immiscible - Noxious - 130	1000 Feet	1/2 Mile
Flammable Liquids - Toxic - 131	Special Table	1/2 Mile
Flammable Liquids - Corrosive - 132	Special Table	1/2 Mile
Flammable Solids - 133	330 Feet	1/2 Mile
Flammable Solids - Toxic or Corrosive - 134	330 Feet	1/2 mile
Substances - Spontaneously Combustible (SC) - 135	See Special Table	1/2 Mile
Substances - (SC) -Toxic/Corrosive-Air Reactive - 136	1000 Feet	1/2 Mile
Substances - Water Reactive (WR) - Corrosive - 137	See Special Table	1/2 Mile
Substances - (WR) - (C) - Emits Flammable Gas 138	See Special Table	1/2 Mile
Substances - (WR) - (C) - Emits (F) (T) Gas 139	See Special Table	1/2 Mile
Oxidizers - 140	330 Feet	1/2 Mile
Oxidizers - Toxic - 141	330 Feet	1/2 Mile
Oxidizers - Toxic - Liquid - 142	330 Feet	1/2 Mile
Oxidizers - Unstable - 143	See Special Table	1/2 Mile
Oxidizers - Water Reactive - 144	See Special Table	1/2 Mile
Organic Peroxides - 145	800 Feet	1/2 Mile
Organic Peroxides - Heat Sensitive (HS) - 146	800 Feet	1/2 Mile
Organic Peroxides - HS - Temp Controlled - 148	800 Feet	1/2 Mile
Substances - Self Reactive (149)	800 Feet	1/2 Mile
Substances - Self Reactive - Temp Controlled (150)	800 Feet	1/2 Mile
Substances - Toxic - Non-Combustible (N Com) (151)	See Special Table	1/2 Mile

Substances - Toxic - Combustible (Com) (152)	See Special Table	1/2 Mile
Substances - Toxic/Corrosive - Combustible (153)	See Special Table	1/2 Mile
Substances - Toxic/Corrosive - Non Combustible (154)	See Special Table	1/2 Mile
Substances - (T)/(C) - (F) Water Sensitive (155)	See Special Table	1/2 Mile
Substances - (T)/(C) - (Com)-Water Sensitive (156)	See Special Table	1/2 Mile
Substances - (T)/(C) - (N Com)-Water Sensitive (157)	See Special Table	1/2 Mile
Substances - Irritating (159)	See Special Table	1/2 Mile
Substance - Low to Moderate Hazard (171)	See Special Table	1/2 Mile
Infectious Substances (158)	75 Feet	
Halogenated Solvents (160)	330 Feet	1/2 Mile
Radioactive Materials (Rad Mat) - Low (L) Level (161)	330 Feet	1000 Feet
Radioactive Materials - Low to Moderate Level (162)	330 Feet	1000 Feet
Radioactive Materials - Low to High (H) Level (163)	330 Feet	1000 Feet
Rad Mat - Special Form - L to H External (164)	330 Feet	1000 Feet
Rad Mat - Fissile - L to H Level (165)	330 Feet	1000 Feet
Rad Mat - Cor - (Uranium Hexafluoride/WS (166)	Special Table	1000 Feet
Fluorine - Refrigerated Liquid (168)	See Special Table	1 Mile
Carbon Monoxide - Refrigerated Liquid (168)	See Special Table	1/2 Mile
Aluminum - Molten (169)	150 Feet	
Metals - Powders, Dusts, Shavings, etc. (170)	160 Feet	1/2 Mile
Gallium - Mercury (172)	330 Feet	1/3 Mile

U.S. DOT - CROSSING INVENTORY INFORMATION
AS OF 1/15/2015

Crossing No.: ***748570G*** Update Reason: ***Changed Crossing*** Effective Begin-Date of Record: ***01/01/11***

Railroad: ***UP*** ***Union Pacific RR Co. [UP]*** End-Date of Record:

Initiating Agency ***State*** Type and Positiion: ***Public At Grade***

Part I Location and Classification of Crossing

Division:	***PORTLAND***	State:	***OR***
Subdivision:	***LA GRANDE***	County:	***UMATILLA***
Branch or Line Name:	***MAIN LINE***	City:	***Near PENDLETON***
Railroad Milepost:	***0218.43***	Street or Road Name:	***MISSION FRONTAGE***
RailRoad I.D. No.:		Highway Type & No.:	
Nearest RR Timetable Stn:	***MUNRA***	HSR Corridor ID:	
Parent Railroad:		County Map Ref. No.:	
Crossing Owner:		Latitude:	***45.6699400***
ENS Sign Installed:	***Yes***	Longitude:	***-118.7352000***
Passenger Service:	***None***	Lat/Long Source:	***Actual***
Avg Passenger Train Count:	***0***	Quiet Zone:	***No***
Adjacent Crossing with Separate Number:	***Yes*** ***809030G***		

Private Crossing Information:

Category: Public Access: ***Unknown***

Specify Signs: Specify Signals:

	ST/RR A	ST/RR B	ST/RR C	ST/RR D
Railroad Use:				
State Use:				

Narrative:

Emergency Contact: ***(800)848-8715*** Railroad Contact: State Contact: ***(503)986-4267***

Part II Railroad Information

Number of Daily Train Movements: Less Than One Movement Per Day: ***No***

Total Trains: ***28*** Total Switching: ***2*** Day Thru: ***16***

Typical Speed Range Over Crossing: From ***20*** to ***55*** mph Maximum Time Table Speed: ***79***

Type and Number of Tracks: Main: ***1*** Other ***1*** Specify: ***SIDING***

Does Another RR Operate a Separate Track at Crossing? ***No***

Does Another RR Operate Over Your Track at Crossing? ***No***

U.S. DOT - CROSSING INVENTORY INFORMATION
Continued

Crossing ***748570G*** Effective Begin-Date of Record: ***01/01/11***
End-Date of Record:

Part III: Traffic Control Device Information

Signs:

Crossbucks:	***0***	Highway Stop Signs:	***0***
Advanced Warning:	***Yes***	Hump Crossing Sign:	***No***
Pavement Markings:	***Stop Lines and RR Xing Symbols***	Other Signs: ***0*** ***0***	Specify:

Train Activated Devices:

Gates:	***2***	4 Quad or Full Barrier:	
Mast Mounted FL:	***8***	Total Number FL Pairs:	***0***
Cantilevered FL (Over):	***0***	Cantilevered FL (Not over):	***0***
Other Flashing Lights:	***1***	Specify Other Flashing Lights:	***SIDELIGHT***
Highway Traffic Signals:	***0***	Wigwags: ***0***	Bells: ***2***
Other Train Activated Warning Devices:		Special Warning Devices Not Train Activated:	
Channelization:		Type of Train Detection:	***Constant Warning Time***
Track Equipped with Train Signals?	***No***	Traffic Light Interconnection/Preemption:	***Simultaneous Preemption***

Part IV: Physical Characteristics

Type of Development:	***Open Space***	Smallest Crossing Angle:	***60 to 90 Degrees***
Number of Traffic Lanes Crossing Railroad:	***2***	Are Truck Pullout Lanes Present?	***No***
Is Highway Paved?	***Yes***		
Crossing Surface:	***Concrete***	If Other:	
Nearby Intersecting Highway?	***Less than 75 feet***	Is it Signalized?	***Yes***
Does Track Run Down a Street?	***No***	Is Crossing Illuminated?	***No***

Is Commercial Power Available? ***Yes***

Part V: Highway Information

Highway System:	***Non-Federal-aid***	Functional Classification of Road at Crossing:	***Rural Local***
Is Crossing on State Highway System:	***No***		
Annual Average Daily Traffic (AADT):	***000900***	AADT Year:	***2005***
Estimated Percent Trucks:		Avg. No of School Buses per Day:	***0***
Posted Highway Speed:	***35***		

U.S. DOT - CROSSING INVENTORY INFORMATION
AS OF 1/15/2015

Crossing No.: ***809221S*** Update Reason: ***Changed Crossing*** Effective Begin-Date of Record: ***01/01/11***

Railroad: ***UP*** ***Union Pacific RR Co. [UP]*** End-Date of Record:

Initiating Agency ***State*** Type and Positiion: ***Public At Grade***

Part I Location and Classification of Crossing

Division:	***NWEST***	State:	***OR***
Subdivision:	***ORE***	County:	***UMATILLA***
Branch or Line Name:	***MAIN LINE***	City:	***Near MEACHAM***
Railroad Milepost:	***0265.00***	Street or Road Name:	***PUBLIC RD***
RailRoad I.D. No.:	***2A 26500***	Highway Type & No.:	***CO***
Nearest RR Timetable Stn:	***MEACHAM***	HSR Corridor ID:	
Parent Railroad:		County Map Ref. No.:	***30SH3B***
Crossing Owner:		Latitude:	***45.5262220***
ENS Sign Installed:		Longitude:	***-118.2903440***
Passenger Service:		Lat/Long Source:	
Avg Passenger Train Count:	***0***	Quiet Zone:	***No***
Adjacent Crossing with Separate Number:			

Private Crossing Information:

Category: Public Access:

Specify Signs: Specify Signals:

	ST/RR A	ST/RR B	ST/RR C	ST/RR D
Railroad Use:				
State Use:				***2A-265.00***

Narrative:

Emergency Contact: ***(800)848-8715*** Railroad Contact: State Contact: ***(503)986-4267***

Part II Railroad Information

Number of Daily Train Movements:		Less Than One Movement Per Day:	***No***
Total Trains: ***25***	Total Switching: ***0***	Day Thru:	***13***
Typical Speed Range Over Crossing: From ***20*** to ***25*** mph		Maximum Time Table Speed:	***25***
Type and Number of Tracks: Main: ***1***	Other ***1***	Specify:	

Does Another RR Operate a Separate Track at Crossing? ***No***

Does Another RR Operate Over Your Track at Crossing? ***Yes: ATK***

U.S. DOT - CROSSING INVENTORY INFORMATION
Continued

Crossing ***809221S***

Effective Begin-Date of Record: ***01/01/11***
End-Date of Record:

Part III: Traffic Control Device Information

Signs:

Crossbucks:	***3***	Highway Stop Signs:	***0***
Advanced Warning:	***Yes***	Hump Crossing Sign:	
Pavement Markings:	***No Markings***	Other Signs: ***3*** ***2***	Specify:

Train Activated Devices:

Gates:	***0***	4 Quad or Full Barrier:	
Mast Mounted FL:	***0***	Total Number FL Pairs:	***0***
Cantilevered FL (Over):	***0***	Cantilevered FL (Not over):	***0***
Other Flashing Lights:	***0***	Specify Other Flashing Lights:	
Highway Traffic Signals:	***0***	Wigwags: ***0*** Bells:	***0***
Other Train Activated Warning Devices:		Special Warning Devices Not Train Activated:	
Channelization:		Type of Train Detection:	***DC/AFO***
Track Equipped with Train Signals?	***Yes***	Traffic Light Interconnection/Preemption:	

Part IV: Physical Characteristics

Type of Development:	***Residential***	Smallest Crossing Angle:	***60 to 90 Degrees***
Number of Traffic Lanes Crossing Railroad:	***2***	Are Truck Pullout Lanes Present?	***No***
Is Highway Paved?	***No***		
Crossing Surface:	***Timber***	If Other:	
Nearby Intersecting Highway?	***Less than 75 feet***	Is it Signalized?	
Does Track Run Down a Street?	***No***	Is Crossing Illuminated?	
Is Commercial Power Available?	***Yes***		

Part V: Highway Information

Highway System:	***Non-Federal-aid***	Functional Classification of Road at Crossing:	***Rural Local***
Is Crossing on State Highway System:	***No***		
Annual Average Daily Traffic (AADT):	***000019***	AADT Year:	***1988***
Estimated Percent Trucks:	***25***	Avg. No of School Buses per Day:	***0***
Posted Highway Speed:	***0***		

U.S. DOT - CROSSING INVENTORY INFORMATION
AS OF 1/15/2015

Crossing No.: ***809213A*** Update Reason: ***Changed Crossing*** Effective Begin-Date of Record: ***01/01/11***

Railroad: ***UP Union Pacific RR Co. [UP]*** End-Date of Record:

Initiating Agency ***Railroad*** Type and Positiion: ***Public At Grade***

Part I Location and Classification of Crossing

Division:	***BOISE***	State:	***OR***
Subdivision:	***LAGRANDE***	County:	***UMATILLA***
Branch or Line Name:	***LAGRANDE SUB.***	City:	***Near PENDLETON***
Railroad Milepost:	***0237.34***	Street or Road Name:	***CAYUSE RIVER RD***
RailRoad I.D. No.:	***2A 23730***	Highway Type & No.:	***CO***
Nearest RR Timetable Stn:	***GIBBON***	HSR Corridor ID:	
Parent Railroad:		County Map Ref. No.:	***30SH2***
Crossing Owner:		Latitude:	***45.6775440***
ENS Sign Installed:		Longitude:	***-118.5521320***
Passenger Service:		Lat/Long Source:	
Avg Passenger Train Count:	***0***	Quiet Zone:	***No***
Adjacent Crossing with Separate Number:			

Private Crossing Information:

Category: Public Access:

Specify Signs: Specify Signals:

	ST/RR A	ST/RR B	ST/RR C	ST/RR D
Railroad Use:				
State Use:				***2A-237.30***

Narrative:

Emergency Contact: ***(800)848-8715*** Railroad Contact: State Contact: ***(503)986-4267***

Part II Railroad Information

Number of Daily Train Movements: Less Than One Movement Per Day: ***No***

Total Trains: ***25*** Total Switching: ***0*** Day Thru: ***13***

Typical Speed Range Over Crossing: From ***25*** to ***35*** mph Maximum Time Table Speed: ***35***

Type and Number of Tracks: Main: ***1*** Other ***1*** Specify: ***PASS***

Does Another RR Operate a Separate Track at Crossing? ***No***

Does Another RR Operate Over Your Track at Crossing? ***No***

U.S. DOT - CROSSING INVENTORY INFORMATION
Continued

Crossing ***809213A***

Effective Begin-Date of Record: ***01/01/11***

End-Date of Record:

Part III: Traffic Control Device Information

Signs:

Crossbucks:	***2***	Highway Stop Signs:	***2***
Advanced Warning:	***No***	Hump Crossing Sign:	
Pavement Markings:	***Stop Lines and RR Xing Symbols***	Other Signs: ***2*** ***2***	Specify:

Train Activated Devices:

Gates:	***2***	4 Quad or Full Barrier:	
Mast Mounted FL:	***8***	Total Number FL Pairs:	***0***
Cantilevered FL (Over):	***0***	Cantilevered FL (Not over):	***0***
Other Flashing Lights:	***0***	Specify Other Flashing Lights:	
Highway Traffic Signals:	***0***	Wigwags: ***0***	Bells: ***2***
Other Train Activated Warning Devices:		Special Warning Devices Not Train Activated:	
Channelization:		Type of Train Detection:	***Constant Warning Time***
Track Equipped with Train Signals?	***Yes***	Traffic Light Interconnection/Preemption:	

Part IV: Physical Characteristics

Type of Development:	***Open Space***	Smallest Crossing Angle:	***60 to 90 Degrees***
Number of Traffic Lanes Crossing Railroad:	***2***	Are Truck Pullout Lanes Present?	***No***
Is Highway Paved?	***Yes***		
Crossing Surface:	***Concrete***	If Other:	
Nearby Intersecting Highway?	***N/A***	Is it Signalized?	
Does Track Run Down a Street?	***No***	Is Crossing Illuminated?	
Is Commercial Power Available?	***Yes***		

Part V: Highway Information

Highway System:	***Other FA Highway - Not NHS***	Functional Classification of Road at Crossing:	***Rural Minor Collector***
Is Crossing on State Highway System:	***No***		
Annual Average Daily Traffic (AADT):	***000110***	AADT Year:	***1988***
Estimated Percent Trucks:	***20***	Avg. No of School Buses per Day:	***0***
Posted Highway Speed:	***0***		

U.S. DOT - CROSSING INVENTORY INFORMATION
AS OF 1/15/2015

Crossing No.: ***809211L*** Update Reason: ***Changed Crossing*** Effective Begin-Date of Record: ***01/01/11***

Railroad: ***UP*** ***Union Pacific RR Co. [UP]*** End-Date of Record:

Initiating Agency ***State*** Type and Positiion: ***Public At Grade***

Part I Location and Classification of Crossing

Division:	***NWEST***	State:	***OR***
Subdivision:	***ORE***	County:	***UMATILLA***
Branch or Line Name:	***MAIN LINE***	City:	***Near PENDLETON***
Railroad Milepost:	***0236.60***	Street or Road Name:	***COUNTY RD***
RailRoad I.D. No.:	***2A 23660C***	Highway Type & No.:	***CO***
Nearest RR Timetable Stn:	***GIBBON***	HSR Corridor ID:	
Parent Railroad:		County Map Ref. No.:	***30SH2***
Crossing Owner:		Latitude:	***45.6768880***
ENS Sign Installed:		Longitude:	***-118.5605010***
Passenger Service:		Lat/Long Source:	
Avg Passenger Train Count:	***0***	Quiet Zone:	***No***
Adjacent Crossing with Separate Number:			

Private Crossing Information:

Category: Public Access:

Specify Signs: Specify Signals:

	ST/RR A	ST/RR B	ST/RR C	ST/RR D
Railroad Use:				
State Use:				***2A-236.60-C***

Narrative:

Emergency Contact: ***(800)848-8715*** Railroad Contact: State Contact: ***(503)986-4267***

Part II Railroad Information

Number of Daily Train Movements: Less Than One Movement Per Day: ***Yes***

Total Trains: ***0*** Total Switching: ***0*** Day Thru: ***0***

Typical Speed Range Over Crossing: From ***2*** to ***5*** mph Maximum Time Table Speed: ***15***

Type and Number of Tracks: Main: ***1*** Other ***1*** Specify:

Does Another RR Operate a Separate Track at Crossing? ***No***

Does Another RR Operate Over Your Track at Crossing? ***No***

U.S. DOT - CROSSING INVENTORY INFORMATION
Continued

Crossing ***809211L***

Effective Begin-Date of Record: ***01/01/11***

End-Date of Record:

Part III: Traffic Control Device Information

Signs:

Crossbucks:	***2***	Highway Stop Signs:	***0***
Advanced Warning:	***No***	Hump Crossing Sign:	
Pavement Markings:	***RR Xing Symbols***	Other Signs: ***2*** ***1***	Specify:

Train Activated Devices:

Gates:	***0***	4 Quad or Full Barrier:	
Mast Mounted FL:	***0***	Total Number FL Pairs:	***0***
Cantilevered FL (Over):	***0***	Cantilevered FL (Not over):	***0***
Other Flashing Lights:	***0***	Specify Other Flashing Lights:	
Highway Traffic Signals:	***0***	Wigwags: ***0***	Bells: ***0***
Other Train Activated Warning Devices:		Special Warning Devices Not Train Activated:	
Channelization:		Type of Train Detection:	***DC/AFO***
Track Equipped with Train Signals?	***No***	Traffic Light Interconnection/Preemption:	

Part IV: Physical Characteristics

Type of Development:	***Open Space***	Smallest Crossing Angle:	***60 to 90 Degrees***
Number of Traffic Lanes Crossing Railroad:	***2***	Are Truck Pullout Lanes Present?	***No***
Is Highway Paved?	***Yes***		
Crossing Surface:	***Asphalt***	If Other:	
Nearby Intersecting Highway?	***N/A***	Is it Signalized?	
Does Track Run Down a Street?	***No***	Is Crossing Illuminated?	
Is Commercial Power Available?	***Yes***		

Part V: Highway Information

Highway System:	***Non-Federal-aid***	Functional Classification of Road at Crossing:	***Rural Local***
Is Crossing on State Highway System:	***No***		
Annual Average Daily Traffic (AADT):	***000110***	AADT Year:	***1988***
Estimated Percent Trucks:	***20***	Avg. No of School Buses per Day:	***0***
Posted Highway Speed:	***0***		

U.S. DOT - CROSSING INVENTORY INFORMATION
AS OF 1/15/2015

Crossing No.: ***809051A*** Update Reason: ***Changed Crossing*** Effective Begin-Date of Record: ***01/01/11***

Railroad: ***UP*** ***Union Pacific RR Co. [UP]*** End-Date of Record:

Initiating Agency ***State*** Type and Positiion: ***Public At Grade***

Part I Location and Classification of Crossing

Division:	***NWEST***	State:	***OR***
Subdivision:	***ORE***	County:	***UMATILLA***
Branch or Line Name:	***MAIN LINE***	City:	***Near PENDLETON***
Railroad Milepost:	***0232.40***	Street or Road Name:	***CAYUSE RIVER RD #***
RailRoad I.D. No.:	***2A 23240***	Highway Type & No.:	***CO***
Nearest RR Timetable Stn:	***PENDLETON***	HSR Corridor ID:	
Parent Railroad:		County Map Ref. No.:	***30SH2***
Crossing Owner:		Latitude:	***45.6827315***
ENS Sign Installed:		Longitude:	***-118.4576500***
Passenger Service:		Lat/Long Source:	***Actual***
Avg Passenger Train Count:	***0***	Quiet Zone:	***No***
Adjacent Crossing with Separate Number:			

Private Crossing Information:

Category: Public Access:

Specify Signs: Specify Signals:

	ST/RR A	ST/RR B	ST/RR C	ST/RR D
Railroad Use:				
State Use:				***2A-232.40***

Narrative:

Emergency Contact: ***(800)848-8715*** Railroad Contact: State Contact: ***(503)986-4267***

Part II Railroad Information

Number of Daily Train Movements: Less Than One Movement Per Day: ***No***

Total Trains: ***25*** Total Switching: ***0*** Day Thru: ***13***

Typical Speed Range Over Crossing: From ***45*** to ***55*** mph Maximum Time Table Speed: ***55***

Type and Number of Tracks: Main: ***1*** Other ***0*** Specify:

Does Another RR Operate a Separate Track at Crossing? ***No***

Does Another RR Operate Over Your Track at Crossing? ***Yes: ATK***

U.S. DOT - CROSSING INVENTORY INFORMATION
Continued

Crossing ***809051A***

Effective Begin-Date of Record: ***01/01/11***
End-Date of Record:

Part III: Traffic Control Device Information

Signs:

Crossbucks:	***2***	Highway Stop Signs:	***2***		
Advanced Warning:	***Yes***	Hump Crossing Sign:			
Pavement Markings:	***No Markings***	Other Signs:	***3***	Specify:	
			0		

Train Activated Devices:

Gates:	***0***	4 Quad or Full Barrier:			
Mast Mounted FL:	***0***	Total Number FL Pairs:	***0***		
Cantilevered FL (Over):	***0***	Cantilevered FL (Not over):	***0***		
Other Flashing Lights:	***0***	Specify Other Flashing Lights:			
Highway Traffic Signals:	***0***	Wigwags:	***0***	Bells:	***0***
Other Train Activated Warning Devices:		Special Warning Devices Not Train Activated:			
Channelization:		Type of Train Detection:	***DC/AFO***		
Track Equipped with Train Signals?	***Yes***	Traffic Light Interconnection/Preemption:			

Part IV: Physical Characteristics

Type of Development:	***Open Space***	Smallest Crossing Angle:	***60 to 90 Degrees***
Number of Traffic Lanes Crossing Railroad:	***2***	Are Truck Pullout Lanes Present?	***No***
Is Highway Paved?	***Yes***		
Crossing Surface:	***Timber***	If Other:	
Nearby Intersecting Highway?	***Less than 75 feet***	Is it Signalized?	
Does Track Run Down a Street?	***No***	Is Crossing Illuminated?	
Is Commercial Power Available?	***Yes***		

Part V: Highway Information

Highway System:	***Other FA Highway - Not NHS***	Functional Classification of Road at Crossing:	***Rural Minor Collector***
Is Crossing on State Highway System:	***No***		
Annual Average Daily Traffic (AADT):	***000130***	AADT Year:	***1988***
Estimated Percent Trucks:	***20***	Avg. No of School Buses per Day:	***0***
Posted Highway Speed:	***0***		

U.S. DOT - CROSSING INVENTORY INFORMATION
AS OF 1/15/2015

Crossing No.: ***809048S*** Update Reason: ***Changed Crossing*** Effective Begin-Date of Record: ***01/01/11***

Railroad: ***UP Union Pacific RR Co. [UP]*** End-Date of Record:

Initiating Agency ***Railroad*** Type and Positiion: ***Public At Grade***

Part I Location and Classification of Crossing

Division:	***BOISE***	State:	***OR***
Subdivision:	***LAGRANDE***	County:	***UMATILLA***
Branch or Line Name:	***LAGRANDE SUB***	City:	***Near MISSION***
Railroad Milepost:	***0231.13***	Street or Road Name:	***THORN HOLLOW RD***
RailRoad I.D. No.:	***2A 23110***	Highway Type & No.:	***CO***
Nearest RR Timetable Stn:	***PENDLETON***	HSR Corridor ID:	
Parent Railroad:		County Map Ref. No.:	***30SH2***
Crossing Owner:		Latitude:	***45.6839940***
ENS Sign Installed:		Longitude:	***-118.4838500***
Passenger Service:		Lat/Long Source:	***Actual***
Avg Passenger Train Count:	***0***	Quiet Zone:	***No***
Adjacent Crossing with Separate Number:			

Private Crossing Information:

Category: Public Access:

Specify Signs: Specify Signals:

	ST/RR A	ST/RR B	ST/RR C	ST/RR D
Railroad Use:				
State Use:				***2A-231.10***

Narrative:

Emergency Contact: ***(800)848-8715*** Railroad Contact: State Contact: ***(503)986-4267***

Part II Railroad Information

Number of Daily Train Movements: Less Than One Movement Per Day: ***No***

Total Trains: ***25*** Total Switching: ***0*** Day Thru: ***13***

Typical Speed Range Over Crossing: From ***30*** to ***40*** mph Maximum Time Table Speed: ***40***

Type and Number of Tracks: Main: ***1*** Other ***0*** Specify:

Does Another RR Operate a Separate Track at Crossing? ***No***

Does Another RR Operate Over Your Track at Crossing? ***No***

U.S. DOT - CROSSING INVENTORY INFORMATION
Continued

Crossing ***809048S***

Effective Begin-Date of Record: ***01/01/11***

End-Date of Record:

Part III: Traffic Control Device Information

Signs:

Crossbucks:	***2***	Highway Stop Signs:	***2***
Advanced Warning:	***No***	Hump Crossing Sign:	
Pavement Markings:	***Stop Lines and RR Xing Symbols***	Other Signs: ***2*** ***0***	Specify:

Train Activated Devices:

Gates:	***2***	4 Quad or Full Barrier:	
Mast Mounted FL:	***8***	Total Number FL Pairs:	***0***
Cantilevered FL (Over):	***0***	Cantilevered FL (Not over):	***0***
Other Flashing Lights:	***0***	Specify Other Flashing Lights:	
Highway Traffic Signals:	***0***	Wigwags: ***0***	Bells: ***2***
Other Train Activated Warning Devices:		Special Warning Devices Not Train Activated:	
Channelization:		Type of Train Detection:	***Constant Warning Time***
Track Equipped with Train Signals?	***Yes***	Traffic Light Interconnection/Preemption:	

Part IV: Physical Characteristics

Type of Development:	***Open Space***	Smallest Crossing Angle:	***60 to 90 Degrees***
Number of Traffic Lanes Crossing Railroad:	***2***	Are Truck Pullout Lanes Present?	***No***
Is Highway Paved?	***Yes***		
Crossing Surface:	***Concrete***	If Other:	
Nearby Intersecting Highway?	***N/A***	Is it Signalized?	
Does Track Run Down a Street?	***No***	Is Crossing Illuminated?	
Is Commercial Power Available?	***Yes***		

Part V: Highway Information

Highway System:	***Other FA Highway - Not NHS***	Functional Classification of Road at Crossing:	***Rural Minor Collector***
Is Crossing on State Highway System:	***No***		
Annual Average Daily Traffic (AADT):	***000243***	AADT Year:	***1988***
Estimated Percent Trucks:	***20***	Avg. No of School Buses per Day:	***0***
Posted Highway Speed:	***0***		

U.S. DOT - CROSSING INVENTORY INFORMATION
AS OF 1/15/2015

Crossing No.: ***809046D*** Update Reason: ***Changed Crossing*** Effective Begin-Date of Record: ***01/01/11***

Railroad: ***UP*** ***Union Pacific RR Co. [UP]*** End-Date of Record:

Initiating Agency ***State*** Type and Positiion: ***Public At Grade***

Part I Location and Classification of Crossing

Division:	***NWEST***	State:	***OR***
Subdivision:	***ORE***	County:	***UMATILLA***
Branch or Line Name:	***MAIN LINE***	City:	***Near PENDLETON***
Railroad Milepost:	***0227.30***	Street or Road Name:	***CAYUSE-ADAMS RD 9***
RailRoad I.D. No.:	***2A 22730***	Highway Type & No.:	***CO***
Nearest RR Timetable Stn:	***CAYUSE***	HSR Corridor ID:	
Parent Railroad:		County Map Ref. No.:	***30SH2***
Crossing Owner:		Latitude:	***45.6770110***
ENS Sign Installed:		Longitude:	***-118.5564350***
Passenger Service:		Lat/Long Source:	***Actual***
Avg Passenger Train Count:	***0***	Quiet Zone:	***No***
Adjacent Crossing with Separate Number:			

Private Crossing Information:

Category: Public Access:

Specify Signs: Specify Signals:

	ST/RR A	ST/RR B	ST/RR C	ST/RR D
Railroad Use:				
State Use:				***2A-227.30***

Narrative:

Emergency Contact: ***(800)848-8715*** Railroad Contact: State Contact: ***(503)986-4267***

Part II Railroad Information

Number of Daily Train Movements:		Less Than One Movement Per Day:	***No***
Total Trains:	***25*** Total Switching: ***0***	Day Thru:	***13***
Typical Speed Range Over Crossing: From	***30*** to ***40*** mph	Maximum Time Table Speed:	***40***
Type and Number of Tracks:	Main: ***1*** Other ***0***	Specify:	

Does Another RR Operate a Separate Track at Crossing? ***No***

Does Another RR Operate Over Your Track at Crossing? ***Yes: ATK***

U.S. DOT - CROSSING INVENTORY INFORMATION
Continued

Crossing ***809046D***

Effective Begin-Date of Record: ***01/01/11***

End-Date of Record:

Part III: Traffic Control Device Information

Signs:

Crossbucks:	***2***	Highway Stop Signs:	***2***
Advanced Warning:	***No***	Hump Crossing Sign:	
Pavement Markings:	***No Markings***	Other Signs: ***2*** ***2***	Specify:

Train Activated Devices:

Gates:	***0***	4 Quad or Full Barrier:	
Mast Mounted FL:	***0***	Total Number FL Pairs:	***0***
Cantilevered FL (Over):	***0***	Cantilevered FL (Not over):	***0***
Other Flashing Lights:	***0***	Specify Other Flashing Lights:	
Highway Traffic Signals:	***0***	Wigwags: ***0*** Bells:	***0***
Other Train Activated Warning Devices:		Special Warning Devices Not Train Activated:	
Channelization:		Type of Train Detection:	***DC/AFO***
Track Equipped with Train Signals?	***Yes***	Traffic Light Interconnection/Preemption:	

Part IV: Physical Characteristics

Type of Development:	***Open Space***	Smallest Crossing Angle:	***60 to 90 Degrees***
Number of Traffic Lanes Crossing Railroad:	***2***	Are Truck Pullout Lanes Present?	***No***
Is Highway Paved?	***No***		
Crossing Surface:	***Timber***	If Other:	
Nearby Intersecting Highway?	***N/A***	Is it Signalized?	
Does Track Run Down a Street?	***No***	Is Crossing Illuminated?	
Is Commercial Power Available?	***Yes***		

Part V: Highway Information

Highway System:	***Non-Federal-aid***	Functional Classification of Road at Crossing:	***Rural Local***
Is Crossing on State Highway System:	***No***		
Annual Average Daily Traffic (AADT):	***000100***	AADT Year:	***1988***
Estimated Percent Trucks:	***25***	Avg. No of School Buses per Day:	***0***
Posted Highway Speed:	***0***		

U.S. DOT - CROSSING INVENTORY INFORMATION
AS OF 1/15/2015

Crossing No.: ***809044P*** Update Reason: ***Changed Crossing*** Effective Begin-Date of Record: ***01/01/11***

Railroad: ***UP*** ***Union Pacific RR Co. [UP]*** End-Date of Record:

Initiating Agency ***State*** Type and Positiion: ***Public At Grade***

Part I Location and Classification of Crossing

Division:	***NWEST***	State:	***OR***
Subdivision:	***ORE***	County:	***UMATILLA***
Branch or Line Name:	***MAIN LINE***	City:	***Near PENDLETON***
Railroad Milepost:	***0226.20***	Street or Road Name:	***OLD RIVER RD #927***
RailRoad I.D. No.:	***2A 22620***	Highway Type & No.:	***FED***
Nearest RR Timetable Stn:	***CAYUSE***	HSR Corridor ID:	
Parent Railroad:		County Map Ref. No.:	***30SH2***
Crossing Owner:		Latitude:	***45.6760649***
ENS Sign Installed:		Longitude:	***-118.5790000***
Passenger Service:		Lat/Long Source:	***Actual***
Avg Passenger Train Count:	***0***	Quiet Zone:	***No***
Adjacent Crossing with Separate Number:			

Private Crossing Information:

Category: Public Access:

Specify Signs: Specify Signals:

	ST/RR A	ST/RR B	ST/RR C	ST/RR D
Railroad Use:				
State Use:				***2A-226.20***

Narrative:

Emergency Contact: ***(800)848-8715*** Railroad Contact: State Contact: ***(503)986-4267***

Part II Railroad Information

Number of Daily Train Movements:		Less Than One Movement Per Day:	***No***
Total Trains:	***25*** Total Switching: ***0***	Day Thru:	***13***
Typical Speed Range Over Crossing: From	***65*** to ***70*** mph	Maximum Time Table Speed:	***70***
Type and Number of Tracks:	Main: ***1*** Other ***0***	Specify:	

Does Another RR Operate a Separate Track at Crossing? ***No***

Does Another RR Operate Over Your Track at Crossing? ***Yes: ATK***

U.S. DOT - CROSSING INVENTORY INFORMATION
Continued

Crossing ***809044P***

Effective Begin-Date of Record: ***01/01/11***

End-Date of Record:

Part III: Traffic Control Device Information

Signs:

Crossbucks:	***1***	Highway Stop Signs:	***2***
Advanced Warning:	***No***	Hump Crossing Sign:	
Pavement Markings:	***No Markings***	Other Signs: ***2*** ***0***	Specify:

Train Activated Devices:

Gates:	***0***	4 Quad or Full Barrier:	
Mast Mounted FL:	***0***	Total Number FL Pairs:	***0***
Cantilevered FL (Over):	***0***	Cantilevered FL (Not over):	***0***
Other Flashing Lights:	***0***	Specify Other Flashing Lights:	
Highway Traffic Signals:	***0***	Wigwags: ***0*** Bells:	***0***
Other Train Activated Warning Devices:		Special Warning Devices Not Train Activated:	
Channelization:		Type of Train Detection:	***DC/AFO***
Track Equipped with Train Signals?	***Yes***	Traffic Light Interconnection/Preemption:	

Part IV: Physical Characteristics

Type of Development:	***Open Space***	Smallest Crossing Angle:	***60 to 90 Degrees***
Number of Traffic Lanes Crossing Railroad:	***1***	Are Truck Pullout Lanes Present?	***No***
Is Highway Paved?	***No***		
Crossing Surface:	***Timber***	If Other:	
Nearby Intersecting Highway?	***N/A***	Is it Signalized?	
Does Track Run Down a Street?	***No***	Is Crossing Illuminated?	
Is Commercial Power Available?	***Yes***		

Part V: Highway Information

Highway System:	***Non-Federal-aid***	Functional Classification of Road at Crossing:	***Rural Local***
Is Crossing on State Highway System:	***No***		
Annual Average Daily Traffic (AADT):	***000020***	AADT Year:	***1988***
Estimated Percent Trucks:	***35***	Avg. No of School Buses per Day:	***0***
Posted Highway Speed:	***0***		

U.S. DOT - CROSSING INVENTORY INFORMATION
AS OF 1/15/2015

Crossing No.: ***809041U*** Update Reason: ***Changed Crossing*** Effective Begin-Date of Record: ***01/01/11***

Railroad: ***UP*** ***Union Pacific RR Co. [UP]*** End-Date of Record:

Initiating Agency ***State*** Type and Positiion: ***Public At Grade***

Part I Location and Classification of Crossing

Division:	***NWEST***	State:	***OR***
Subdivision:	***ORE***	County:	***UMATILLA***
Branch or Line Name:	***MAIN LINE***	City:	***Near PENDLETON***
Railroad Milepost:	***0225.20***	Street or Road Name:	***OLD RIVER RD #918***
RailRoad I.D. No.:	***2A 22520***	Highway Type & No.:	***FED***
Nearest RR Timetable Stn:	***MINTHORN***	HSR Corridor ID:	
Parent Railroad:		County Map Ref. No.:	***30SH2***
Crossing Owner:		Latitude:	***45.6707000***
ENS Sign Installed:		Longitude:	***-118.7051320***
Passenger Service:		Lat/Long Source:	
Avg Passenger Train Count:	***0***	Quiet Zone:	***No***
Adjacent Crossing with Separate Number:			

Private Crossing Information:

Category: Public Access:

Specify Signs: Specify Signals:

	ST/RR A	ST/RR B	ST/RR C	ST/RR D
Railroad Use:				
State Use:				***2A-225.20***

Narrative:

Emergency Contact: ***(800)848-8715*** Railroad Contact: State Contact: ***(503)986-4267***

Part II Railroad Information

Number of Daily Train Movements: Less Than One Movement Per Day: ***No***

Total Trains: ***25*** Total Switching: ***0*** Day Thru: ***13***

Typical Speed Range Over Crossing: From ***65*** to ***70*** mph Maximum Time Table Speed: ***70***

Type and Number of Tracks: Main: ***1*** Other ***1*** Specify:

Does Another RR Operate a Separate Track at Crossing? ***No***

Does Another RR Operate Over Your Track at Crossing? ***Yes: ATK***

U.S. DOT - CROSSING INVENTORY INFORMATION
Continued

Crossing ***809041U***

Effective Begin-Date of Record: ***01/01/11***
End-Date of Record:

Part III: Traffic Control Device Information

Signs:

Crossbucks:	***2***	Highway Stop Signs:	***2***
Advanced Warning:	***No***	Hump Crossing Sign:	
Pavement Markings:	***No Markings***	Other Signs: ***2*** ***2***	Specify:

Train Activated Devices:

Gates:	***0***	4 Quad or Full Barrier:	
Mast Mounted FL:	***0***	Total Number FL Pairs:	***0***
Cantilevered FL (Over):	***0***	Cantilevered FL (Not over):	***0***
Other Flashing Lights:	***0***	Specify Other Flashing Lights:	
Highway Traffic Signals:	***0***	Wigwags: ***0*** Bells:	***0***
Other Train Activated Warning Devices:		Special Warning Devices Not Train Activated:	
Channelization:		Type of Train Detection:	***DC/AFO***
Track Equipped with Train Signals?	***Yes***	Traffic Light Interconnection/Preemption:	

Part IV: Physical Characteristics

Type of Development:	***Open Space***	Smallest Crossing Angle:	***60 to 90 Degrees***
Number of Traffic Lanes Crossing Railroad:	***1***	Are Truck Pullout Lanes Present?	***No***
Is Highway Paved?	***No***		
Crossing Surface:	***Timber***	If Other:	
Nearby Intersecting Highway?	***N/A***	Is it Signalized?	
Does Track Run Down a Street?	***No***	Is Crossing Illuminated?	
Is Commercial Power Available?	***Yes***		

Part V: Highway Information

Highway System:	***Non-Federal-aid***	Functional Classification of Road at Crossing:	***Rural Local***
Is Crossing on State Highway System:	***No***		
Annual Average Daily Traffic (AADT):	***000027***	AADT Year:	***1988***
Estimated Percent Trucks:	***25***	Avg. No of School Buses per Day:	***0***
Posted Highway Speed:	***0***		

U.S. DOT - CROSSING INVENTORY INFORMATION
AS OF 1/15/2015

Crossing No.: ***809040M*** Update Reason: ***Changed Crossing*** Effective Begin-Date of Record: ***01/01/11***

Railroad: ***UP*** ***Union Pacific RR Co. [UP]*** End-Date of Record:

Initiating Agency ***State*** Type and Positiion: ***Public At Grade***

Part I Location and Classification of Crossing

Division:	***NWEST***	State:	***OR***
Subdivision:	***ORE***	County:	***UMATILLA***
Branch or Line Name:	***MAIN LINE***	City:	***Near PENDLETON***
Railroad Milepost:	***0224.10***	Street or Road Name:	***INDIAN SERVICE RD***
RailRoad I.D. No.:	***2A 22410***	Highway Type & No.:	***FED***
Nearest RR Timetable Stn:	***MINTHORN***	HSR Corridor ID:	
Parent Railroad:		County Map Ref. No.:	***30SH2***
Crossing Owner:		Latitude:	***45.6668065***
ENS Sign Installed:		Longitude:	***-118.6217000***
Passenger Service:		Lat/Long Source:	***Actual***
Avg Passenger Train Count:	***0***	Quiet Zone:	***No***
Adjacent Crossing with Separate Number:			

Private Crossing Information:

Category: Public Access:

Specify Signs: Specify Signals:

	ST/RR A	ST/RR B	ST/RR C	ST/RR D
Railroad Use:				
State Use:				***2A-224.10***

Narrative:

Emergency Contact: ***(800)848-8715*** Railroad Contact: State Contact: ***(503)986-4267***

Part II Railroad Information

Number of Daily Train Movements: Less Than One Movement Per Day: ***No***

Total Trains: ***25*** Total Switching: ***0*** Day Thru: ***13***

Typical Speed Range Over Crossing: From ***65*** to ***70*** mph Maximum Time Table Speed: ***70***

Type and Number of Tracks: Main: ***1*** Other ***0*** Specify:

Does Another RR Operate a Separate Track at Crossing? ***No***

Does Another RR Operate Over Your Track at Crossing? ***Yes: ATK***

U.S. DOT - CROSSING INVENTORY INFORMATION
Continued

Crossing ***809040M***

Effective Begin-Date of Record: ***01/01/11***
End-Date of Record:

Part III: Traffic Control Device Information

Signs:

Crossbucks:	***1***	Highway Stop Signs:	***2***		
Advanced Warning:	***Yes***	Hump Crossing Sign:			
Pavement Markings:	***No Markings***	Other Signs:	***0***	Specify:	
			0		

Train Activated Devices:

Gates:	***0***	4 Quad or Full Barrier:			
Mast Mounted FL:	***0***	Total Number FL Pairs:	***0***		
Cantilevered FL (Over):	***0***	Cantilevered FL (Not over):	***0***		
Other Flashing Lights:	***0***	Specify Other Flashing Lights:			
Highway Traffic Signals:	***0***	Wigwags:	***0***	Bells:	***0***
Other Train Activated Warning Devices:		Special Warning Devices Not Train Activated:			
Channelization:		Type of Train Detection:	***DC/AFO***		
Track Equipped with Train Signals?	***Yes***	Traffic Light Interconnection/Preemption:			

Part IV: Physical Characteristics

Type of Development:	***Open Space***	Smallest Crossing Angle:	***60 to 90 Degrees***
Number of Traffic Lanes Crossing Railroad:	***1***	Are Truck Pullout Lanes Present?	***No***
Is Highway Paved?	***No***		
Crossing Surface:	***Timber***	If Other:	
Nearby Intersecting Highway?	***N/A***	Is it Signalized?	
Does Track Run Down a Street?	***No***	Is Crossing Illuminated?	
Is Commercial Power Available?	***No***		

Part V: Highway Information

Highway System:	***Non-Federal-aid***	Functional Classification of Road at Crossing:	***Rural Local***
Is Crossing on State Highway System:	***No***		
Annual Average Daily Traffic (AADT):	***000012***	AADT Year:	***1988***
Estimated Percent Trucks:	***30***	Avg. No of School Buses per Day:	***0***
Posted Highway Speed:	***0***		

U.S. DOT - CROSSING INVENTORY INFORMATION
AS OF 1/15/2015

Crossing No.: ***809037E*** Update Reason: ***Changed Crossing*** Effective Begin-Date of Record: ***01/01/11***

Railroad: ***UP*** ***Union Pacific RR Co. [UP]*** End-Date of Record:

Initiating Agency ***State*** Type and Positiion: ***Public At Grade***

Part I Location and Classification of Crossing

Division:	***NWEST***	State:	***OR***
Subdivision:	***ORE***	County:	***UMATILLA***
Branch or Line Name:	***MAIN LINE***	City:	***Near PENDLETON***
Railroad Milepost:	***0221.50***	Street or Road Name:	***COUNTY ROAD***
RailRoad I.D. No.:	***2A 22150***	Highway Type & No.:	***CO***
Nearest RR Timetable Stn:	***MISSION***	HSR Corridor ID:	
Parent Railroad:		County Map Ref. No.:	***30SH2***
Crossing Owner:		Latitude:	***45.6700847***
ENS Sign Installed:		Longitude:	***-118.6734450***
Passenger Service:		Lat/Long Source:	***Actual***
Avg Passenger Train Count:	***0***	Quiet Zone:	***No***
Adjacent Crossing with Separate Number:			

Private Crossing Information:

Category: Public Access:

Specify Signs: Specify Signals:

	ST/RR A	ST/RR B	ST/RR C	ST/RR D
Railroad Use:				
State Use:				***2A-221.50***

Narrative:

Emergency Contact: ***(800)848-8715*** Railroad Contact: State Contact: ***(503)986-4267***

Part II Railroad Information

Number of Daily Train Movements:		Less Than One Movement Per Day:	***No***
Total Trains: ***25***	Total Switching: ***0***	Day Thru:	***13***
Typical Speed Range Over Crossing: From ***65*** to ***70*** mph		Maximum Time Table Speed:	***70***
Type and Number of Tracks: Main: ***1***	Other ***0***	Specify:	

Does Another RR Operate a Separate Track at Crossing? ***No***

Does Another RR Operate Over Your Track at Crossing? ***Yes: ATK***

U.S. DOT - CROSSING INVENTORY INFORMATION
Continued

Crossing ***809037E***

Effective Begin-Date of Record: ***01/01/11***

End-Date of Record:

Part III: Traffic Control Device Information

Signs:

Crossbucks:	***2***	Highway Stop Signs:	***2***		
Advanced Warning:	***No***	Hump Crossing Sign:			
Pavement Markings:	***No Markings***	Other Signs:	***2***	Specify:	
			0		

Train Activated Devices:

Gates:	***0***	4 Quad or Full Barrier:			
Mast Mounted FL:	***0***	Total Number FL Pairs:	***0***		
Cantilevered FL (Over):	***0***	Cantilevered FL (Not over):	***0***		
Other Flashing Lights:	***0***	Specify Other Flashing Lights:			
Highway Traffic Signals:	***0***	Wigwags:	***0***	Bells:	***0***
Other Train Activated Warning Devices:		Special Warning Devices Not Train Activated:			
Channelization:		Type of Train Detection:	***DC/AFO***		
Track Equipped with Train Signals?	***Yes***	Traffic Light Interconnection/Preemption:			

Part IV: Physical Characteristics

Type of Development:	***Open Space***	Smallest Crossing Angle:	***60 to 90 Degrees***
Number of Traffic Lanes Crossing Railroad:	***1***	Are Truck Pullout Lanes Present?	***No***
Is Highway Paved?	***No***		
Crossing Surface:	***Timber***	If Other:	
Nearby Intersecting Highway?	***N/A***	Is it Signalized?	
Does Track Run Down a Street?	***No***	Is Crossing Illuminated?	
Is Commercial Power Available?	***Yes***		

Part V: Highway Information

Highway System:	***Non-Federal-aid***	Functional Classification of Road at Crossing:	***Rural Local***
Is Crossing on State Highway System:	***No***		
Annual Average Daily Traffic (AADT):	***000014***	AADT Year:	***1988***
Estimated Percent Trucks:	***40***	Avg. No of School Buses per Day:	***0***
Posted Highway Speed:	***0***		

U.S. DOT - CROSSING INVENTORY INFORMATION
AS OF 1/15/2015

Crossing No.: ***809036X*** Update Reason: ***Changed Crossing*** Effective Begin-Date of Record: ***01/01/11***

Railroad: ***UP*** ***Union Pacific RR Co. [UP]*** End-Date of Record:

Initiating Agency ***State*** Type and Positiion: ***Public At Grade***

Part I Location and Classification of Crossing

Division:	***NWEST***	State:	***OR***
Subdivision:	***ORE***	County:	***UMATILLA***
Branch or Line Name:	***MAIN LINE***	City:	***Near PENDLETON***
Railroad Milepost:	***0221.00***	Street or Road Name:	***UMATILLA-MISSION***
RailRoad I.D. No.:	***2A 22100***	Highway Type & No.:	***ST***
Nearest RR Timetable Stn:	***MISSION***	HSR Corridor ID:	
Parent Railroad:		County Map Ref. No.:	***30SH2***
Crossing Owner:		Latitude:	***45.6707147***
ENS Sign Installed:		Longitude:	***-118.6839050***
Passenger Service:		Lat/Long Source:	***Actual***
Avg Passenger Train Count:	***0***	Quiet Zone:	***No***
Adjacent Crossing with Separate Number:			

Private Crossing Information:

Category: Public Access:

Specify Signs: Specify Signals:

	ST/RR A	ST/RR B	ST/RR C	ST/RR D
Railroad Use:				
State Use:				***2A-221.00***

Narrative:

Emergency Contact: ***(800)848-8715*** Railroad Contact: State Contact: ***(503)986-4267***

Part II Railroad Information

Number of Daily Train Movements: Less Than One Movement Per Day: ***No***

Total Trains: ***25*** Total Switching: ***0*** Day Thru: ***13***

Typical Speed Range Over Crossing: From ***1*** to ***79*** mph Maximum Time Table Speed: ***79***

Type and Number of Tracks: Main: ***1*** Other ***1*** Specify:

Does Another RR Operate a Separate Track at Crossing? ***No***

Does Another RR Operate Over Your Track at Crossing? ***Yes: ATK***

U.S. DOT - CROSSING INVENTORY INFORMATION
Continued

Crossing ***809036X***

Effective Begin-Date of Record: ***01/01/11***

End-Date of Record:

Part III: Traffic Control Device Information

Signs:

Crossbucks:	***0***	Highway Stop Signs:	***0***		
Advanced Warning:	***Yes***	Hump Crossing Sign:			
Pavement Markings:	***RR Xing Symbols***	Other Signs:	***2***	Specify:	
			2		

Train Activated Devices:

Gates:	***2***	4 Quad or Full Barrier:			
Mast Mounted FL:	***0***	Total Number FL Pairs:	***0***		
Cantilevered FL (Over):	***0***	Cantilevered FL (Not over):	***0***		
Other Flashing Lights:	***0***	Specify Other Flashing Lights:			
Highway Traffic Signals:	***0***	Wigwags:	***0***	Bells:	***2***
Other Train Activated Warning Devices:		Special Warning Devices Not Train Activated:			
Channelization:		Type of Train Detection:	***DC/AFO***		
Track Equipped with Train Signals?	***Yes***	Traffic Light Interconnection/Preemption:			

Part IV: Physical Characteristics

Type of Development:	***Residential***	Smallest Crossing Angle:	***60 to 90 Degrees***
Number of Traffic Lanes Crossing Railroad:	***2***	Are Truck Pullout Lanes Present?	***No***
Is Highway Paved?	***Yes***		
Crossing Surface:	***Other***	If Other:	
Nearby Intersecting Highway?	***N/A***	Is it Signalized?	
Does Track Run Down a Street?	***No***	Is Crossing Illuminated?	
Is Commercial Power Available?	***Yes***		

Part V: Highway Information

Highway System:	***Other FA Highway - Not NHS***	Functional Classification of Road at Crossing:	***Rural Major Collector***
Is Crossing on State Highway System:	***Yes***		
Annual Average Daily Traffic (AADT):	***001740***	AADT Year:	***1993***
Estimated Percent Trucks:	***10***	Avg. No of School Buses per Day:	***0***
Posted Highway Speed:	***0***		

U.S. DOT - CROSSING INVENTORY INFORMATION
AS OF 1/15/2015

Crossing No.: ***809034J*** Update Reason: ***Changed Crossing*** Effective Begin-Date of Record: ***01/01/11***

Railroad: ***UP*** ***Union Pacific RR Co. [UP]*** End-Date of Record:

Initiating Agency ***State*** Type and Positiion: ***Public At Grade***

Part I Location and Classification of Crossing

Division:	***NWEST***	State:	***OR***
Subdivision:	***ORE***	County:	***UMATILLA***
Branch or Line Name:	***MAIN LINE***	City:	***Near PENDLETON***
Railroad Milepost:	***0219.90***	Street or Road Name:	
RailRoad I.D. No.:	***2A 21990***	Highway Type & No.:	***CO***
Nearest RR Timetable Stn:	***PENDLETON***	HSR Corridor ID:	
Parent Railroad:		County Map Ref. No.:	***30SH2***
Crossing Owner:		Latitude:	***45.6705371***
ENS Sign Installed:		Longitude:	***-118.7047350***
Passenger Service:		Lat/Long Source:	***Actual***
Avg Passenger Train Count:	***0***	Quiet Zone:	***No***
Adjacent Crossing with Separate Number:			

Private Crossing Information:

Category: Public Access:

Specify Signs: Specify Signals:

	ST/RR A	ST/RR B	ST/RR C	ST/RR D
Railroad Use:				
State Use:				***2A-219.90***

Narrative:

Emergency Contact: ***(800)848-8715*** Railroad Contact: State Contact: ***(503)986-4267***

Part II Railroad Information

Number of Daily Train Movements: Less Than One Movement Per Day: ***No***

Total Trains: ***25*** Total Switching: ***0*** Day Thru: ***13***

Typical Speed Range Over Crossing: From ***65*** to ***70*** mph Maximum Time Table Speed: ***70***

Type and Number of Tracks: Main: ***1*** Other ***0*** Specify:

Does Another RR Operate a Separate Track at Crossing? ***No***

Does Another RR Operate Over Your Track at Crossing? ***Yes: ATK***

U.S. DOT - CROSSING INVENTORY INFORMATION
Continued

Crossing ***809034J***

Effective Begin-Date of Record: ***01/01/11***
End-Date of Record:

Part III: Traffic Control Device Information

Signs:

Crossbucks:	***1***	Highway Stop Signs:	***2***		
Advanced Warning:	***No***	Hump Crossing Sign:			
Pavement Markings:	***No Markings***	Other Signs:	***0***	Specify:	
			0		

Train Activated Devices:

Gates:	***0***	4 Quad or Full Barrier:			
Mast Mounted FL:	***0***	Total Number FL Pairs:	***0***		
Cantilevered FL (Over):	***0***	Cantilevered FL (Not over):	***0***		
Other Flashing Lights:	***0***	Specify Other Flashing Lights:			
Highway Traffic Signals:	***0***	Wigwags:	***0***	Bells:	***0***
Other Train Activated Warning Devices:		Special Warning Devices Not Train Activated:			
Channelization:		Type of Train Detection:	***DC/AFO***		
Track Equipped with Train Signals?	***Yes***	Traffic Light Interconnection/Preemption:			

Part IV: Physical Characteristics

Type of Development:	***Open Space***	Smallest Crossing Angle:	***60 to 90 Degrees***
Number of Traffic Lanes Crossing Railroad:	***2***	Are Truck Pullout Lanes Present?	***No***
Is Highway Paved?	***Yes***		
Crossing Surface:	***Timber***	If Other:	
Nearby Intersecting Highway?	***N/A***	Is it Signalized?	
Does Track Run Down a Street?	***No***	Is Crossing Illuminated?	
Is Commercial Power Available?	***Yes***		

Part V: Highway Information

Highway System:	***Non-Federal-aid***	Functional Classification of Road at Crossing:	***Rural Local***
Is Crossing on State Highway System:	***No***		
Annual Average Daily Traffic (AADT):	***000040***	AADT Year:	***1988***
Estimated Percent Trucks:	***20***	Avg. No of School Buses per Day:	***0***
Posted Highway Speed:	***0***		

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION (FRA)

HIGHWAY-RAIL GRADE CROSSING ACCIDENT/INCIDENT REPORT

OMB Approval No. 2130-0500

Name Of	Alphabetic Code	RR Accident/Incident No.
1. Reporting Railroad: **Union Pacific RR Co. [UP]**	1a. **UP**	1b. **0898PD036**
2. Other Railroad Involved in Train Accident/Incident	2a.	2b.
3. Railroad Responsible for Track Maintenance: **Union Pacific RR Co. [UP]**	3a. **UP**	3b. **0898PD036**

4. U.S. DOT-AAR Grade Crossing ID No.	5. Date of Accident/Incident	6. Time of Accident/Incident
809034J	**08/24/98**	**05:40 PM**

7. Nearest Railroad Station	8. Division	9. County	10. State Abbr. / Code
PENDLETON	**PORTLAND**	**UMATILLA**	**41 / OR**

11. City (if in a city): **PENDLETON**
12. Highway Name or No.: **ISHKIT LANE** ☑ Public ☐ Private

Highway User Involved

13. Type — A. Auto, B. Truck, C. Truck-trailer, D. Pick-up truck, E. Van, F. Bus, G. School Bus, H. Motorcycle, J. Other Motor Vehicle, K. Pedestrian, M. Other (specify) — Code: **A**

14. Vehicle Speed (est. mph at impact): **2**

15. Direction (geographical) — 1. North 2. South 3. East 4. West — Code: **2**

16. Position — 1. Stalled on crossing, 2. Stopped on Crossing, 3. Moving over crossing, 4. Trapped — Code: **3**

20a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials? — 1. Highway User 2. Rail Equipment 3. Both 4. Neither — Code: **4**

Rail Equipment Involved

17. Equipment — 1. Train (units pulling), 2. Train (units pushing), 3. Train (standing), 4. Car(s) (moving), 5. Car(s) (standing), 6. Light loco(s) (moving), 7. Light loco(s) (standing), 8. Other (specify), A. Train pulling- RCL, B. Train pushing- RCL, C. Train standing- RCL — Code: **1**

18. Position of Car Unit in Train: **1**

19. Circumstance — 1. Rail equipment struck highway user, 2. Rail equipment struck by highway user — Code: **1**

20b. Was there a hazardous materials release by — 1. Highway User 2. Rail Equipment 3. Both 4. Neither — Code: **4**

20c. State the name and quantity of the hazardous material released, if any

21. Temperature (specify if minus): **85** °F

22. Visibility (single entry) — 1. Dawn 2. Day 3. Dusk 4. Dark — Code: **2**

23. Weather (single entry) — 1. Clear 2. Cloudy 3. Rain 4. Fog 5. Sleet 6. Snow — Code: **1**

24. Type of Equipment Consist (single entry) — 1. Freight train, 2. Passenger train, 3. Commuter train, 4. Work train, 5. Single car, 6. Cut of cars, 7. Yard/Switching, 8. Light loco(s), 9. Main./inspect. car, A. Spec. MoW Equip. — Code: **1**

25. Track Type Used by Rail Equipment Involved — 1. Main 2. Yard 3. Siding 4. Industry — Code: **1**

26. Track Number or Name: **SINGLE MAIN**

27. FRA Track Class: **5**

28. Number of Locomotive Units: **3**

29. Number of Cars: **103**

30. Consist Speed (Recorded if available) — R. Recorded, E. Estimated: **50** mph — Code: **E**

31. Time Table Direction — 1. North 2. South 3. East 4. West — Code: **3**

32. Type of Crossing Warning — 1. Gates, 2. Cantilever FLS, 3. Standard FLS, 4. Wig wags, 5. Hwy. traffic signals, 6. Audible, 7. Crossbucks, 8. Stop signs, 9. Watchman, 10. Flagged by crew, 11. Other (specify), 12. None

Code(s): **08** **07**

33. Signaled Crossing Warning

34. Whistle Ban — 1. Yes 2. No 3. Unknown — Code: **2**

35. Location of Warning — 1. Both Sides, 2. Side of Vehicle Approach, 3. Opposite Side of Vehicle Approach — Code: **1**

36. Crossing Warning Interconnected with Highway Signals — 1. Yes 2. No 3. Unknown — Code: **2**

37. Crossing Illuminated by Street Lights or Special Lights — 1. Yes 2. No 3. Unknown — Code: **2**

38. Driver's Age: **25**

39. Driver's Gender — 1. Male, 2. Female — Code: **1**

40. Driver Drove Behind or in Front of Train and Struck or was Struck by Second Train — 1. Yes 2. No 3. Unknown — Code: **2**

41. Driver — 1. Drove around or thru the gate, 2. Stopped and then proceeded, 3. Did not stop, 4. Stopped on crossing, 5. Other (specify) — Code: **3**

42. Driver Passed Standing Highway Vehicle — 1. Yes 2. No 3. Unknown — Code: **2**

43. View of Track Obscured by (primary obstruction) — 1. Permanent Structure, 2. Standing railroad equipment, 3. Passing Train, 4. Topography, 5. Vegetation, 6. Highway Vehicles, 7. Other (specify), 8. Not Obstructed — Code: **5**

Casualties to:	Killed	Injured
46. Highway-Rail Crossing Users	**0**	**0**
49. Railroad Employees	**0**	**0**
52. Passengers on Train	**0**	**0**

44. Driver was — 1. Killed 2. Injured 3. Uninjured — Code: **3**

45. Was Driver in the Vehicle? — 1. Yes 2. No — Code: **1**

47. Highway Vehicle Property Damage (est. dollar damage): **$5,000**

48. Total Number of Highway-Rail Crossing Users (include driver): **1**

50. Total Number of People on Train (include passengers and crew): **2**

51. Is a Rail Equipment Accident / Incident Report Being Filed — 1. Yes 2. No — Code: **2**

53a. Special Study Block

53b. Special Study Block

54. Narrative Description

55. Typed Name and Title

56. Signature

57. Date

FORM FRA F 6180.57

* NOTE THAT ALL CASUALTIES MUST BE REPORTED ON FORM FRA F 6180.55A

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION (FRA)

HIGHWAY-RAIL GRADE CROSSING ACCIDENT/INCIDENT REPORT

OMB Approval No. 2130-0500

Name Of		Alphabetic Code	RR Accident/Incident No.
1. Reporting Railroad	Union Pacific RR Co. [UP]	1a. UP	1b. 0598PD015
2. Other Railroad Involved in Train Accident/Incident		2a.	2b.
3. Railroad Responsible for Track Maintenance	Union Pacific RR Co. [UP]	3a. UP	3b. 0598PD015

4. U.S. DOT-AAR Grade Crossing ID No.	5. Date of Accident/Incident	6. Time of Accident/Incident
809037E	05/13/98	04:15 PM

7. Nearest Railroad Station	8. Division	9. County	10. State Abbr.	Code
MISSION	PORTLAND	UMATILLA	41	OR

11. City (if in a city): MISSION
12. Highway Name or No.: PARR ROAD
☑ Public ☐ Private

Highway User Involved

13. Type — A. Auto, B. Truck, C. Truck-trailer, D. Pick-up truck, E. Van, F. Bus, G. School Bus, H. Motorcycle, J. Other Motor Vehicle, K. Pedestrian, M. Other (specify) — Code: **A**

14. Vehicle Speed (est. mph at impact): **5**

15. Direction (geographical) 1. North 2. South 3. East 4. West — Code: **1**

16. Position 1. Stalled on crossing 2. Stopped on Crossing 3. Moving over crossing 4. Trapped — Code: **3**

20a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials? 1. Highway User 2. Rail Equipment 3. Both 4. Neither — Code: **4**

Rail Equipment Involved

17. Equipment — 1. Train (units pulling), 2. Train (units pushing), 3. Train (standing), 4. Car(s) (moving), 5. Car(s) (standing), 6. Light loco(s) (moving), 7. Light loco(s) (standing), 8. Other (specify), A. Train pulling- RCL, B. Train pushing- RCL, C. Train standing- RCL — Code: **8**

18. Position of Car Unit in Train: **1**

19. Circumstance 1. Rail equipment struck highway user 2. Rail equipment struck by highway user — Code: **1**

20b. Was there a hazardous materials release by 1. Highway User 2. Rail Equipment 3. Both 4. Neither — Code: **4**

20c. State the name and quantity of the hazardous material released, if any

21. Temperature (specify if minus): **50** °F

22. Visibility (single entry) 1. Dawn 2. Day 3. Dusk 4. Dark — Code: **2**

23. Weather (single entry) 1. Clear 2. Cloudy 3. Rain 4. Fog 5. Sleet 6. Snow — Code: **2**

24. Type of Equipment Consist (single entry) — A. Spec. MoW Equip. 1. Freight train 2. Passenger train 3. Commuter train 4. Work train 5. Single car 6. Cut of cars 7. Yard/Switching 8. Light loco(s) 9. Main./inspect. car — Code: **4**

25. Track Type Used by Rail Equipment Involved 1. Main 2. Yard 3. Siding 4. Industry — Code: **1**

26. Track Number or Name: **SINGLE MAIN**

27. FRA Track Class: **5**

28. Number of Locomotive Units: **1**

29. Number of Cars: **3**

30. Consist Speed (Recorded if available) R. Recorded E. Estimated: **10** mph — Code: **E**

31. Time Table Direction 1. North 2. South 3. East 4. West — Code: **4**

32. Type of Crossing Warning — 1. Gates 2. Cantilever FLS 3. Standard FLS 4. Wig wags 5. Hwy. traffic signals 6. Audible 7. Crossbucks 8. Stop signs 9. Watchman 10. Flagged by crew 11. Other (specify) 12. None

Code(s): **08** **07**

33. Signaled Crossing Warning

34. Whistle Ban 1. Yes 2. No 3. Unknown — Code: **2**

35. Location of Warning 1. Both Sides 2. Side of Vehicle Approach 3. Opposite Side of Vehicle Approach — Code: **1**

36. Crossing Warning Interconnected with Highway Signals 1. Yes 2. No 3. Unknown — Code: **2**

37. Crossing Illuminated by Street Lights or Special Lights 1. Yes 2. No 3. Unknown — Code: **2**

38. Driver's Age: **62**

39. Driver's Gender 1. Male 2. Female — Code: **2**

40. Driver Drove Behind or in Front of Train and Struck or was Struck by Second Train 1. Yes 2. No 3. Unknown — Code: **2**

41. Driver 1. Drove around or thru the gate 2. Stopped and then proceeded 3. Did not stop 4. Stopped on crossing 5. Other (specify) — Code: **3**

42. Driver Passed Standing Highway Vehicle 1. Yes 2. No 3. Unknown — Code: **2**

43. View of Track Obscured by (primary obstruction) 1. Permanent Structure 2. Standing railroad equipment 3. Passing Train 4. Topography 5. Vegetation 6. Highway Vehicles 7. Other (specify) 8. Not Obstructed — Code: **8**

Casualties to:	Killed	Injured
46. Highway-Rail Crossing Users	0	1
49. Railroad Employees	0	0
52. Passengers on Train	0	0

44. Driver was 1. Killed 2. Injured 3. Uninjured — Code: **2**

45. Was Driver in the Vehicle? 1. Yes 2. No — Code: **1**

47. Highway Vehicle Property Damage (est. dollar damage): **$10,000**

48. Total Number of Highway-Rail Crossing Users (include driver): **1**

50. Total Number of People on Train (include passengers and crew): **0**

51. Is a Rail Equipment Accident / Incident Report Being Filed 1. Yes 2. No — Code: **2**

53a. Special Study Block

53b. Special Study Block

54. Narrative Description
17. OHIO CRANE.

55. Typed Name and Title

56. Signature

57. Date

FORM FRA F 6180.57

* NOTE THAT ALL CASUALTIES MUST BE REPORTED ON FORM FRA F 6180.55A

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION (FRA)

HIGHWAY-RAIL GRADE CROSSING ACCIDENT/INCIDENT REPORT

OMB Approval No. 2130-0500

Name Of		Alphabetic Code	RR Accident/Incident No.
1. Reporting Railroad	Union Pacific RR Co. [UP]	1a. UP	1b. 1195PC017
2. Other Railroad Involved in Train Accident/Incident		2a.	2b.
3. Railroad Responsible for Track Maintenance	Union Pacific RR Co. [UP]	3a. UP	3b. 1195PC017

4. U.S. DOT-AAR Grade Crossing ID No.	5. Date of Accident/Incident	6. Time of Accident/Incident
809040M	11/22/95	04:02 AM

7. Nearest Railroad Station	8. Division	9. County	10. State Abbr.	Code
MINTHORN		UMATILLA	41	OR

11. City (if in a city): MINTHORN
12. Highway Name or No.: INDIAN SERVICE ROAD — ☑ Public ☐ Private

Highway User Involved

13. Type — A. Auto, B. Truck, C. Truck-trailer, D. Pick-up truck, E. Van, F. Bus, G. School Bus, H. Motorcycle, J. Other Motor Vehicle, K. Pedestrian, M. Other (specify) — Code: **B**

14. Vehicle Speed (est. mph at impact): **30**

15. Direction (geographical) — 1. North 2. South 3. East 4. West — Code: **1**

16. Position — 1. Stalled on crossing, 2. Stopped on Crossing, 3. Moving over crossing, 4. Trapped — Code: **3**

20a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials? — 1. Highway User 2. Rail Equipment 3. Both 4. Neither — Code: **4**

Rail Equipment Involved

17. Equipment — 1. Train (units pulling), 2. Train (units pushing), 3. Train (standing), 4. Car(s) (moving), 5. Car(s) (standing), 6. Light loco(s) (moving), 7. Light loco(s) (standing), 8. Other (specify), A. Train pulling- RCL, B. Train pushing- RCL, C. Train standing- RCL — Code: **1**

18. Position of Car Unit in Train: **1**

19. Circumstance — 1. Rail equipment struck highway user, 2. Rail equipment struck by highway user — Code: **1**

20b. Was there a hazardous materials release by — 1. Highway User 2. Rail Equipment 3. Both 4. Neither — Code:

20c. State the name and quantity of the hazardous material released, if any

21. Temperature (specify if minus): **58** °F

22. Visibility (single entry) — 1. Dawn 2. Day 3. Dusk 4. Dark — Code: **4**

23. Weather (single entry) — 1. Clear 2. Cloudy 3. Rain 4. Fog 5. Sleet 6. Snow — Code: **3**

24. Type of Equipment Consist (single entry) — 1. Freight train, 2. Passenger train, 3. Commuter train, 4. Work train, 5. Single car, 6. Cut of cars, 7. Yard/Switching, 8. Light loco(s), 9. Main./inspect. car, A. Spec. MoW Equip. — Code: **1**

25. Track Type Used by Rail Equipment Involved — 1. Main 2. Yard 3. Siding 4. Industry — Code: **1**

26. Track Number or Name: **SINGLE MAIN**

27. FRA Track Class	28. Number of Locomotive Units	29. Number of Cars	30. Consist Speed (Recorded if available)	Code	31. Time Table Direction	Code
5	3	68	R. Recorded / E. Estimated **37** mph	E	1. North 2. South 3. East 4. West	3

32. Type of Crossing Warning — 1. Gates, 2. Cantilever FLS, 3. Standard FLS, 4. Wig wags, 5. Hwy. traffic signals, 6. Audible, 7. Crossbucks, 8. Stop signs, 9. Watchman, 10. Flagged by crew, 11. Other (specify), 12. None

Code(s): **03** **06** **07**

33. Signaled Crossing Warning: **20 sec warn min (1);**

34. Whistle Ban — 1. Yes 2. No 3. Unknown — Code:

35. Location of Warning — 1. Both Sides, 2. Side of Vehicle Approach, 3. Opposite Side of Vehicle Approach	Code	36. Crossing Warning Interconnected with Highway Signals — 1. Yes 2. No 3. Unknown	Code	37. Crossing Illuminated by Street Lights or Special Lights — 1. Yes 2. No 3. Unknown	Code
	1		2		2

38. Driver's Age	39. Driver's Gender — 1. Male, 2. Female	Code	40. Driver Drove Behind or in Front of Train and Struck or was Struck by Second Train — 1. Yes 2. No 3. Unknown	Code	41. Driver — 1. Drove around or thru the gate, 2. Stopped and then proceeded, 3. Did not stop, 4. Stopped on crossing, 5. Other (specify)	Code
			2			3

42. Driver Passed Standing Highway Vehicle — 1. Yes 2. No 3. Unknown — Code: **2**

43. View of Track Obscured by (primary obstruction) — 1. Permanent Structure, 2. Standing railroad equipment, 3. Passing Train, 4. Topography, 5. Vegetation, 6. Highway Vehicles, 7. Other (specify), 8. Not Obstructed — Code: **8**

Casualties to:	Killed	Injured
46. Highway-Rail Crossing Users	0	3
49. Railroad Employees	0	0
52. Passengers on Train	0	0

44. Driver was — 1. Killed 2. Injured 3. Uninjured — Code: **2**

45. Was Driver in the Vehicle? — 1. Yes 2. No — Code: **1**

47. Highway Vehicle Property Damage (est. dollar damage): **$3,000**

48. Total Number of Highway-Rail Crossing Users (include driver): **3**

50. Total Number of People on Train (include passengers and crew):

51. Is a Rail Equipment Accident / Incident Report Being Filed — 1. Yes 2. No — Code: **2**

53a. Special Study Block

53b. Special Study Block

54. Narrative Description

55. Typed Name and Title

56. Signature

57. Date

FORM FRA F 6180.57

* NOTE THAT ALL CASUALTIES MUST BE REPORTED ON FORM FRA F 6180.55A

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION (FRA)

HIGHWAY-RAIL GRADE CROSSING ACCIDENT/INCIDENT REPORT

OMB Approval No. 2130-0500

Name Of	Alphabetic Code	RR Accident/Incident No.
1. Reporting Railroad: **Union Pacific RR Co. [UP]**	1a. **UP**	1b. **1094PC020**
2. Other Railroad Involved in Train Accident/Incident	2a.	2b.
3. Railroad Responsible for Track Maintenance: **Union Pacific RR Co. [UP]**	3a. **UP**	3b. **1094PC020**

4. U.S. DOT-AAR Grade Crossing ID No.	5. Date of Accident/Incident	6. Time of Accident/Incident
809034J	**10/10/94**	**07:00 AM**

7. Nearest Railroad Station	8. Division	9. County	10. State Abbr.	Code
MUNRA		**UMATILLA**	**41**	**OR**

11. City (if in a city): **MUNRA**
12. Highway Name or No.: **MISSION HIWAY** ☑ Public ☐ Private

Highway User Involved

13. Type — A. Auto, B. Truck, C. Truck-trailer, D. Pick-up truck, E. Van, F. Bus, G. School Bus, H. Motorcycle, J. Other Motor Vehicle, K. Pedestrian, M. Other (specify) — Code: **C**

14. Vehicle Speed (est. mph at impact): **10**

15. Direction (geographical) — 1. North 2. South 3. East 4. West — Code: **1**

16. Position — 1. Stalled on crossing, 2. Stopped on Crossing, 3. Moving over crossing, 4. Trapped — Code: **3**

20a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials? — 1. Highway User 2. Rail Equipment 3. Both 4. Neither — Code: **2**

Rail Equipment Involved

17. Equipment — 1. Train (units pulling), 2. Train (units pushing), 3. Train (standing), 4. Car(s) (moving), 5. Car(s) (standing), 6. Light loco(s) (moving), 7. Light loco(s) (standing), 8. Other (specify), A. Train pulling- RCL, B. Train pushing- RCL, C. Train standing- RCL — Code: **1**

18. Position of Car Unit in Train: **1**

19. Circumstance — 1. Rail equipment struck highway user, 2. Rail equipment struck by highway user — Code: **1**

20b. Was there a hazardous materials release by — 1. Highway User 2. Rail Equipment 3. Both 4. Neither — Code:

20c. State the name and quantity of the hazardous material released, if any

21. Temperature (specify if minus): **65** °F

22. Visibility (single entry) — 1. Dawn 2. Day 3. Dusk 4. Dark — Code: **2**

23. Weather (single entry) — 1. Clear 2. Cloudy 3. Rain 4. Fog 5. Sleet 6. Snow — Code: **1**

24. Type of Equipment Consist (single entry) — 1. Freight train, 2. Passenger train, 3. Commuter train, 4. Work train, 5. Single car, 6. Cut of cars, 7. Yard/Switching, 8. Light loco(s), 9. Main./inspect. car, A. Spec. MoW Equip. — Code: **1**

25. Track Type Used by Rail Equipment Involved — 1. Main 2. Yard 3. Siding 4. Industry — Code: **1**

26. Track Number or Name: **NO 1 MAIN**

27. FRA Track Class	28. Number of Locomotive Units	29. Number of Cars	30. Consist Speed (Recorded if available)	Code	31. Time Table Direction	Code
4	**1**	**10**	R. Recorded / E. Estimated **50** mph	**E**	1. North 2. South 3. East 4. West	**4**

32. Type of Crossing Warning — 1. Gates, 2. Cantilever FLS, 3. Standard FLS, 4. Wig wags, 5. Hwy. traffic signals, 6. Audible, 7. Crossbucks, 8. Stop signs, 9. Watchman, 10. Flagged by crew, 11. Other (specify), 12. None

Code(s): **07** **08**

33. Signaled Crossing Warning

34. Whistle Ban — 1. Yes 2. No 3. Unknown — Code:

35. Location of Warning — 1. Both Sides, 2. Side of Vehicle Approach, 3. Opposite Side of Vehicle Approach — Code: **1**

36. Crossing Warning Interconnected with Highway Signals — 1. Yes 2. No 3. Unknown — Code: **2**

37. Crossing Illuminated by Street Lights or Special Lights — 1. Yes 2. No 3. Unknown — Code: **3**

38. Driver's Age

39. Driver's Gender — 1. Male, 2. Female — Code:

40. Driver Drove Behind or in Front of Train and Struck or was Struck by Second Train — 1. Yes 2. No 3. Unknown — Code: **2**

41. Driver — 1. Drove around or thru the gate, 2. Stopped and then proceeded, 3. Did not stop, 4. Stopped on crossing, 5. Other (specify) — Code: **3**

42. Driver Passed Standing Highway Vehicle — 1. Yes 2. No 3. Unknown — Code: **3**

43. View of Track Obscured by (primary obstruction) — 1. Permanent Structure, 2. Standing railroad equipment, 3. Passing Train, 4. Topography, 5. Vegetation, 6. Highway Vehicles, 7. Other (specify), 8. Not Obstructed — Code: **8**

Casualties to:	Killed	Injured
46. Highway-Rail Crossing Users	**0**	**0**
49. Railroad Employees	**0**	**0**
52. Passengers on Train	**0**	**0**

44. Driver was — 1. Killed 2. Injured 3. Uninjured — Code: **3**

45. Was Driver in the Vehicle? — 1. Yes 2. No — Code: **1**

47. Highway Vehicle Property Damage (est. dollar damage): **$1,000**

48. Total Number of Highway-Rail Crossing Users (include driver): **1**

50. Total Number of People on Train (include passengers and crew)

51. Is a Rail Equipment Accident / Incident Report Being Filed — 1. Yes 2. No — Code: **2**

53a. Special Study Block

53b. Special Study Block

54. Narrative Description

55. Typed Name and Title	56. Signature	57. Date

FORM FRA F 6180.57

* NOTE THAT ALL CASUALTIES MUST BE REPORTED ON FORM FRA F 6180.55A

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION (FRA)

HIGHWAY-RAIL GRADE CROSSING ACCIDENT/INCIDENT REPORT

OMB Approval No. 2130-0500

Name Of	Alphabetic Code	RR Accident/Incident No.
1. Reporting Railroad: **Union Pacific RR Co. [UP]**	1a. **UP**	1b. **0594PC025**
2. Other Railroad Involved in Train Accident/Incident	2a.	2b.
3. Railroad Responsible for Track Maintenance: **Union Pacific RR Co. [UP]**	3a. **UP**	3b. **0594PC025**

4. U.S. DOT-AAR Grade Crossing ID No.	5. Date of Accident/Incident	6. Time of Accident/Incident
809036X	**05/19/94**	**02:30 PM**

7. Nearest Railroad Station	8. Division	9. County	10. State Abbr.	Code
MISSION		**UMATILLA**	**41**	**OR**

11. City (if in a city): **MISSION**
12. Highway Name or No.: **UMATILLA/MISSION** ☑ Public ☐ Private

Highway User Involved

13. Type — A. Auto, B. Truck, C. Truck-trailer, D. Pick-up truck, E. Van, F. Bus, G. School Bus, H. Motorcycle, J. Other Motor Vehicle, K. Pedestrian, M. Other (specify) — Code: **A**

14. Vehicle Speed (est. mph at impact): **10**

15. Direction (geographical) — 1. North 2. South 3. East 4. West — Code: **2**

16. Position — 1. Stalled on crossing, 2. Stopped on Crossing, 3. Moving over crossing, 4. Trapped — Code: **3**

20a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials? — 1. Highway User 2. Rail Equipment 3. Both 4. Neither — Code: **4**

Rail Equipment Involved

17. Equipment — 1. Train (units pulling), 2. Train (units pushing), 3. Train (standing), 4. Car(s) (moving), 5. Car(s) (standing), 6. Light loco(s) (moving), 7. Light loco(s) (standing), 8. Other (specify), A. Train pulling- RCL, B. Train pushing- RCL, C. Train standing- RCL — Code: **4**

18. Position of Car Unit in Train: **1**

19. Circumstance — 1. Rail equipment struck highway user, 2. Rail equipment struck by highway user — Code: **1**

20b. Was there a hazardous materials release by — 1. Highway User 2. Rail Equipment 3. Both 4. Neither — Code:

20c. State the name and quantity of the hazardous material released, if any

21. Temperature (specify if minus): **75** °F

22. Visibility (single entry) — 1. Dawn 2. Day 3. Dusk 4. Dark — Code: **2**

23. Weather (single entry) — 1. Clear 2. Cloudy 3. Rain 4. Fog 5. Sleet 6. Snow — Code: **3**

24. Type of Equipment Consist (single entry) — 1. Freight train, 2. Passenger train, 3. Commuter train, 4. Work train, 5. Single car, 6. Cut of cars, 7. Yard/Switching, 8. Light loco(s), 9. Main./inspect. car, A. Spec. MoW Equip. — Code: **4**

25. Track Type Used by Rail Equipment Involved — 1. Main 2. Yard 3. Siding 4. Industry — Code: **1**

26. Track Number or Name: **SINGLE MAIN**

27. FRA Track Class	28. Number of Locomotive Units	29. Number of Cars	30. Consist Speed (Recorded if available) R. Recorded E. Estimated	Code	31. Time Table Direction 1. North 2. South 3. East 4. West	Code
4	**0**	**1**	**10** mph	**E**		**4**

32. Type of Crossing Warning — 1. Gates, 2. Cantilever FLS, 3. Standard FLS, 4. Wig wags, 5. Hwy. traffic signals, 6. Audible, 7. Crossbucks, 8. Stop signs, 9. Watchman, 10. Flagged by crew, 11. Other (specify), 12. None

Code(s): **01** **07**

33. Signaled Crossing Warning: **Allgd. no warn (4);**

34. Whistle Ban — 1. Yes 2. No 3. Unknown — Code:

35. Location of Warning — 1. Both Sides, 2. Side of Vehicle Approach, 3. Opposite Side of Vehicle Approach — Code: **1**

36. Crossing Warning Interconnected with Highway Signals — 1. Yes 2. No 3. Unknown — Code: **2**

37. Crossing Illuminated by Street Lights or Special Lights — 1. Yes 2. No 3. Unknown — Code: **2**

38. Driver's Age:

39. Driver's Gender — 1. Male, 2. Female — Code:

40. Driver Drove Behind or in Front of Train and Struck or was Struck by Second Train — 1. Yes 2. No 3. Unknown — Code: **2**

41. Driver — 1. Drove around or thru the gate, 2. Stopped and then proceeded, 3. Did not stop, 4. Stopped on crossing, 5. Other (specify) — Code: **3**

42. Driver Passed Standing Highway Vehicle — 1. Yes 2. No 3. Unknown — Code: **2**

43. View of Track Obscured by (primary obstruction) — 1. Permanent Structure, 2. Standing railroad equipment, 3. Passing Train, 4. Topography, 5. Vegetation, 6. Highway Vehicles, 7. Other (specify), 8. Not Obstructed — Code: **8**

Casualties to:	Killed	Injured
46. Highway-Rail Crossing Users	**0**	**0**
49. Railroad Employees	**0**	**0**
52. Passengers on Train	**0**	**0**

44. Driver was — 1. Killed 2. Injured 3. Uninjured — Code: **3**

45. Was Driver in the Vehicle? — 1. Yes 2. No — Code: **1**

47. Highway Vehicle Property Damage (est. dollar damage): **$3,500**

48. Total Number of Highway-Rail Crossing Users (include driver): **1**

50. Total Number of People on Train (include passengers and crew):

51. Is a Rail Equipment Accident / Incident Report Being Filed — 1. Yes 2. No — Code: **2**

53a. Special Study Block

53b. Special Study Block

54. Narrative Description

55. Typed Name and Title

56. Signature

57. Date

FORM FRA F 6180.57

* NOTE THAT ALL CASUALTIES MUST BE REPORTED ON FORM FRA F 6180.55A

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION (FRA)

HIGHWAY-RAIL GRADE CROSSING ACCIDENT/INCIDENT REPORT

OMB Approval No. 2130-0500

Name Of		Alphabetic Code	RR Accident/Incident No.
1. Reporting Railroad	Union Pacific RR Co. [UP]	1a. UP	1b. 0691CR012
2. Other Railroad Involved in Train Accident/Incident		2a.	2b.
3. Railroad Responsible for Track Maintenance	Union Pacific RR Co. [UP]	3a. UP	3b. 0691CR012

4. U.S. DOT-AAR Grade Crossing ID No.	5. Date of Accident/Incident	6. Time of Accident/Incident
809037E	06/08/91	10:00 AM

7. Nearest Railroad Station	8. Division	9. County	10. State Abbr.	Code
MUNRA		UMATILLA	41	OR

11. City (if in a city): MISSION
12. Highway Name or No.: COUNTY
☑ Public ☐ Private

Highway User Involved

13. Type — Code: A
A. Auto B. Truck C. Truck-trailer D. Pick-up truck E. Van F. Bus G. School Bus H. Motorcycle J. Other Motor Vehicle K. Pedestrian M. Other (specify)

14. Vehicle Speed (est. mph at impact): 10

15. Direction (geographical) — Code: 2
1. North 2. South 3. East 4. West

16. Position — Code: 3
1. Stalled on crossing 2. Stopped on Crossing 3. Moving over crossing 4. Trapped

20a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials? — Code: 4
1. Highway User 2. Rail Equipment 3. Both 4. Neither

Rail Equipment Involved

17. Equipment — Code: 1
1. Train (units pulling) 2. Train (units pushing) 3. Train (standing) 4. Car(s) (moving) 5. Car(s) (standing) 6. Light loco(s) (moving) 7. Light loco(s) (standing) 8. Other (specify) A. Train pulling- RCL B. Train pushing- RCL C. Train standing- RCL

18. Position of Car Unit in Train: 1

19. Circumstance — Code: 1
1. Rail equipment struck highway user 2. Rail equipment struck by highway user

20b. Was there a hazardous materials release by — Code:
1. Highway User 2. Rail Equipment 3. Both 4. Neither

20c. State the name and quantity of the hazardous material released, if any

21. Temperature (specify if minus): 60 °F

22. Visibility (single entry) — Code: 2
1. Dawn 2. Day 3. Dusk 4. Dark

23. Weather (single entry) — Code: 1
1. Clear 2. Cloudy 3. Rain 4. Fog 5. Sleet 6. Snow

24. Type of Equipment Consist (single entry) — Code: 1
A. Spec. MoW Equip. 1. Freight train 2. Passenger train 3. Commuter train 4. Work train 5. Single car 6. Cut of cars 7. Yard/Switching 8. Light loco(s) 9. Main./inspect. car

25. Track Type Used by Rail Equipment Involved — Code: 1
1. Main 2. Yard 3. Siding 4. Industry

26. Track Number or Name: SINGLE MAIN

27. FRA Track Class: 5

28. Number of Locomotive Units: 2

29. Number of Cars: 25

30. Consist Speed (Recorded if available) — Code: R
R. Recorded E. Estimated 55 mph

31. Time Table Direction — Code: 3
1. North 2. South 3. East 4. West

32. Type of Crossing Warning — Code(s): 07
1. Gates 2. Cantilever FLS 3. Standard FLS 4. Wig wags 5. Hwy. traffic signals 6. Audible 7. Crossbucks 8. Stop signs 9. Watchman 10. Flagged by crew 11. Other (specify) 12. None

33. Signaled Crossing Warning

34. Whistle Ban — Code:
1. Yes 2. No 3. Unknown

35. Location of Warning — Code: 1
1. Both Sides 2. Side of Vehicle Approach 3. Opposite Side of Vehicle Approach

36. Crossing Warning Interconnected with Highway Signals — Code: 2
1. Yes 2. No 3. Unknown

37. Crossing Illuminated by Street Lights or Special Lights — Code: 2
1. Yes 2. No 3. Unknown

38. Driver's Age

39. Driver's Gender — Code:
1. Male 2. Female

40. Driver Drove Behind or in Front of Train and Struck or was Struck by Second Train — Code: 2
1. Yes 2. No 3. Unknown

41. Driver — Code: 3
1. Drove around or thru the gate 2. Stopped and then proceeded 3. Did not stop 4. Stopped on crossing 5. Other (specify)

42. Driver Passed Standing Highway Vehicle — Code: 2
1. Yes 2. No 3. Unknown

43. View of Track Obscured by (primary obstruction) — Code: 8
1. Permanent Structure 2. Standing railroad equipment 3. Passing Train 4. Topography 5. Vegetation 6. Highway Vehicles 7. Other (specify) 8. Not Obstructed

Casualties to:	Killed	Injured
46. Highway-Rail Crossing Users	1	0
49. Railroad Employees	0	0
52. Passengers on Train	0	0

44. Driver was — Code: 1
1. Killed 2. Injured 3. Uninjured

45. Was Driver in the Vehicle? — Code: 1
1. Yes 2. No

47. Highway Vehicle Property Damage (est. dollar damage): $3,000

48. Total Number of Highway-Rail Crossing Users (include driver): 1

50. Total Number of People on Train (include passengers and crew)

51. Is a Rail Equipment Accident / Incident Report Being Filed — Code: 2
1. Yes 2. No

53a. Special Study Block

53b. Special Study Block

54. Narrative Description

55. Typed Name and Title

56. Signature

57. Date

FORM FRA F 6180.57

* NOTE THAT ALL CASUALTIES MUST BE REPORTED ON FORM FRA F 6180.55A

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION (FRA)

HIGHWAY-RAIL GRADE CROSSING ACCIDENT/INCIDENT REPORT

OMB Approval No. 2130-0500

Name Of		Alphabetic Code	RR Accident/Incident No.
1. Reporting Railroad	**Union Pacific RR Co. [UP]**	1a. **UP**	1b. **0391ID211**
2. Other Railroad Involved in Train Accident/Incident		2a.	2b.
3. Railroad Responsible for Track Maintenance	**Union Pacific RR Co. [UP]**	3a. **UP**	3b. **0391ID211**

4. U.S. DOT-AAR Grade Crossing ID No.	5. Date of Accident/Incident	6. Time of Accident/Incident
809040M	**03/16/91**	**04:08 AM**

7. Nearest Railroad Station	8. Division	9. County	10. State Abbr.	Code
MINTHORN		**UMATILLA**	**41**	**OR**

11. City (if in a city) **MISSION** | 12. Highway Name or No. | ☑ Public ☐ Private

Highway User Involved

13. Type — A. Auto, B. Truck, C. Truck-trailer, D. Pick-up truck, E. Van, F. Bus, G. School Bus, H. Motorcycle, J. Other Motor Vehicle, K. Pedestrian, M. Other (specify) — Code: **A**

14. Vehicle Speed (est. mph at impact): **0**

15. Direction (geographical) 1. North 2. South 3. East 4. West — Code: **3**

16. Position 1. Stalled on crossing 2. Stopped on Crossing 3. Moving over crossing 4. Trapped — Code: **1**

20a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials? 1. Highway User 2. Rail Equipment 3. Both 4. Neither — Code: **4**

Rail Equipment Involved

17. Equipment — 1. Train (units pulling), 2. Train (units pushing), 3. Train (standing), 4. Car(s) (moving), 5. Car(s) (standing), 6. Light loco(s) (moving), 7. Light loco(s) (standing), 8. Other (specify), A. Train pulling- RCL, B. Train pushing- RCL, C. Train standing- RCL — Code: **6**

18. Position of Car Unit in Train: **1**

19. Circumstance 1. Rail equipment struck highway user 2. Rail equipment struck by highway user — Code: **1**

20b. Was there a hazardous materials release by 1. Highway User 2. Rail Equipment 3. Both 4. Neither — Code:

20c. State the name and quantity of the hazardous material released, if any

21. Temperature (specify if minus): **45** °F

22. Visibility (single entry) 1. Dawn 2. Day 3. Dusk 4. Dark — Code: **4**

23. Weather (single entry) 1. Clear 2. Cloudy 3. Rain 4. Fog 5. Sleet 6. Snow — Code: **1**

24. Type of Equipment Consist (single entry) — A. Spec. MoW Equip. 1. Freight train 2. Passenger train 3. Commuter train 4. Work train 5. Single car 6. Cut of cars 7. Yard/Switching 8. Light loco(s) 9. Main./inspect. car — Code: **8**

25. Track Type Used by Rail Equipment Involved 1. Main 2. Yard 3. Siding 4. Industry — Code: **1**

26. Track Number or Name: **MAIN**

27. FRA Track Class: **4**

28. Number of Locomotive Units: **2**

29. Number of Cars: **0**

30. Consist Speed (Recorded if available) R. Recorded E. Estimated **60** mph — Code: **E**

31. Time Table Direction 1. North 2. South 3. East 4. West — Code: **3**

32. Type of Crossing Warning — 1. Gates 2. Cantilever FLS 3. Standard FLS 4. Wig wags 5. Hwy. traffic signals 6. Audible 7. Crossbucks 8. Stop signs 9. Watchman 10. Flagged by crew 11. Other (specify) 12. None — Code(s): **07**

33. Signaled Crossing Warning

34. Whistle Ban 1. Yes 2. No 3. Unknown — Code:

35. Location of Warning 1. Both Sides 2. Side of Vehicle Approach 3. Opposite Side of Vehicle Approach — Code: **3**

36. Crossing Warning Interconnected with Highway Signals 1. Yes 2. No 3. Unknown — Code: **2**

37. Crossing Illuminated by Street Lights or Special Lights 1. Yes 2. No 3. Unknown — Code: **2**

38. Driver's Age

39. Driver's Gender 1. Male 2. Female — Code:

40. Driver Drove Behind or in Front of Train and Struck or was Struck by Second Train 1. Yes 2. No 3. Unknown — Code: **2**

41. Driver 1. Drove around or thru the gate 2. Stopped and then proceeded 3. Did not stop 4. Stopped on crossing 5. Other (specify) — Code: **4**

42. Driver Passed Standing Highway Vehicle 1. Yes 2. No 3. Unknown — Code: **2**

43. View of Track Obscured by (primary obstruction) 1. Permanent Structure 2. Standing railroad equipment 3. Passing Train 4. Topography 5. Vegetation 6. Highway Vehicles 7. Other (specify) 8. Not Obstructed — Code: **8**

Casualties to:	Killed	Injured
46. Highway-Rail Crossing Users	**0**	**0**
49. Railroad Employees	**0**	**0**
52. Passengers on Train	**0**	**0**

44. Driver was 1. Killed 2. Injured 3. Uninjured — Code: **3**

45. Was Driver in the Vehicle? 1. Yes 2. No — Code: **2**

47. Highway Vehicle Property Damage (est. dollar damage): **$600**

48. Total Number of Highway-Rail Crossing Users (include driver): **2**

50. Total Number of People on Train (include passengers and crew)

51. Is a Rail Equipment Accident / Incident Report Being Filed 1. Yes 2. No — Code: **2**

53a. Special Study Block | 53b. Special Study Block

54. Narrative Description

55. Typed Name and Title | 56. Signature | 57. Date

FORM FRA F 6180.57

* NOTE THAT ALL CASUALTIES MUST BE REPORTED ON FORM FRA F 6180.55A

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION (FRA)

HIGHWAY-RAIL GRADE CROSSING ACCIDENT/INCIDENT REPORT

OMB Approval No. 2130-0500

Name Of		Alphabetic Code	RR Accident/Incident No.
1. Reporting Railroad	Union Pacific RR Co. [UP]	1a. UP	1b. 1185OR203
2. Other Railroad Involved in Train Accident/Incident		2a.	2b.
3. Railroad Responsible for Track Maintenance	Union Pacific RR Co. [UP]	3a. UP	3b. 1185OR203

4. U.S. DOT-AAR Grade Crossing ID No.	5. Date of Accident/Incident	6. Time of Accident/Incident
809041U	11/10/85	08:30 PM

7. Nearest Railroad Station	8. Division	9. County	10. State Abbr.	Code
MINTHORN		UMATILLA	41	OR

11. City (if in a city): PENDLETON
12. Highway Name or No.: CAYUSE RIVER RD — ☑ Public ☐ Private

Highway User Involved

13. Type — Code: B
A. Auto B. Truck C. Truck-trailer D. Pick-up truck E. Van F. Bus G. School Bus H. Motorcycle J. Other Motor Vehicle K. Pedestrian M. Other (specify)

14. Vehicle Speed (est. mph at impact): 0

15. Direction (geographical) — Code: 2
1. North 2. South 3. East 4. West

16. Position — Code: 1
1. Stalled on crossing 2. Stopped on Crossing 3. Moving over crossing 4. Trapped

20a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials? — Code: 4
1. Highway User 2. Rail Equipment 3. Both 4. Neither

Rail Equipment Involved

17. Equipment — Code: 1
1. Train (units pulling) 2. Train (units pushing) 3. Train (standing) 4. Car(s) (moving) 5. Car(s) (standing) 6. Light loco(s) (moving) 7. Light loco(s) (standing) 8. Other (specify) A. Train pulling- RCL B. Train pushing- RCL C. Train standing- RCL

18. Position of Car Unit in Train: 1

19. Circumstance — Code: 1
1. Rail equipment struck highway user 2. Rail equipment struck by highway user

20b. Was there a hazardous materials release by — Code:
1. Highway User 2. Rail Equipment 3. Both 4. Neither

20c. State the name and quantity of the hazardous material released, if any

21. Temperature (specify if minus): 30 °F

22. Visibility (single entry) — Code: 4
1. Dawn 2. Day 3. Dusk 4. Dark

23. Weather (single entry) — Code: 6
1. Clear 2. Cloudy 3. Rain 4. Fog 5. Sleet 6. Snow

24. Type of Equipment Consist (single entry) — Code: 1
1. Freight train 2. Passenger train 3. Commuter train 4. Work train 5. Single car 6. Cut of cars 7. Yard/Switching 8. Light loco(s) 9. Main./inspect. car A. Spec. MoW Equip.

25. Track Type Used by Rail Equipment Involved — Code: 1
1. Main 2. Yard 3. Siding 4. Industry

26. Track Number or Name: MAINLINE

27. FRA Track Class	28. Number of Locomotive Units	29. Number of Cars	30. Consist Speed (Recorded if available)	Code	31. Time Table Direction	Code
3	5	98	R. Recorded E. Estimated 45 mph	R	1. North 2. South 3. East 4. West	4

32. Type of Crossing Warning — Code(s): 07, 08
1. Gates 2. Cantilever FLS 3. Standard FLS 4. Wig wags 5. Hwy. traffic signals 6. Audible 7. Crossbucks 8. Stop signs 9. Watchman 10. Flagged by crew 11. Other (specify) 12. None

33. Signaled Crossing Warning

34. Whistle Ban — Code:
1. Yes 2. No 3. Unknown

35. Location of Warning — Code: 1
1. Both Sides 2. Side of Vehicle Approach 3. Opposite Side of Vehicle Approach

36. Crossing Warning Interconnected with Highway Signals — Code: 2
1. Yes 2. No 3. Unknown

37. Crossing Illuminated by Street Lights or Special Lights — Code: 2
1. Yes 2. No 3. Unknown

38. Driver's Age

39. Driver's Gender — Code:
1. Male 2. Female

40. Driver Drove Behind or in Front of Train and Struck or was Struck by Second Train — Code: 2
1. Yes 2. No 3. Unknown

41. Driver — Code: 4
1. Drove around or thru the gate 2. Stopped and then proceeded 3. Did not stop 4. Stopped on crossing 5. Other (specify)

42. Driver Passed Standing Highway Vehicle — Code: 2
1. Yes 2. No 3. Unknown

43. View of Track Obscured by (primary obstruction) — Code: 8
1. Permanent Structure 2. Standing railroad equipment 3. Passing Train 4. Topography 5. Vegetation 6. Highway Vehicles 7. Other (specify) 8. Not Obstructed

Casualties to:	Killed	Injured
46. Highway-Rail Crossing Users	0	0
49. Railroad Employees	0	0
52. Passengers on Train	0	0

44. Driver was — Code: 3
1. Killed 2. Injured 3. Uninjured

45. Was Driver in the Vehicle? — Code: 2
1. Yes 2. No

47. Highway Vehicle Property Damage (est. dollar damage): $500

48. Total Number of Highway-Rail Crossing Users (include driver): 0

50. Total Number of People on Train (include passengers and crew)

51. Is a Rail Equipment Accident / Incident Report Being Filed — Code: 2
1. Yes 2. No

53a. Special Study Block

53b. Special Study Block

54. Narrative Description

55. Typed Name and Title

56. Signature

57. Date

FORM FRA F 6180.57

* NOTE THAT ALL CASUALTIES MUST BE REPORTED ON FORM FRA F 6180.55A

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION (FRA)

HIGHWAY-RAIL GRADE CROSSING ACCIDENT/INCIDENT REPORT

OMB Approval No. 2130-0500

Name Of		Alphabetic Code	RR Accident/Incident No.
1. Reporting Railroad	Union Pacific RR Co. [UP]	1a. UP	1b. 1282OR021
2. Other Railroad Involved in Train Accident/Incident		2a.	2b.
3. Railroad Responsible for Track Maintenance	Union Pacific RR Co. [UP]	3a. UP	3b. 1282OR021

4. U.S. DOT-AAR Grade Crossing ID No.	5. Date of Accident/Incident	6. Time of Accident/Incident
809037E	12/04/82	05:50 AM

7. Nearest Railroad Station	8. Division	9. County	10. State Abbr.	Code
MISSION		UMATILLA	41	OR

11. City (if in a city): MISSION
12. Highway Name or No.: PRIVATE XING — ☐ Public ☑ Private

Highway User Involved

13. Type — Code: A
A. Auto B. Truck C. Truck-trailer D. Pick-up truck E. Van F. Bus G. School Bus H. Motorcycle J. Other Motor Vehicle K. Pedestrian M. Other (specify)

14. Vehicle Speed (est. mph at impact): 0

15. Direction (geographical) — Code: 2
1. North 2. South 3. East 4. West

16. Position — Code: 1
1. Stalled on crossing 2. Stopped on Crossing 3. Moving over crossing 4. Trapped

20a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials? — Code: 4
1. Highway User 2. Rail Equipment 3. Both 4. Neither

Rail Equipment Involved

17. Equipment — Code: 1
1. Train (units pulling) 2. Train (units pushing) 3. Train (standing) 4. Car(s) (moving) 5. Car(s) (standing) 6. Light loco(s) (moving) 7. Light loco(s) (standing) 8. Other (specify) A. Train pulling- RCL B. Train pushing- RCL C. Train standing- RCL

18. Position of Car Unit in Train: 1

19. Circumstance — Code: 1
1. Rail equipment struck highway user 2. Rail equipment struck by highway user

20b. Was there a hazardous materials release by — Code:
1. Highway User 2. Rail Equipment 3. Both 4. Neither

20c. State the name and quantity of the hazardous material released, if any

21. Temperature (specify if minus)	22. Visibility (single entry) — Code	23. Weather (single entry) — Code
45 °F	1	3
	1. Dawn 2. Day 3. Dusk 4. Dark	1. Clear 2. Cloudy 3. Rain 4. Fog 5. Sleet 6. Snow

24. Type of Equipment Consist (single entry) — Code: 1
1. Freight train 2. Passenger train 3. Commuter train 4. Work train 5. Single car 6. Cut of cars 7. Yard/Switching 8. Light loco(s) 9. Main./inspect. car A. Spec. MoW Equip.

25. Track Type Used by Rail Equipment Involved — Code: 1
1. Main 2. Yard 3. Siding 4. Industry

26. Track Number or Name: SINGLE MAIN

27. FRA Track Class	28. Number of Locomotive Units	29. Number of Cars	30. Consist Speed (Recorded if available) — Code	31. Time Table Direction — Code
3	4	76	R. Recorded E. Estimated 40 mph — E	1. North 2. South 3. East 4. West — 4

32. Type of Crossing Warning — Code(s): 07, 08
1. Gates 2. Cantilever FLS 3. Standard FLS 4. Wig wags 5. Hwy. traffic signals 6. Audible 7. Crossbucks 8. Stop signs 9. Watchman 10. Flagged by crew 11. Other (specify) 12. None

33. Signaled Crossing Warning

34. Whistle Ban — Code:
1. Yes 2. No 3. Unknown

35. Location of Warning — Code: 1
1. Both Sides 2. Side of Vehicle Approach 3. Opposite Side of Vehicle Approach

36. Crossing Warning Interconnected with Highway Signals — Code: 2
1. Yes 2. No 3. Unknown

37. Crossing Illuminated by Street Lights or Special Lights — Code: 2
1. Yes 2. No 3. Unknown

38. Driver's Age	39. Driver's Gender — Code	40. Driver Drove Behind or in Front of Train and Struck or was Struck by Second Train — Code	41. Driver — Code
	1. Male 2. Female	2	4
		1. Yes 2. No 3. Unknown	1. Drove around or thru the gate 2. Stopped and then proceeded 3. Did not stop 4. Stopped on crossing 5. Other (specify)

42. Driver Passed Standing Highway Vehicle — Code: 2
1. Yes 2. No 3. Unknown

43. View of Track Obscured by (primary obstruction) — Code: 8
1. Permanent Structure 2. Standing railroad equipment 3. Passing Train 4. Topography 5. Vegetation 6. Highway Vehicles 7. Other (specify) 8. Not Obstructed

Casualties to:	Killed	Injured
46. Highway-Rail Crossing Users	0	1
49. Railroad Employees	0	0
52. Passengers on Train	0	0

44. Driver was — Code: 3
1. Killed 2. Injured 3. Uninjured

45. Was Driver in the Vehicle? — Code: 2
1. Yes 2. No

47. Highway Vehicle Property Damage (est. dollar damage): $0

48. Total Number of Highway-Rail Crossing Users (include driver): 2

50. Total Number of People on Train (include passengers and crew)

51. Is a Rail Equipment Accident / Incident Report Being Filed — Code: 2
1. Yes 2. No

53a. Special Study Block

53b. Special Study Block

54. Narrative Description

55. Typed Name and Title	56. Signature	57. Date

FORM FRA F 6180.57

* NOTE THAT ALL CASUALTIES MUST BE REPORTED ON FORM FRA F 6180.55A

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION (FRA)

HIGHWAY-RAIL GRADE CROSSING ACCIDENT/INCIDENT REPORT

OMB Approval No. 2130-0500

Name Of	Alphabetic Code	RR Accident/Incident No.
1. Reporting Railroad: **Union Pacific RR Co. [UP]**	1a. **UP**	1b. **0181OR206**
2. Other Railroad Involved in Train Accident/Incident	2a.	2b.
3. Railroad Responsible for Track Maintenance: **Union Pacific RR Co. [UP]**	3a. **UP**	3b. **0181OR206**

4. U.S. DOT-AAR Grade Crossing ID No.	5. Date of Accident/Incident	6. Time of Accident/Incident
809044P	**01/25/81**	**07:30 PM**

7. Nearest Railroad Station	8. Division	9. County	10. State Abbr.	Code
MINTHORN		**UMATILLA**	**41**	**OR**

11. City (if in a city): **MINTHORN**
12. Highway Name or No.: **PRIVATE CROSSING** ☐ Public ☑ Private

Highway User Involved

13. Type — A. Auto, B. Truck, C. Truck-trailer, D. Pick-up truck, E. Van, F. Bus, G. School Bus, H. Motorcycle, J. Other Motor Vehicle, K. Pedestrian, M. Other (specify) — Code: **A**

14. Vehicle Speed (est. mph at impact): **0**

15. Direction (geographical) 1. North 2. South 3. East 4. West — Code: **1**

16. Position 1. Stalled on crossing 2. Stopped on Crossing 3. Moving over crossing 4. Trapped — Code: **1**

20a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials? 1. Highway User 2. Rail Equipment 3. Both 4. Neither — Code: **4**

Rail Equipment Involved

17. Equipment — 1. Train (units pulling), 2. Train (units pushing), 3. Train (standing), 4. Car(s) (moving), 5. Car(s) (standing), 6. Light loco(s) (moving), 7. Light loco(s) (standing), 8. Other (specify), A. Train pulling- RCL, B. Train pushing- RCL, C. Train standing- RCL — Code: **1**

18. Position of Car Unit in Train: **1**

19. Circumstance 1. Rail equipment struck highway user 2. Rail equipment struck by highway user — Code: **1**

20b. Was there a hazardous materials release by 1. Highway User 2. Rail Equipment 3. Both 4. Neither — Code:

20c. State the name and quantity of the hazardous material released, if any

21. Temperature (specify if minus): **60** °F

22. Visibility (single entry) 1. Dawn 2. Day 3. Dusk 4. Dark — Code: **4**

23. Weather (single entry) 1. Clear 2. Cloudy 3. Rain 4. Fog 5. Sleet 6. Snow — Code: **1**

24. Type of Equipment Consist (single entry) 1. Freight train 2. Passenger train 3. Commuter train 4. Work train 5. Single car 6. Cut of cars 7. Yard/Switching 8. Light loco(s) 9. Main./inspect. car A. Spec. MoW Equip. — Code: **1**

25. Track Type Used by Rail Equipment Involved 1. Main 2. Yard 3. Siding 4. Industry — Code: **1**

26. Track Number or Name: **SINGLE MAIN**

27. FRA Track Class: **4**

28. Number of Locomotive Units: **4**

29. Number of Cars: **115**

30. Consist Speed (Recorded if available) R. Recorded E. Estimated: **45** mph — Code: **E**

31. Time Table Direction 1. North 2. South 3. East 4. West — Code: **4**

32. Type of Crossing Warning 1. Gates 2. Cantilever FLS 3. Standard FLS 4. Wig wags 5. Hwy. traffic signals 6. Audible 7. Crossbucks 8. Stop signs 9. Watchman 10. Flagged by crew 11. Other (specify) 12. None — Code(s): **07**

33. Signaled Crossing Warning

34. Whistle Ban 1. Yes 2. No 3. Unknown — Code:

35. Location of Warning 1. Both Sides 2. Side of Vehicle Approach 3. Opposite Side of Vehicle Approach — Code: **1**

36. Crossing Warning Interconnected with Highway Signals 1. Yes 2. No 3. Unknown — Code: **2**

37. Crossing Illuminated by Street Lights or Special Lights 1. Yes 2. No 3. Unknown — Code: **2**

38. Driver's Age

39. Driver's Gender 1. Male 2. Female — Code:

40. Driver Drove Behind or in Front of Train and Struck or was Struck by Second Train 1. Yes 2. No 3. Unknown — Code: **2**

41. Driver 1. Drove around or thru the gate 2. Stopped and then proceeded 3. Did not stop 4. Stopped on crossing 5. Other (specify) — Code: **4**

42. Driver Passed Standing Highway Vehicle 1. Yes 2. No 3. Unknown — Code: **2**

43. View of Track Obscured by (primary obstruction) 1. Permanent Structure 2. Standing railroad equipment 3. Passing Train 4. Topography 5. Vegetation 6. Highway Vehicles 7. Other (specify) 8. Not Obstructed — Code: **8**

Casualties to:	Killed	Injured
46. Highway-Rail Crossing Users	**0**	**0**
49. Railroad Employees	**0**	**0**
52. Passengers on Train	**0**	**0**

44. Driver was 1. Killed 2. Injured 3. Uninjured — Code: **3**

45. Was Driver in the Vehicle? 1. Yes 2. No — Code: **2**

47. Highway Vehicle Property Damage (est. dollar damage): **$1,000**

48. Total Number of Highway-Rail Crossing Users (include driver): **0**

50. Total Number of People on Train (include passengers and crew)

51. Is a Rail Equipment Accident / Incident Report Being Filed 1. Yes 2. No — Code: **2**

53a. Special Study Block

53b. Special Study Block

54. Narrative Description

55. Typed Name and Title

56. Signature

57. Date

FORM FRA F 6180.57

* NOTE THAT ALL CASUALTIES MUST BE REPORTED ON FORM FRA F 6180.55A

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION (FRA)

HIGHWAY-RAIL GRADE CROSSING ACCIDENT/INCIDENT REPORT

OMB Approval No. 2130-0500

Name Of		Alphabetic Code	RR Accident/Incident No.
1. Reporting Railroad	Union Pacific RR Co. [UP]	1a. UP	1b. 1280OR006
2. Other Railroad Involved in Train Accident/Incident	Amtrak [ATK]	2a. ATK	2b. 120980A
3. Railroad Responsible for Track Maintenance	Union Pacific RR Co. [UP]	3a. UP	3b. 1280OR006

4. U.S. DOT-AAR Grade Crossing ID No.	5. Date of Accident/Incident	6. Time of Accident/Incident
809034J	12/09/80	12:25 PM

7. Nearest Railroad Station	8. Division	9. County	10. State Abbr.	Code
MUNRA		UMATILLA	41	OR

11. City (if in a city): MUNRA
12. Highway Name or No.: PRIVATE CROSSING — ☐ Public ☑ Private

Highway User Involved

13. Type — Code: A
A. Auto B. Truck C. Truck-trailer D. Pick-up truck E. Van F. Bus G. School Bus H. Motorcycle J. Other Motor Vehicle K. Pedestrian M. Other (specify)

14. Vehicle Speed (est. mph at impact): 60

15. Direction (geographical) — Code: 2
1. North 2. South 3. East 4. West

16. Position — Code: 3
1. Stalled on crossing 2. Stopped on Crossing 3. Moving over crossing 4. Trapped

20a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials? — Code: 4
1. Highway User 2. Rail Equipment 3. Both 4. Neither

Rail Equipment Involved

17. Equipment — Code: 1
1. Train (units pulling) 2. Train (units pushing) 3. Train (standing) 4. Car(s) (moving) 5. Car(s) (standing) 6. Light loco(s) (moving) 7. Light loco(s) (standing) 8. Other (specify) A. Train pulling- RCL B. Train pushing- RCL C. Train standing- RCL

18. Position of Car Unit in Train: 1

19. Circumstance — Code: 1
1. Rail equipment struck highway user 2. Rail equipment struck by highway user

20b. Was there a hazardous materials release by — Code:
1. Highway User 2. Rail Equipment 3. Both 4. Neither

20c. State the name and quantity of the hazardous material released, if any

21. Temperature (specify if minus): 32 °F

22. Visibility (single entry) — Code: 2
1. Dawn 2. Day 3. Dusk 4. Dark

23. Weather (single entry) — Code: 1
1. Clear 2. Cloudy 3. Rain 4. Fog 5. Sleet 6. Snow

24. Type of Equipment Consist (single entry) — Code: 2
1. Freight train 2. Passenger train 3. Commuter train 4. Work train 5. Single car 6. Cut of cars 7. Yard/Switching 8. Light loco(s) 9. Main./inspect. car A. Spec. MoW Equip.

25. Track Type Used by Rail Equipment Involved — Code: 1
1. Main 2. Yard 3. Siding 4. Industry

26. Track Number or Name: SINGLE MAIN

27. FRA Track Class: 4

28. Number of Locomotive Units: 1

29. Number of Cars: 5

30. Consist Speed (Recorded if available) — Code: E
R. Recorded E. Estimated 40 mph

31. Time Table Direction — Code: 4
1. North 2. South 3. East 4. West

32. Type of Crossing Warning
1. Gates 2. Cantilever FLS 3. Standard FLS 4. Wig wags 5. Hwy. traffic signals 6. Audible 7. Crossbucks 8. Stop signs 9. Watchman 10. Flagged by crew 11. Other (specify) 12. None
Code(s): 07

33. Signaled Crossing Warning

34. Whistle Ban — Code:
1. Yes 2. No 3. Unknown

35. Location of Warning — Code: 1
1. Both Sides 2. Side of Vehicle Approach 3. Opposite Side of Vehicle Approach

36. Crossing Warning Interconnected with Highway Signals — Code: 2
1. Yes 2. No 3. Unknown

37. Crossing Illuminated by Street Lights or Special Lights — Code: 2
1. Yes 2. No 3. Unknown

38. Driver's Age

39. Driver's Gender — Code:
1. Male 2. Female

40. Driver Drove Behind or in Front of Train and Struck or was Struck by Second Train — Code: 2
1. Yes 2. No 3. Unknown

41. Driver — Code: 3
1. Drove around or thru the gate 2. Stopped and then proceeded 3. Did not stop 4. Stopped on crossing 5. Other (specify)

42. Driver Passed Standing Highway Vehicle — Code: 2
1. Yes 2. No 3. Unknown

43. View of Track Obscured by (primary obstruction) — Code: 8
1. Permanent Structure 2. Standing railroad equipment 3. Passing Train 4. Topography 5. Vegetation 6. Highway Vehicles 7. Other (specify) 8. Not Obstructed

Casualties to:	Killed	Injured
46. Highway-Rail Crossing Users	0	2
49. Railroad Employees	0	0
52. Passengers on Train	0	0

44. Driver was — Code: 2
1. Killed 2. Injured 3. Uninjured

45. Was Driver in the Vehicle? — Code: 1
1. Yes 2. No

47. Highway Vehicle Property Damage (est. dollar damage): $1,000

48. Total Number of Highway-Rail Crossing Users (include driver): 2

50. Total Number of People on Train (include passengers and crew)

51. Is a Rail Equipment Accident / Incident Report Being Filed — Code: 2
1. Yes 2. No

53a. Special Study Block

53b. Special Study Block

54. Narrative Description

55. Typed Name and Title

56. Signature

57. Date

FORM FRA F 6180.57

* NOTE THAT ALL CASUALTIES MUST BE REPORTED ON FORM FRA F 6180.55A

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION (FRA)

HIGHWAY-RAIL GRADE CROSSING ACCIDENT/INCIDENT REPORT

OMB Approval No. 2130-0500

Name Of		Alphabetic Code	RR Accident/Incident No.
1. Reporting Railroad	**Union Pacific RR Co. [UP]**	1a. **UP**	1b. **0780OR205**
2. Other Railroad Involved in Train Accident/Incident		2a.	2b.
3. Railroad Responsible for Track Maintenance	**Union Pacific RR Co. [UP]**	3a. **UP**	3b. **0780OR205**

4. U.S. DOT-AAR Grade Crossing ID No.	5. Date of Accident/Incident	6. Time of Accident/Incident
809046D	**07/16/80**	**04:55 PM**

7. Nearest Railroad Station	8. Division	9. County	10. State Abbr.	Code
CAYUSE		**UMATILLA**	**41**	**OR**

11. City (if in a city)	12. Highway Name or No.	
CAYUSE	**CAYUSE XING**	☑ Public ☐ Private

Highway User Involved

13. Type — A. Auto, B. Truck, C. Truck-trailer, D. Pick-up truck, E. Van, F. Bus, G. School Bus, H. Motorcycle, J. Other Motor Vehicle, K. Pedestrian, M. Other (specify) — Code: **M**

14. Vehicle Speed (est. mph at impact): **40**

15. Direction (geographical) 1. North 2. South 3. East 4. West — Code: **3**

16. Position 1. Stalled on crossing 2. Stopped on Crossing 3. Moving over crossing 4. Trapped — Code: **3**

20a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials? 1. Highway User 2. Rail Equipment 3. Both 4. Neither — Code: **4**

Rail Equipment Involved

17. Equipment 1. Train (units pulling) 2. Train (units pushing) 3. Train (standing) 4. Car(s) (moving) 5. Car(s) (standing) 6. Light loco(s) (moving) 7. Light loco(s) (standing) 8. Other (specify) A. Train pulling- RCL B. Train pushing- RCL C. Train standing- RCL — Code: **1**

18. Position of Car Unit in Train: **1**

19. Circumstance 1. Rail equipment struck highway user 2. Rail equipment struck by highway user — Code: **1**

20b. Was there a hazardous materials release by 1. Highway User 2. Rail Equipment 3. Both 4. Neither — Code:

20c. State the name and quantity of the hazardous material released, if any

21. Temperature (specify if minus): **85** °F

22. Visibility (single entry) 1. Dawn 2. Day 3. Dusk 4. Dark — Code: **2**

23. Weather (single entry) 1. Clear 2. Cloudy 3. Rain 4. Fog 5. Sleet 6. Snow — Code: **1**

24. Type of Equipment Consist (single entry) 1. Freight train 2. Passenger train 3. Commuter train 4. Work train 5. Single car 6. Cut of cars 7. Yard/Switching 8. Light loco(s) 9. Main./inspect. car A. Spec. MoW Equip. — Code: **4**

25. Track Type Used by Rail Equipment Involved 1. Main 2. Yard 3. Siding 4. Industry — Code: **1**

26. Track Number or Name: **SINGLE MAIN**

27. FRA Track Class	28. Number of Locomotive Units	29. Number of Cars	30. Consist Speed (Recorded if available) R. Recorded E. Estimated	Code	31. Time Table Direction 1. North 2. South 3. East 4. West	Code
4	**4**	**40**	**40** mph	**E**		**3**

32. Type of Crossing Warning 1. Gates 2. Cantilever FLS 3. Standard FLS 4. Wig wags 5. Hwy. traffic signals 6. Audible 7. Crossbucks 8. Stop signs 9. Watchman 10. Flagged by crew 11. Other (specify) 12. None

Code(s): **08**

33. Signaled Crossing Warning

34. Whistle Ban 1. Yes 2. No 3. Unknown — Code:

35. Location of Warning 1. Both Sides 2. Side of Vehicle Approach 3. Opposite Side of Vehicle Approach — Code: **1**

36. Crossing Warning Interconnected with Highway Signals 1. Yes 2. No 3. Unknown — Code: **2**

37. Crossing Illuminated by Street Lights or Special Lights 1. Yes 2. No 3. Unknown — Code: **2**

38. Driver's Age

39. Driver's Gender 1. Male 2. Female — Code:

40. Driver Drove Behind or in Front of Train and Struck or was Struck by Second Train 1. Yes 2. No 3. Unknown — Code: **2**

41. Driver 1. Drove around or thru the gate 2. Stopped and then proceeded 3. Did not stop 4. Stopped on crossing 5. Other (specify) — Code: **3**

42. Driver Passed Standing Highway Vehicle 1. Yes 2. No 3. Unknown — Code: **2**

43. View of Track Obscured by (primary obstruction) 1. Permanent Structure 2. Standing railroad equipment 3. Passing Train 4. Topography 5. Vegetation 6. Highway Vehicles 7. Other (specify) 8. Not Obstructed — Code: **8**

Casualties to:	Killed	Injured
46. Highway-Rail Crossing Users	**0**	**0**
49. Railroad Employees	**0**	**0**
52. Passengers on Train	**0**	**0**

44. Driver was 1. Killed 2. Injured 3. Uninjured — Code: **3**

45. Was Driver in the Vehicle? 1. Yes 2. No — Code: **1**

47. Highway Vehicle Property Damage (est. dollar damage): **$2,000**

48. Total Number of Highway-Rail Crossing Users (include driver): **1**

50. Total Number of People on Train (include passengers and crew)

51. Is a Rail Equipment Accident / Incident Report Being Filed 1. Yes 2. No — Code: **2**

53a. Special Study Block

53b. Special Study Block

54. Narrative Description

55. Typed Name and Title	56. Signature	57. Date

FORM FRA F 6180.57

* NOTE THAT ALL CASUALTIES MUST BE REPORTED ON FORM FRA F 6180.55A

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION (FRA)

HIGHWAY-RAIL GRADE CROSSING ACCIDENT/INCIDENT REPORT

OMB Approval No. 2130-0500

Name Of		Alphabetic Code	RR Accident/Incident No.
1. Reporting Railroad	Union Pacific RR Co. [UP]	1a. UP	1b. 0779OR221
2. Other Railroad Involved in Train Accident/Incident		2a.	2b.
3. Railroad Responsible for Track Maintenance	Union Pacific RR Co. [UP]	3a. UP	3b. 0779OR221

4. U.S. DOT-AAR Grade Crossing ID No.	5. Date of Accident/Incident	6. Time of Accident/Incident
809044P	07/05/79	01:45 AM

7. Nearest Railroad Station	8. Division	9. County	10. State Abbr.	Code
MINTHORN		UMATILLA	41	OR

11. City (if in a city): MINTHORN
12. Highway Name or No.: OLD RIVER RD
☑ Public ☐ Private

Highway User Involved

13. Type — A. Auto, B. Truck, C. Truck-trailer, D. Pick-up truck, E. Van, F. Bus, G. School Bus, H. Motorcycle, J. Other Motor Vehicle, K. Pedestrian, M. Other (specify) — Code: A

14. Vehicle Speed (est. mph at impact): 0

15. Direction (geographical) — 1. North 2. South 3. East 4. West — Code: 2

16. Position — 1. Stalled on crossing, 2. Stopped on Crossing, 3. Moving over crossing, 4. Trapped — Code: 2

20a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials? — 1. Highway User 2. Rail Equipment 3. Both 4. Neither — Code: 4

Rail Equipment Involved

17. Equipment — 1. Train (units pulling), 2. Train (units pushing), 3. Train (standing), 4. Car(s) (moving), 5. Car(s) (standing), 6. Light loco(s) (moving), 7. Light loco(s) (standing), 8. Other (specify), A. Train pulling- RCL, B. Train pushing- RCL, C. Train standing- RCL — Code: 1

18. Position of Car Unit in Train: 1

19. Circumstance — 1. Rail equipment struck highway user, 2. Rail equipment struck by highway user — Code: 1

20b. Was there a hazardous materials release by — 1. Highway User 2. Rail Equipment 3. Both 4. Neither — Code:

20c. State the name and quantity of the hazardous material released, if any

21. Temperature (specify if minus): 60 °F

22. Visibility (single entry) — 1. Dawn 2. Day 3. Dusk 4. Dark — Code: 4

23. Weather (single entry) — 1. Clear 2. Cloudy 3. Rain 4. Fog 5. Sleet 6. Snow — Code: 1

24. Type of Equipment Consist (single entry) — 1. Freight train, 2. Passenger train, 3. Commuter train, 4. Work train, 5. Single car, 6. Cut of cars, 7. Yard/Switching, 8. Light loco(s), 9. Main./inspect. car, A. Spec. MoW Equip. — Code: 1

25. Track Type Used by Rail Equipment Involved — 1. Main 2. Yard 3. Siding 4. Industry — Code: 1

26. Track Number or Name: SINGLE MAIN

27. FRA Track Class	28. Number of Locomotive Units	29. Number of Cars	30. Consist Speed (Recorded if available)	Code	31. Time Table Direction	Code
5	1	45	R. Recorded / E. Estimated 45 mph	E	1. North 2. South 3. East 4. West	4

32. Type of Crossing Warning — 1. Gates, 2. Cantilever FLS, 3. Standard FLS, 4. Wig wags, 5. Hwy. traffic signals, 6. Audible, 7. Crossbucks, 8. Stop signs, 9. Watchman, 10. Flagged by crew, 11. Other (specify), 12. None

Code(s): 05, 07

33. Signaled Crossing Warning: 20 sec warn min (1);

34. Whistle Ban — 1. Yes 2. No 3. Unknown — Code:

35. Location of Warning — 1. Both Sides, 2. Side of Vehicle Approach, 3. Opposite Side of Vehicle Approach	Code	36. Crossing Warning Interconnected with Highway Signals — 1. Yes 2. No 3. Unknown	Code	37. Crossing Illuminated by Street Lights or Special Lights — 1. Yes 2. No 3. Unknown	Code
	1		1		1

38. Driver's Age	39. Driver's Gender — 1. Male, 2. Female	Code	40. Driver Drove Behind or in Front of Train and Struck or was Struck by Second Train — 1. Yes 2. No 3. Unknown	Code	41. Driver — 1. Drove around or thru the gate, 2. Stopped and then proceeded, 3. Did not stop, 4. Stopped on crossing, 5. Other (specify)	Code
				2		4

42. Driver Passed Standing Highway Vehicle — 1. Yes 2. No 3. Unknown — Code: 2

43. View of Track Obscured by (primary obstruction) — 1. Permanent Structure, 2. Standing railroad equipment, 3. Passing Train, 4. Topography, 5. Vegetation, 6. Highway Vehicles, 7. Other (specify), 8. Not Obstructed — Code: 8

Casualties to:	Killed	Injured
46. Highway-Rail Crossing Users	0	0
49. Railroad Employees	0	0
52. Passengers on Train	0	0

44. Driver was — 1. Killed 2. Injured 3. Uninjured — Code: 3

45. Was Driver in the Vehicle? — 1. Yes 2. No — Code: 2

47. Highway Vehicle Property Damage (est. dollar damage): $1,000

48. Total Number of Highway-Rail Crossing Users (include driver): 0

50. Total Number of People on Train (include passengers and crew):

51. Is a Rail Equipment Accident / Incident Report Being Filed — 1. Yes 2. No — Code: 2

53a. Special Study Block

53b. Special Study Block

54. Narrative Description

55. Typed Name and Title	56. Signature	57. Date

FORM FRA F 6180.57

* NOTE THAT ALL CASUALTIES MUST BE REPORTED ON FORM FRA F 6180.55A


Britt

Table 3-7: Severe Winter Weather in Umatilla County

Date	Type	Location	Comments	Information Source
Jan 1960	Wind – Cold Weather	County	2 days	SHELDUS
Nov 1961	Wind – Cold Weather	County	3 days	SHELDUS
Feb 1963	Cold Weather	County	2 days – flooding from rapid snow melt	SHELDUS
Jan 1964	Wind – Cold Weather	County	3 days	SHELDUS
Dec 1965	Winter Weather	County	2 days	SHELDUS
Dec 27, 1968 Jan 3, 1969	Snow – Freezing Rain	County	Several days of cold weather	SHELDUS
Jan 25, 1969	Winter Weather	County	5 days	SHELDUS
1971	Cold Spell	County	2 storms in 1971	SHELDUS
1973	Winter Weather	County		SHELDUS
Jan 1980	Winter Weather	County	Snow	SHELDUS
Nov 1983	Winter Weather	County	Snow – Extreme Cold	SHELDUS
Nov 1 1984	Wind Severe Weather	County	2 days	SHELDUS
Nov 26, 1984	Winter Weather	County	2 days	SHELDUS
Feb 1989	Winter Weather	County	1 day	SHELDUS
Jan 1997	Winter Weather	County	2 day ice storm	SHELDUS
Nov 1998	Winter Storm	County	2 days of heavy snow	SHELDUS
Dec 1998	Winter Storm	County	1 day	SHELDUS
April 1999	Heavy Snow	County	1 day	SHELDUS
Nov 1999	Heavy Rain – Snow	Meacham	Closed I-84	NWS
Dec. 2003 – Jan 2004	Heavy Snow	Blue Mtns	2 feet of snow – closed I-84	OR State Hazard Mitigation Plan
Nov 24-25, 2006	Heavy Snow	Meacham	3 days of snowfall 10 inches at Meacham	NWS Pendleton
Jan 4-5, 2007	Heavy Snow	Blue Mtns	2 days of snowfall Blues and Columbia Basin	NWS Pendleton
Mar 1, 2007	Heavy Snow	Blue Mtns	1 day 6-16 inches of snow	NWS Pendleton
Nov 18, 2007	Heavy Snow	Blue Mtns	7.5 " of snow at Meacham, snow throughout Basin	NWS Pendleton
Nov 28, 2007	Heavy Snow	Basin & Blues	12 " - Meacham, 4.8" - Pendleton, 7" - Helix	NWS Pendleton
Dec 6, 2007	Heavy Snow	Basin & Blues	4.8" Pendleton, 4.5" Athena, 5.7 Pilot Rock	NWS Pendleton
Dec 19, 2007	Heavy Snow	Blue Mtns	10-12" in Northern Blues	NWS Pendleton
Dec 26, 2007	Heavy Snow	Blue Mtns	10" - Meacham	NWS Pendleton
Dec 27, 2007	Heavy Snow	Basin & Blues	15"- Meacham, I-84 closed in Grand Ronde Valley	NWS Pendleton
Jan 08, 2008	Heavy Snow	Basin & Blues	8" Meacham, 10" Battle Mountain	NWS Pendleton
Jan 19, 2008	Heavy Snow	Blues	10" Meacham	NWS Pendleton
Jan 26, 2008	Heavy Snow	Basin & Blues	13" - Bingham Springs, 14" - Meacham, 9"- Pendleton.	NWS Pendleton

			I-84 closed at Arlington for 5 hours, multiple vehicles	
Jan 29, 2008	Heavy Snow	Blues	8" Meacham	NWS Pendleton
Jan 30, 2008	Heavy Snow	Blues	9" Meacham, I-84 closed at LaGrande	NWS Pendleton
Feb 02, 2008	Heavy Snow	Basin & Blues	4.3 " Pendleton Expt. Station, 4" Helix	NWS Pendleton
Mar 13, 2008	Heavy Snow	Blues	8" Northern Blues	NWS Pendleton
Mar 26, 2008	Heavy Snow	Blues	12" Northern Blues	NWS Pendleton
June 10, 2008	Heavy Snow	Blues	14" Meacham	NWS Pendleton
Dec 12-13, 2008	Heavy Snow	Basin & Blues	2 days of heavy snowfall, 8" Kamela, 10" Meacham, 8" Pilot Rock, 5.5" Mission	NWS Pendleton
Dec 17, 2008	Heavy Snow	Basin & Blues	5" Pendleton, 8" Bingham Springs	NWS Pendleton
Dec 20-21, 2008	Heavy Snow	Basin & Blues	2 days of heavy snowfall 5" Holdman, 12" Kamela, 7" Milton F.	NWS Pendleton
Dec 24-28, 2008	Heavy Snow/Blizzard	Basin & Blues	4 days of heavy snowfall	NWS Pendleton
Mar 24, 2009	Heavy Snow	Blues	11" Meacham	NWS Pendleton
Apr 1-2, 2009	Heavy Snow	Blues	2 days of heavy snow, 8.5 " Meacham	NWS Pendleton
Dec 12, 2009	Heavy Snow	Basin & Blues	5" Pendleton, 5.5" Athena, 12" Meacham, 14" Bingham Springs	NWS Pendleton
Dec 14, 2009	Heavy Snow	Basin & Blues	10-14" Meacham, 14" Bingham Spr., West-side freezing rain. I-84 closed LaGrande to Arlington	NWS Pendleton
Jan 22, 2010	Heavy Snow	Blues	11.5" Emigrant Spr. Park, 10.5" Meacham	NWS Pendleton
Mar 12, 2010	Heavy Snow	Blues	6.5" Ukiah, 9-10" Meacham,	NWS Pendleton
Apr 27, 2010	Heavy Snow	Blues	6" Tollgate	NWS Pendleton
Nov 21-24, 2010	Heavy Snow & record setting cold	Basin & Blues	Snow – 4" Celilo, 6" Irrigon 7" Helix. Temp - -24 Meacham, -7 Pendleton,	NWS Pendleton
Nov 30, 2010	Heavy Snow	Blues	14" Bingham Spr., 10.4 Meacham	NWS Pendleton
Dec 27-30, 2010	Heavy Snow	Basin & Blues	21" Kamela, 40" Meacham, 12" Weston. Heavy wet snow caused tree damage and power outages. 800 OTEC customers out of power for 47 hours. 3 men and 1 3 year old child were stuck and stranded near Foreman Point, Warm Springs	NWS Pendleton
Feb 7, 2011	Heavy Snow	Blues	10.2 " Meacham	NWS Pendleton

Feb 15, 2011	Heavy Snow	Basin & Blues		NWS Pendleton
Feb 22-24	Heavy Snow	Blues		NWS Pendleton
Feb 28, 2011	Heavy Snow	Blues	9” Rowena, 11” Bingham Spr.	NWS Pendleton
Jan 17-19, 2012	Heavy Snow/Freezing Rain	Basin & Blues	8” Kamela, 4” Athena, 4” Pendleton, 10” Meacham, 4” Cayuse. Freezing rain .25” Pendleton, .25” Athena, Numerous vehicle accidents with injuries, down trees, closed roads including I-84.	NWS Pendleton
Mar 1, 2012	Winter Weather	Blues	Icy roads closed I-84 LaGrande to Pendleton	NWS Pendleton
Apr 4, 2012	Heavy Snow	Basin & Blues	7” Meacham, 7” Bingham Spr., 4” Athena	NWS Pendleton
Dec 8, 2012	Heavy Snow	Basin & Blues	8” Meacham w/Blizzard conditions, I-84 closed for accidents near Meacham	NWS Pendleton
Jan 28, 2013	Heavy Snow	Basin & Blues	15” Meacham, 12” Kamela	NWS Pendleton
Nov 15, 2013	Heavy Snow	Blues	8” Meacham	NWS Pendleton
Dec 8, 2013	Extreme Cold/Wind-chill	Basin& Blues	Very cold temperatures and dangerous wind chill	NWS Pendleton
Dec 20, 2013	Heavy Snow	Blues	9” Bingham Spr.	NWS Pendleton
Feb 6, 2014	Heavy Snow	Basin & Blues	4” Hermiston, 4” Pendleton, 4” Milton_	NWS Pendleton
Feb 7-9, 2014	Heavy Snow	Basin & Blues	13” Warm Spr., 12” Dalles, 10” Pilot Rock, 9.5 Athena, 8” Milton-Freewater	NWS Pendleton

TABLE 3-8: Monthly Total Snowfall for Pendleton Area, OR[i]

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1970	9.9	3.8	1.3	T	T	0.0	0.0	0.0	0.0	0.0	1.6	2.3	18.9
1971	4.0	0.6	4.9	T	T	0.0	0.0	0.0	0.0	1.9	T	11.8	23.2
1972	3.6	6.2	0.1	1.1	0.0	0.0	0.0	0.0	0.0	T	T	12.6	23.6
1973	2.2	5.9	T	0.1	0.0	0.0	0.0	0.0	0.0	3.2	9.1	5.3	25.8
1974	2.6	0.5	T	T	0.0	0.0	0.0	0.0	0.0	0.0	T	T	3.1
1975	16.6	3.3	T	2.2	T	0.0	0.0	0.0	0.0	0.0	5.2	3.0	30.3
1976	0.3	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.7
1977	3.1	0.5	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.5	11.5	24.0
1978	6.1	T	3.9	0.0	T	0.0	0.0	0.0	0.0	0.0	9.0	7.4	26.4
1979	14.7	2.2	T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	T	21.2
1980	16.6	0.9	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.7	26.1
1981	3.6	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	5.1	10.5
1982	5.7	1.5	1.9	T	0.0	0.0	0.0	0.0	0.0	0.0	T	1.6	10.7
1983	0.2	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	T	26.6	27.7
1984	1.0	1.2	T	T	0.0	0.0	0.0	0.0	0.0	0.0	T	6.2	8.4
1985	0.8	12.7	0.6	T	0.0	0.0	0.0	0.0	0.0	0.0	14.9	9.1	38.1
1986	T	7.6	0.0	0.0	T	0.0	0.0	0.0	0.0	0.0	1.2	6.8	15.6
1987	5.8	0.0	T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.3	8.4
1988	10.6	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	T	T	12.1
1989	4.3	4.9	4.0	0.0	T	0.0	0.0	0.0	0.0	0.0	0.0	1.0	14.2
1990	T	2.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	T	6.4	9.7
1991	1.6	0.0	0.6	T	0.0	0.0	0.0	0.0	0.0	2.3	1.0	T	5.5
1992	0.8	T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	7.6	8.6
1993	25.1	14.8	1.8	T	T	0.0	T	0.0	0.0	0.0	0.7	0.4	42.8
1994	T	16.8	0.2	0.0	0.0	T	0.0	0.0	0.0	0.0	0.6	3.8	21.4
1995	2.0	7.2	T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.2
1996	0.0	2.6	M	M	0.0	M	M	M	M	T	1.0	10.1	13.7
1997	3.2	0.8	T	T	M	M	M	M	M	M	M	4.2	8.2
1998	M	0.0	M	M	M	M	M	M	0.0	0.0	M	0.8	0.8
1999	0.0	2.4	T	T	T	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.9
2000	5.7	4.5	1.0	0.0	T	0.0	0.0	0.0	0.0	0.0	0.7	2.5	14.4

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2001	3.1	0.5	T	T	T	T	0.0	0.0	0.0	0.0	T	3.0	6.6
2002	1.5	T	0.3	0.0	0.0	T	T	0.0	0.0	T	0.0	2.1	3.9
2003	0.3	T	T	T	0.0	0.0	0.0	0.0	0.0	T	0.1	13.9	14.3
2004	10.0	2.2	T	0.0	T	0.0	0.0	0.0	0.0	0.0	0.4	0.8	13.4
2005	2.7	1.2	T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.6	5.7
2006	T	0.0	T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	T	0.8
2007	1.2	2.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.7	8.1	20.8
2008	10.7	4.3	2.8	T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.5	50.3
2009	6.6	4.7	1.5	0.5	T	0.0	0.0	0.0	0.0	0.0	T	6.7	20.0
2010	0.0	0.0	T	T	T	0.0	0.0	0.0	0.0	0.0	8.6	9.8	18.4
2011	4.0	1.3	T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.1	7.0
2012	2.7	0.9	2.3	T	0.0	T	0.0	0.0	0.0	T	T	1.8	7.7
2013	0.1	0.0	0.1	T	0.0	0.0	0.0	T	0.0	T	0.0	6.5	6.7
2014	T	14.2	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	M	M	15.2
Mean	4.4	3.0	0.8	0.1	T	T	T	T	0.0	0.2	1.9	5.4	15.5
Max	25.1	16.8	4.9	2.2	T	T	T	T	0.0	3.2	14.9	32.5	50.3
Min	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8

[i] NOAA National Weather Service, Pendleton, OR

1 IA 1 – Severe Weather (including Landslides)

Severe Weather Incident Checklist		
Phase of Activity	**Action Items**	**Supplemental Information**
PRE-INCIDENT PHASE	❒ Continue to maintain and revise, as needed, applicable response plans pertaining to severe weather and landslides, including the EOP and supporting procedures/plans.	
	❒ Monitor weather and flood reports.	
	❒ Pre-designate evacuation routes and alternate routes for areas vulnerable to landslides or other hazards relating to severe weather.	
	❒ Conduct pre-incident planning for sheltering and evacuation related to severe weather and landslides.	
	▪ Prepare map(s) and scripts for use by local television station(s) during emergency broadcasts. Include release instructions.	
	▪ Prepare radio messages for use by local radio stations during emergency broadcasts. Include release instructions.	
	❒ Have CTUIR personnel participate in necessary training and exercises, as determined by the Emergency Management Coordinator in conjunction with lead agencies and coordinators.	
	❒ Participate in CTUIR and Umatilla County severe weather and landslide preparedness activities, seeking understanding of interactions with participating agencies in a severe weather scenario.	
	❒ Ensure that emergency contact lists are updated and establish a pre-event duty roster allowing for 24/7 operational support for the CTUIR EOC.	
	❒ Ensure that landslide and flood response equipment and personnel inventories are current for the CTUIR. Test and maintain response and communications equipment. Keep a stock of necessary response supplies.	
	❒ Inform the Emergency Management Coordinator of any major developments that could adversely affect response operations (e.g., personnel shortages, loss of firefighting equipment, etc.).	
	❒ Work with the CTUIR Planning Department and, as applicable, Umatilla County Planning Department for establishment of appropriate infrastructure protection measures in landslide/flood-prone areas.	
	❒ Provide public safety information and educational programs regarding emergency preparedness and response.	

Severe Weather Incident Checklist		
Phase of Activity	**Action Items**	**Supplemental Information**
RESPONSE PHASE	❒ Activate the EOP when severe weather, and/or landslides incidents pose threats to the CTUIR.	
	❒ Activate the appropriate EOCs and establish Incident Command. For larger events that cross multiple jurisdictions, establish a Unified Command. Regional city and/or Umatilla County EOCs may be staffed. Staffing levels vary with the complexity and needs of the response. At a minimum, the IC, all Section Chiefs, the Resource Coordinator, and management support positions will most likely be needed.	
	❒ Estimate emergency staffing levels and request personnel support.	
	❒ Ensure that action is taken to protect personnel and emergency equipment from possible damage by severe weather, landslides, or floodwaters.	
	❒ Develop work assignments for ICS positions (recurring).	*ICS Form 203: Organization Assignment List*
	❒ Notify supporting agencies as well as the Tribal Executive Director.	
	▪ Identify other local, Umatilla County, and regional agencies/entities that may be able to mobilize resources to support local response efforts and EOC staffing.	
	❒ Determine the type, scope, and extent of the incident (recurring). Verify reports and obtain estimates of the area that may be affected. Obtain status of impacts within the County.	*ICS Form 209: Incident Status Summary*
	▪ Notify command staff, support agencies, adjacent jurisdictions, agency leads/coordinators, and liaisons of any situational changes.	
	❒ Develop and initiate shift rotation plans, including briefing of replacements during shift changes.	
	▪ Dedicate time during each shift to preparing for shift change briefings.	*ICS Form 201: Incident Briefing*
	❒ Confirm or establish communications links among local and County EOCs, and other Agency Operations Centers. Confirm operable phone numbers and verify functionality of alternate communications resources.	
	❒ Ensure that all required notifications have been completed. Consider other local, Umatilla County, and regional agencies/entities that may be affected by the incident. Notify them of the status.	*Established emergency contact lists maintained at the EOC*
	❒ Manage and coordinate interagency functions. Providing multi-agency coordination is the primary goal. Assimilate into a Unified Command structure if the scope of the incident so dictates.	

Severe Weather Incident Checklist		
Phase of Activity	**Action Items**	**Supplemental Information**
	❒ Implement local plans and procedures for severe weather, landslide, and/or flood operations. Ensure that copies of all documents are available to response personnel. Implement agency-specific protocols and SOPs.	*Local, agency, and facility-specific SOPs*
	❒ Obtain current and forecasted weather to project potential damage and determine the affected area (recurring).	
	❒ Determine the need to conduct evacuations and sheltering activities (recurring).	*See ESF 6, Mass Care, Emergency Assistance, Housing and Human Services*
	❒ Determine the need for additional resources and request them as necessary through appropriate channels (recurring).	
	❒ Submit a request for an emergency/disaster declaration, as applicable.	*See Chapter 1 of the Basic Plan*
	❒ Activate mutual aid agreements. Activation includes placing backup teams on standby and alerting resource suppliers of both potential and current needs.	
	❒ Coordinate resource access, deployment, and storage in the operational area. Resources to coordinate include equipment, personnel, facilities, supplies, procedures, and communications. Track resources as they are dispatched and/or used.	*ICS Resource Tracking Forms*
	❒ Develop plans and procedures for registering mutual aid and other first responders as they arrive on the scene and receive deployment orders.	
	❒ Establish a JIC and designate a lead PIO for the CTUIR.	
	❒ Formulate emergency public information messages and media responses, utilizing “one message, many voices” concepts (recurring).	
	❒ Public information will be reviewed by the IC, or designee. Information will be approved for release by the IC and Lead PIO before dissemination to the public.	
	❒ Record all EOC and individual personnel activities (recurring). All assignments, person(s) responsible, and actions taken should be documented in logbooks.	*EOC Planning Section Position Checklist*
	❒ Record all incoming and outgoing messages (recurring). All messages, and the names of those sending or receiving them should be documented as part of the EOC log.	
	❒ Develop situation reports (recurring). At regular intervals, the EOC Director and staff will assemble a situation report.	*ICS Form 209: Incident Status Summary*
	❒ Develop and update the IAP (recurring). This document is developed by the Planning Section and approved by the IC. The IAP should be discussed at regular intervals and modified as the situation changes.	*ICS Form 202: Incident Objectives*

Severe Weather Incident Checklist		
Phase of Activity	**Action Items**	**Supplemental Information**
	❒ Implement objectives and tasks outlined in the IAP (recurring).	
	❒ Coordinate with private sector partners as needed.	
	❒ Ensure that all reports of injuries, deaths, and major equipment damage accrued during response activities are communicated to the IC and/or the Safety Officer.	
RECOVERY/ DEMOBILIZATION PHASE	❒ Ensure an orderly demobilization of emergency operations, in accordance with current demobilization plans.	*ICS Form 221 - Demobilization Plan*
	❒ Once the threat to public safety is eliminated, conduct cleanup and recovery operations.	
	❒ Activate, if necessary, the appropriate recovery strategies and COOP/COG plans.	*See ESF 14 – Long-Term Community Recovery and COOP/COG Plans as developed*
	❒ Release mutual aid resources as soon as possible.	
	❒ Conduct a post-event debriefing to identify success stories, opportunities for improvement, and development of the After Action Report/Improvement Plan.	
	❒ Deactivate/demobilize the EOCs, Agency Operations Centers, and command posts.	
	❒ Correct response deficiencies reflected in the Improvement Plan.	
	❒ Revise any applicable emergency response plans based on the success stories and/or lessons learned during the response.	
	❒ Submit valuable success stories and/or lessons learned to the Lessons Learned Information Sharing website (www.llis.gov)	

Table 3-9: Spring and Summer Storms in Umatilla County

Date	Type	Location	Comments	Information Source
July 1958	Thunder Wind	County		National Weather Service (NWS)
July 1964	Thunder Wind	County	52 Knots (60 miles/hour)	NWS
Aug 1965	Thunder Flooding	County		SHELDUS
Aug 1968	Thunder Rain	County		SHELDUS
June 1969	Hail	County	1 inch in size	NWS
June 1972	Thunder Hail	County		SHELDUS
May 1976	Hail	County		SHELDUS
April 1981	Hail	County	0.75 and 1.75 inch reported in two places	NWS
May 1981	Thunder Hail Wind	County	1.75 inches	NWS
Aug 1982	Thunder Wind	County	87 knots (100 miles/hour)	NWS
July 1983	Hail	County	1 inch	NWS
July 1985	Lightning	County		SHELDUS
June 1990	Thunder Wind	County		SHELDUS
July 1990	Thunder Wind	County	Wind 55 knots (63 miles/hour)	NWS
May 1991	Tornado	Umatilla	Width – 10 yards wide F0	NWS
Aug 1991	Thunder Hail Wind	Milton-Freewater	Wind – 100 knots (115 miles/hour) Hail – 1.75 inches and 2 inches	SHELDUS NWS
April 1992	Hail			SHELDUS
Jun 1992	Thunder Wind	County	Wind – 59 knots (68 miles/hour)	NWS
Aug 2, 1994	Thunder Wind	SE of Pilot Rock	$5000 in property damage	NWS
Aug 3, 1994	**Hail**	**Pendleton Helix**	**1.6 inches and 0.75 inches**	**NWS**
May 5, 1995	**Hail**	**I-84 at Deadman's Pass**	**Hail 4 inches deep that was 1 inch in diameter**	**NWS**
May 25, 1995	Thunder Wind	Pendleton	$5000 in property damage	NWS SHELDUS
July 6, 1995	Thunder Wind	Pendleton	$5000 in property damage	NWS SHELDUS
July 8, 1995	Thunder Wind	Pendleton	$15000 in property damage	NWS SHELDUS
May 1997	Lightning	Pendleton		NWS
Aug 1, 1997	Hail	Ukiah	0.75 inches	NWS
Aug 24, 1997	Thunder Wind	Pendleton	F0- 52 knots (60 miles/hour)	NWS
July 1998	Hail	Meacham	0.75 inch	NWS

June 24, 1999	Hail	Pilot Rock Ukiah	1.25 and 0.75 inches	NWS
Aug 2, 1999	Hail	Lehman	0.75 inch	NWS
Aug 8, 1999	Hail	Lehman	1 inch	NWS
May 9, 2000	**Funnel Cloud**	**10 miles E-SE of Pendleton**		**NWS**
May 9 2000	**Hail**	**Pendleton Meacham**	**0.88 and 0.75 inches**	**NWS**
Aug 2000	Lightning	Ukiah		NWS
April 2001	Hail	Tollgate	0.75 inch	NWS
June 8, 2001	Hail	Ukiah	0.88 inch	NWS
June 27, 2001	Hail	Umapine	0.75 inch	NWS
July 12, 2001	Hail	Weston	0.88 inch	NWS
Aug 2001	**Thunder Wind**	**Meacham Weston**	**$15,000 damage and $10,000 damage**	**NWS SHELDUS**
July 2002	Tornado	Pendleton Airport	F0	NWS
April 2003	Hail	Ukiah	0.75 inch	NWS
May 2003	Hail	Ukiah Indian Lake	1 inch 1.50 inch	NWS
Aug 2003	Hail Lightning	Hermiston Pilot Rock	0.75 inch	NWS
June 5, 2004	Hail	Pilot Rock	0.88 inch	NWS
July 2004	Hail Wind Thunder	Lehman Ukiah	1.75 inch hail 60 knots 0.75 inch hail	NWS
Aug 2, 2004	Lightning	Pendleton	$1000 damage	NWS
Aug 4, 2004	Funnel Cloud	Pendleton		NWS
Aug 4, 2004	**Hail**	**Mission** Mil-Freewater Pilot Rock	**0.75 inch hail** 0.75 inch hail 0.88 inch hail	**NWS**
Aug 6, 2004	Funnel Cloud	Pilot Rock		NWS
May 9, 2005	Funnel Cloud	Weston		NWS
June 2005	Hail Wind	Tollgate Ukiah	0.88 inch hail F0 - 52 knots (60 miles/hour)	NWS
April 2006	High Wind Funnel Cloud	Hermiston Stanfield Echo Helix Mil-Freewater	54 knots (62 miles/hour) 64 knots (74 miles/hour)	**NWS**
May 19, 2006	Hail	Tollgate	0.75 inch hail	**NWS**
June 4, 2006	Hail	Meacham Tollgate	1 inch 1.75 inch	NWS
July 4, 2006	Hail	Meacham	0.75 inch hail	NWS
July 5, 2006	Hail	Lehman Ukiah	1 inch hail 0.88 inch hail	NWS

June 13, 2009	Hail/Flash Flood	Pilot Rock	0.75 hail/rain in 15 minutes	NWS
May 17, 2010	Heavy Rain, Thunder, Hail	County	0.50 hail/rain in 20 minutes. Street flooding, ditch erosion, wet basements	NWS
June 1, 2010	Heavy rain over multiple days	North County, Milton-Freewater	Heavy rain from June 1 to June 10	NWS
July 16, 2012	Flash flood /Thunder	County, Helix	Heavy rainfall caused floods in Helix; roads, yards and basements covered in mud.	NWS
September 5, 2013	Flash Flood/Thunder/ Hail	County	Several reports of severe weather from wind damage, to large hail, and flash flooding hit portions of central and northeast Oregon on September 5th. The largest hail reported was 1.75 inches and the strongest estimated wind gust was 70 mph.	NWS

From: Dennis Hull [mailto:dennis.hull@noaa.gov]
Sent: Thursday, June 18, 2015 12:58 PM
To: Ray Denny
Cc: Michael Vescio
Subject: Fwd: A StormReady Location status has changed by Dennis Hull

Ray,
I have updated CTUIR StormReady status to Renewed (to 2018). Thanks again for attending the flood exercise back in April.

Dennis

-------- Forwarded Message --------
Subject: A StormReady Location status has changed by Dennis Hull
Date: Thu, 18 Jun 2015 15:23:44 -0400
From: melody.magnus@noaa.gov
Reply-To: melody.magnus@noaa.gov
To: melody.magnus@noaa.gov, jeffrey.lorens@noaa.gov, dennis.hull@noaa.gov, leslie.wanek@noaa.gov

```
A StormReady Location status has changed by Dennis Hull:

Name: Confederated Tribes of the Umatilla Indian Reservation
State: OR
WFO: PDT
Contact: Dennis Hull
Org Code: WT9688
Type: Indian Nation
Population: 3500
Status: Renewed 1 Time *
Recognized Date: 04/26/12
Renewed Date: 04/21/15
Expiration Date:
Tsunami Ready: No
Require New StormReady Signs:
Notes:

If Mission or Cayuse are not able to be identified by the system, then use
Pendleton as the \"nearest city\".
```

Volcanoes and Volcanic Events

Overview

The Cascade Range of the Pacific Northwest has more than a dozen active volcanoes. These familiar snow-clad peaks are part of a 1,000 mile-long chain of mountains which extend from southern British Columbia to northern California. Cascades volcanoes tend to erupt explosively, and have occurred at an average rate of 1-2 per century during the last 4,000 years. Future eruptions are certain. Seven Cascades volcanoes have erupted since the first U.S. Independence Day slightly more than 200 years ago. Four of those eruptions would have caused considerable property damage and loss of life had they occurred today without warning. The most recent events were Mt. St. Helens in Washington (1980-86) and Lassen Peak in California (1914-1917). The existence, position and recurrent activity of Cascades volcanoes are generally thought to be related to the convergence of shifting crustal plates. As population increases in the Pacific Northwest, areas near volcanoes are being developed and recreational usage is expanding. As a result more and more people and property are at risk from volcanic activity. The next eruptions in the Cascades could affect hundreds of thousands of people.

To identify the areas that are likely to be affected by future events, pre-historic rock deposits are mapped and studied to learn about the types and frequency of past eruptions at each volcano. This information helps scientists to better anticipate future activity at a volcano, and provides a basis for mitigating the effects of future eruptions through land use and emergency planning,

Effects

The effects of a major volcanic event can be widespread and devastating. The Cascade Mountains in Washington, Oregon and northern California is one of the most volcanically active regions in the United States. Volcanoes produce a wide variety of hazards that can kill people and destroy property. Large explosive eruptions can endanger people and property hundreds of miles away and even affect global climate. Some volcano hazards such as landslides can occur even when a volcano is not erupting.

The specific hazards produced by volcanic activity include the following:

<u>Eruption Columns and Clouds</u>

An explosive eruption blasts solid and molten rock fragments called tephra and volcanic gases into the air with tremendous force. The largest rock fragments called bombs usually fall back to the ground within two miles of the vent. Small fragments (less than 0.1 inch across) of volcanic glass, mineral and rock (ash) rise high into the air forming a huge, billowing eruption column. Eruption columns creating an eruption cloud can grow rapidly and reach more than 12 miles above a volcano in less than 30 minutes. Volcanic ash clouds can pose serious hazards to aviation. Several commercial jets have nearly crashed because of engine failure from inadvertently flying into ash clouds.

Large eruption clouds can extend hundreds of miles downwind resulting in ash fall over enormous areas. Ash from the May 18, 1980 Mt. St. Helens eruption fell over an area of 22,000 square miles in the western U.S. Heavy ash fall, particularly when mixed with rain, can collapse buildings and even a minor ash fall can damage crops, electronic and machinery.

Volcanic Gases

Volcanoes emit gases during eruptions. Even when a volcano is not erupting, cracks in the ground allow gases to reach the surface through small openings called fumaroles. More than ninety percent of all gas emitted by volcanoes is water vapor (steam), most of which is heated ground water. Other common volcanic gases are carbon dioxide, sulfur dioxide, hydrogen sulfide, hydrogen and fluorine. In higher concentrations, these gases can cause corrosion, contaminate domestic water supplies and harm or even kill vegetation, livestock and people.

Lava Flows and Domes

Molten rock (magma) that pours or oozes onto the earth's surface is called lava and forms lava flows. The higher a lava's content of silica the less easily it flows. Low-silica basalt lava can form fast-moving (10 to 30 miles per hour) streams or can spread out into broad thin sheets up to several miles wide.

Pyroclastic Flows

High-speed avalanches of hot ash, rock fragments and gas can move down the sides of a volcano during explosive eruptions or when the steep side of a growing lava dome collapses and breaks apart. Pyroclastic flows can be as hot as 1,500 degrees Fahrenheit and move at speeds of 100 to 150 miles per hour. Such flows tend to follow valleys and are capable of knocking down and burning everything in their paths. Lower-density pyroclastic flows called pyroclastic surges can easily overflow ridges hundreds of feet high. The climatic eruption of Mt. St. Helens generated a series of explosions that formed a huge pyroclastic surge which destroyed an area of 230 square miles and leveled trees six feet in diameter as far as 15 miles from the volcano.

Volcano Landslides

A volcanic landslides or debris avalanche is a rapid downhill movement of rocky material, snow and/or ice. Volcano landslides range in size from small movements of loose debris on the surface of a volcano to massive collapses of the entire summit or sides of a volcano. Landslides on volcano slopes are triggered when eruptions, heavy rainfall or large earthquakes cause these materials to break free and move downhill.

Lahars

Lahars are mudflows or debris flows composed mostly of volcanic materials on the flanks of a volcano. These flows of mud, rock and water can rush down valley and stream channels at speeds of 20 to 40 miles per house and can travel more than 50 miles. Some lahars contain so much rock debris (60 to 90% by weight) that they look like fast-moving rivers of wet concrete. Historically, lahars have been one of the deadliest volcano hazards. Close to their source, these flows are powerful enough to rip up and carry trees, houses and huge boulders miles downstream. Farther downstream they can entomb in mud everything in their path. Lahars can occur during an eruption and when a volcano is quiet. The water that creates lahars can come from melting snow and ice (especially water from a glacier melted by a pyroclatic flow or surge), intense rainfall, or the breakout of a summit crater lake. Large lahars are potential hazard to many communities downstream from glacier-clad volcanoes.

Prepared by James B. Knight for the Oregon Natural Hazard Workshop – May 2007

Table 1. 45 eruptions and 15 cases of notable volcanic unrest have occurred at 33 U.S. volcanoes since 1980.		
VOLCANO	**ERUPTION YEAR**	**UNREST EPISODE**
Mt. St. Helens, Washington	1980-1986, 2004-2005	1989-2003, occasional earthquake bursts, minor phreatic explosions, small mudflows
Mt. Hood, Oregon		Occasional earthquake swarms
Three Sisters, Oregon		Uplift began 1997; earthquake swarm March 2004

OPEN-FILE REPORT 2005-1164 An Assessment of Volcanic Threat and Monitoring Capabilities in the United States: Framework for a **N**ational **V**olcano **E**arly **W**arning **S**ystem

By John W. Ewert, Marianne Guffanti, and Thomas L. Murray
U.S. Geological Survey, April 2005

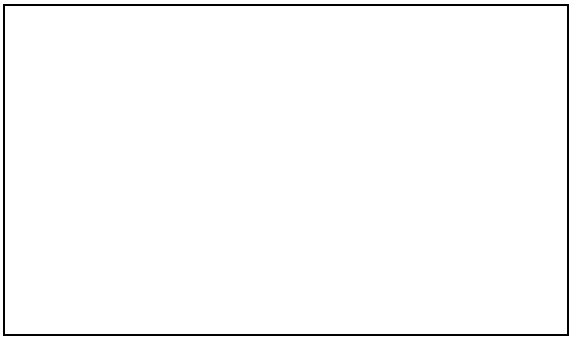
http://pubs.usgs.gov/of/2005/1164/2005-1164.pdf

Table 3. Summary of volcanic threat by state. N is number of volcanoes; %N is percentage of the total of 169 volcanoes.. For each state, the number of volcanoes in each of the five threat groups (very high, high, moderate, low, very low) is given; the percentage of a state's volcanoes that have a very high (VH) or high (H) threat level also is calculated. Recur=4 is the code for an eruption-recurrence interval of 1-99 years and indicates the most frequently erupting volcanoes. Number of volcanoes in each state with eruptions having a volcanic explosivity index (VEI) greater than 3 in the past 500 years is tabulated in the last column.

STATE	N	%N	VERY HIGH	HIGH	(VH+H)/N as %	MOD	LOW	VERY LOW	RECUR =4	VEI>3/500 YR
AK	90	53.3	5	26	34	31	22	6	22	29
CA	19	11.2	3	4	37	4	0	8	0	2
WA	7	4.1	4	1	71	0	2	0	1	1
CNMI	13	7.7	0	4	31	4	3	2	4	2
OR	19	11.2	4	0	21	2	2	11	0	0
HI	5	3.0	2	1	60	2	0	0	2	1
WY	1	0.6	0	1	100	0	0	0	0	0
UT	4	2.4	0	0	0	1	1	2	0	0
ID	4	2.4	0	0	0	0	4	0	0	0
NM	3	1.8	0	0	0	1	0	2	0	0
AZ	2	1.2	0	0	0	1	0	1	0	0
NV	1	0.6	0	0	0	1	0	0	0	0
CO	1	0.6	0	0	0	1	0	0	0	0
Total	**169**	**100**	**18**	**37**	**N/A**	**48**	**34**	**32**	**29**	**35**

Table 4 lists volcanoes alphabetically by state, in the five threat groups. The very high threat group includes 10 Cascade Range volcanoes in Washington, Oregon, and California – Baker, Crater Lake, Glacier Peak, Hood, Lassen, Newberry, Rainier, Shasta, South Sister, St. Helens – whose explosive behavior and lahar potential can impact both large populations and extensive development on the ground as well as heavily traveled air-traffic corridors.

Yellowstone caldera also falls in the high-threat group, as do Hualalai volcano in Hawaii, Mount Adams in Washington, and Clear Lake, Medicine Lake, and Inyo Craters and Mono Craters in California.



Earthquakes

From USGS

http://earthquake.usgs.gov/eqcenter/recenteqsus/Maps/US2/44.46.-122.-120_eqs.php

Latest Oregon earthquake:

Earthquake List for Map Centered at 45°N, 121°W

Update time = Fri Jan 5 21:00:02 UTC 2007

Here are the earthquakes in the Map Centered at 45°N, 121°W area, most recent at the top.
(Some early events may be obscured by later ones.)
Click on the underlined portion of an earthquake record in the list below for more information.

	MAG	UTC DATE-TIME y/m/d h:m:s	LAT deg	LON deg	DEPTH km	LOCATION	MAP
							3.0

Significant Earthquakes in Recorded History:

http://earthquake.usgs.gov/regional/world/historical.php

```
The input zip-code is 97801.
```

Probabilistic Hazard Lookup by Zip Code, 1996

Welcome to the USGS Zip Code earthquake ground motion hazard look-up page. Here you will be able to enter a 5 digit integer zip code and ground motion hazard values, expressed as a percent of the acceleration of gravity, (%g), will be returned to you. The ground motion hazard values returned will be Peak Ground Acceleration, (PGA), 0.2 second period spectral acceleration, (SA), 0.3 second period (SA), and 1.0 second period (SA) for 10%, 5%, and 2% probability of exceedance, (PE), in 50 years.

(These ground motion values are calculated for 'firm rock' sites which correspond to a shear-wave velocity of 760 m/sec. in the top 30m. Different soil sites may amplify or de-amplify these values.)

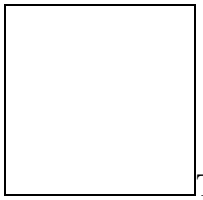
- The original zip code file was a free bee download from the Census Bureau, dated approximately January 1996, and thus may not reflect the most recent Zip Codes in use today.
- It has been determined that the latitude and longitude associated with each zip code is the average of the northern and southern most latitudes and the average of the eastern and western most longitudes of the zip code area. This location is not necessarily the Post Office location nor the centroid of the zip code area.

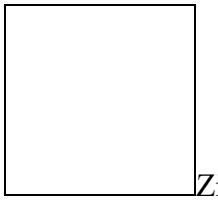
- In this look-up program each zip code location is associated with the nearest point on a grid of points 1/10 of a degree apart on which earthquake ground motions have been calculated covering the 48 adjacent states.

To find the ground motion values enter a 5 digit zip code in each of the blank boxes in the following table. Use the TAB key to move to the next table element. You may request from 1 to 12 Zip Codes.

NO EXTENSIONS - NO ALPHA CHARACTERS - NO DECIMAL NUMBERS

```
 ZIP CODE                          97801
   LOCATION                          45.6661 Lat. -118.7964 Long.
   DISTANCE TO NEAREST GRID POINT  3.7763 kms
   NEAREST GRID POINT                45.7 Lat. -118.8 Long.
   Probabilistic ground motion values, in %g, at the Nearest Grid point
are:
                10%PE in 50 yr   5%PE in 50 yr   2%PE in 50 yr
      PGA         7.489391         11.357510        18.593479
   0.2 sec SA    17.730869         26.418390        41.786308
   0.3 sec SA    16.033670         23.725330        38.335041
   1.0 sec SA     5.618903          8.284203        13.316500
   - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
```

 The input zip-code is .

 Zip code is zero and we go to the end and stop.

PROJECT INFO: SEISMIC HAZARD: Hazard by Zip Code

http://eqint.cr.usgs.gov/eq-men/html/zipcode-06.html

Table 3-6: Inventory of Wildland Fires within the UIR

Fire Name	Fire #	Date	Year	General Desc.	Total Ac	Prot Ac
Stumbough Ridge	1497301915	7/24/14	2014	Lightning	11.5	9.2
Cayuse	1497304814	6/21/14	2014	Debris Burning	237	23
Burke Road	1397302714	8/16/13	2013	Lightning	27.5	27.5
Elephant Rock	1197301712	8/27/11	2011	Equipment Use	303	303
Wilson Road	1197301012	8/24/11	2011	Equipment Use	14	0
Eagle Creek	0897303009	8/8/08	2008	Lightning	370	128
Coyote Canyon	0897301309	8/7/08	2008	Lightning	103	103
MP 230	0397306704	11/19/03	2003	Railroad	763	398
McKay	0397304304	8/6/03	2003	Lightning	405	405
MP 241	0397301004	7/16/03	2003	Railroad	134	134
Isqúulktpe Creek	0397300704	7/7/03	2003	Lightning	40	40
MP 245	0397300104	7/2/03	2003	Railroad	129	50
Huckleberry Lane	0297304203	8/14/02	2002	Smoking	16	16
Lower McKay	0197304702	10/16/01	2001	Debris Burning	11	11
MP 244	0097301701	8/15/00	2000	Railroad	4098	484
Deadman's Pass	0097301101	8/7/00	2000	Equipment Use	322	322
Milepost 245	0097301001	8/6/00	2000	Railroad	121	7
Stumbough Ridge	9997303500	8/14/99	1999	Lightning	12	12
McKay Creek	9997300900	8/1/99	1999	Equipment Use	15	15
M.P. 230.5	9897306999	9/6/98	1998	Railroad	110	36
Spring Hollow	9797300197	3/8/97	1997	Debris Burning	192	192
Buckaroo Creek	9697360197	8/27/96	1996	Lightning	25	25
Isqúulktpe Creek	9497358495	8/29/94	1994	Equipment Use	683	683
Isqúulktpe Creek	9297359493	7/1/92	1992	Equipment Use	60	60
91973545	9197354592	8/27/91	1991	Smoking	18	18
90973630	9097363091	10/20/90	1990	Debris Burning	35	35
90973572	9097357291	7/26/90	1990	Miscellaneous	40	40
89973551	8997355190	10/16/89	1989	Debris Burning	62	62
88973688	8897368889	8/26/88	1988	Lightning	987	987
87973624	8797362488	8/23/87	1987	Debris Burning	350	350
Emigrant Hill	8797362588	8/22/87	1987	Recreation	2716	2716
86973527	8697352787	7/18/86	1986	Railroad	35	35
82973552	8297355282	6/26/82	1982	Juveniles	225	225
81973518	8197351882	8/14/81	1981	Lightning	360	360
81973516	8197351682	8/13/81	1981	Lightning	587	587
80973611	8097361181	7/31/80	1980	Lightning	10	10

Wildland Fire Prevention Plan

Umatilla Agency & Confederated Tribes of the Umatilla Indian Reservation

2012-2016

The purpose of this Wildland Fire Prevention Plan is to further define the Prevention and Education Strategy contained in the Umatilla Agency Fire Management Plan (FMP) and Environmental Assessment (EA) of May 2000.

Dept. of the Interior - Indian Affairs
Umatilla Agency
P.O. Box 520
Pendleton, OR 97801

Bureau of Indian Affairs Umatilla Agency

&

Confederated Tribes of the Umatilla Indian Reservation

Wildland Fire Prevention Plan

2012

Prepared by:

Darron Williams

Bureau of Indian Affairs

Umatilla Agency Fire Management Officer

Bureau of Indian Affairs (BIA) Umatilla Agency (UMA)

&

Confederated Tribes of the Umatilla Indian Reservation (CTUIR)

Wildland Fire Prevention Plan

2012

Approvals

Prepared by: _____ _____
Darron Williams, BIA UMA Fire Management Officer Date

Reviewed by: _____ _____
Jerry Lauer, BIA UMA Superintendent Date

Reviewed by: _____ _____
Les Minthorn, CTUIR Board of Trustees Chairman Date

Reviewed by: _____ _____
Leonard J.Diaz, NWRO, WUI/Prevention Specialist Date

Recommended by: _____ _____
BIA Regional Forester Date

Approved by: _____ _____
Stanley Speaks, Northwest Regional Office, Regional Director Date

Contents

Wildfire Prevention Plan

Five year Revision

01/2012

Umatilla Agency

Executive Summary

As stated in the National Fire Prevention Handbook, April 2009, 90 IAM 1.4C (6)-H an approved Wildland Fire Prevention Plan (WFPP) is required to secure long-term prevention program funds. Once integrated, these program funds would be reoccurring for the life of the prevention plan. This plan will be updated every five years or when significant change in the prevention program occurs. This revision is tiered to the current Umatilla Agency Fire Management Plan (FMP), approved May of 2000. This process involves collaboration with several stakeholders, overall and community risk assessments, fuels treatment analysis and addresses structural ignitability. It utilized a collaborative process and Risk Assessment Mitigation Strategies (RAMS) software.

This Bureau of Indian Affairs – Umatilla Agency (BIA UMA) WFPP was developed by the BIA UMA Fire Management Officer. It was reviewed and approved by the BIA UMA Superintendent, the Chairman of the Board of Trustees of the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), Northwest Regional Office (NWRO) Wildland Urban Interface/Prevention Specialist, BIA Regional Forester and the NWRO Regional Director.

The main objective of this prevention program is ignition management. According to the Department of the Interior's official reporting system, Wildland Fire Management Information (WFMI) data from 2002-2011, the trust lands of the CTUIR identify the primary human causes as equipment and incendiary. Prevention activities will focus on these two primary causes. Identified within the WFPP is the close partnership the Umatilla BIA has with the Confederated Tribes which include: Walla Walla Nation, Cayuse Nation, and Umatilla Nation. Partnerships are formed with CTUIR Fire Department, Oregon Department of Forestry, and rural fire departments for prevention, detection and suppression of wildfires across its area of Trust responsibility.

Prior to 2005, a prevention plan did not exist and minimal prevention activities took place. A WFPP was developed in 2005. The workload identified in the 2005 was not realistic and primary human causes were not identified. The plan did not target specific causes. The 2012 WFPP workload is a reduction from the 2005 WFPP. This reduction in workload has been determined by the UMA FMO and staff to be more realistic in scope and purpose for the funding amount allotted.

An analysis in this WFPP indicates an overall program effectiveness of nearly 11.12%, which computes to an annual reduction of 1 wildfire. This estimate is based upon the option referred to as the 2012 Plan. The cost of full implementation for the 2012 Plan option is $11,000.00. A portion of work hours for the FMO and work hours for a GS 5/6 will be needed to implement the 2012 Plan. Specifically, the 2012 Plan staffing requirements are divided between 1 GS-6 Step 5 for 4.5 Pay Periods and 1 GS-11 Step 5 for 1/2 of a single Pay Period.[L1] Based[L2] on this analysis the benefits outweigh the costs. The BIA Branch of Forestry and Fire at NIFC established a minimum benefit/cost ratio of 1 to 1. The 2012 WFPP has a benefit/cost ratio of 2.02:1.

To properly direct wildfire prevention efforts, it is important to accurately analyze problems or potential problems. The analysis section is developed through a process which is necessary to establish that a prevention program is justified and fiscally responsible. The analysis section of this prevention plan includes the following:

- Analysis of planning unit historical fire occurrence data
- Assessment of risks, values and hazards
- Development and analysis of workload and program budget
- Strategically evaluate prevention options
- Analysis of the benefits versus cost of implementing the program
- Identification and evaluation of options which reduce wildfire risk and hazard to communities with the CTUIR boundary

The RAMS Software program facilitates the analysis process and provides information needed to develop the implementation section (action plan). RAMS data from the 2005 WFPP will be referred to as 005 Plan. RAMS data from the 2012 WFPP will be referred to as 012 Plan. RAMS data from the 2012 Alternative WFPP will be referred to as 12 Alt 1.

The implementation portion of the plan provides guidance and direction to conduct day to day operations as well as establish a general framework for the program. BIA requires the following criteria:

- Documented program support which outlines the agreed direction the prevention program should take
- Documented fire investigation policies and procedures that outline cause and prevention program efforts
- Documented standard operating procedures for investigating wildfires for civil and criminal activity
- Documented burn permit system to regulate open burning when and where conditions are not conducive for public and firefighter safety and health

The WFPP is an equivalent document to the Community Wildfire Protection Plan. The requirements include categories based on the Healthy Forest Restoration Act (HFRA):

- Collaboration
- Prioritized fuel reduction
- Treatment of structural ignitability

Prevention actions are the activities that have been selected and analyzed in the planning process to be the most cost-effective measures in order to reduce the incidence of human caused fires and the risk of loss to life and property. General Actions (Table 9), Specific Actions (Table 10), and Structural Ignitability (Table 11) are the prevention action tables generated later in this WFPP.

The Annual Planning calendar provides guidance to scheduling and planning implementation of the prevention actions.

The UMA WFPP includes several appendices to include:

- Data for analysis, burn permit systems, program support documents, law enforcement agreements, outputs from all RAMS runs and a copy of the database file from RAMS

I. Introduction

A. Purpose and Scope

The purpose of this WFPP is to further define the Prevention and Education Strategy contained in the Umatilla Agency Fire Management Plan (FMP) and Environmental Assessment (EA) of May 2000. A previous WFPP was approved in 2005. The 2012 WFPP is tiered to the 2000 UMA FMP and covers the period of 2012-2016. The WFPP revision provides refined direction and guidance for the implementation of wildfire prevention and hazard mitigation strategies within the jurisdictional boundaries of the CTUIR boundary. The WFPP also provides the information and guidance needed to meet the BIA Equivalency for a WFPP.

B. Program Objectives

The following fire management goals related to wildfire prevention have been identified from the 2000 UMA FMP.

- To promote the integrated management and ensure the long-term health, availability and wise use production of all natural and treaty resources consistent with Tribal cultural values and sound management principles.
- Implement and maintain a wildland fire management program that makes firefighter and public safety high priority, is cost efficient, and is responsive to land stewardship needs and other resource management actions. (Source: IAM90, Chapter 1 section 1.2 and 620 DM section1.8, 2.0)
- Develop and maintain a fuels management and prescribed fire program that effectively reduces the hazard of accumulated fuels, achieves multiple resource management objectives, and provides for a natural role of fire in the ecosystem.
- Develop and maintain a prevention program that reduces human caused wildland fires.
- Encourage resident awareness of the need to reduce hazardous fuels near their homes.
- Limit area affected by a wildland fire to less than 500 acres per decade in all fuel types.
- Reduce the incidence of human-caused wildland fires by 20% during the next five years. This objective was changed to 10% due to the number of wildland fire starts that threaten urban interface on the CTUIR.
- Establish a program which provides information and training to Tribal homeowners to help protect their property from the threat of wildland fire.

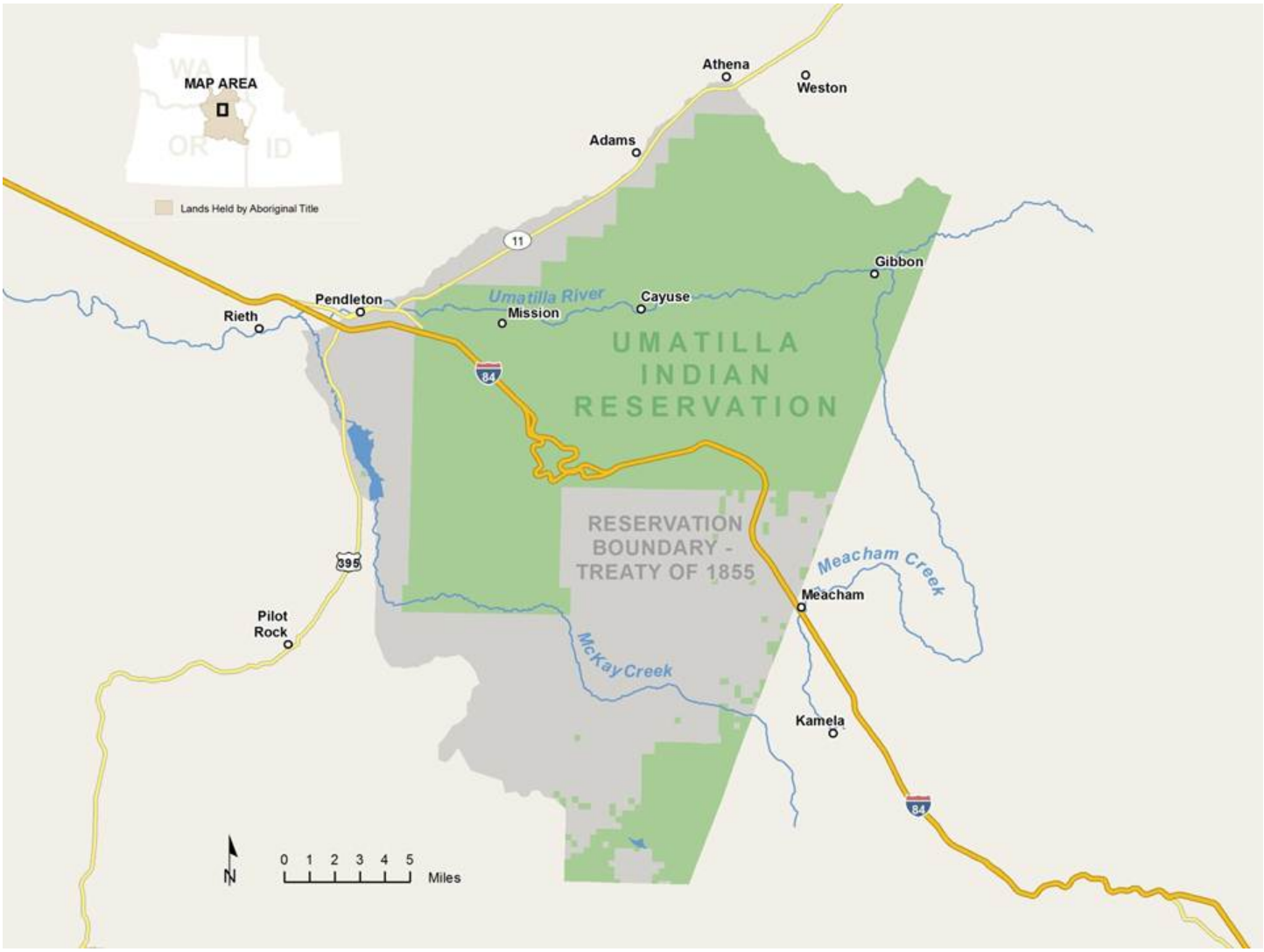
II. Situational Analysis

A. Description of Area, Land Ownership, Location and Size

The UMA is located in northeastern Oregon, primarily on the western slopes of the Blue Mountains, near Pendleton, Oregon. Tribal and UMA Offices are located in Mission, Oregon. The Agency is serviced by the BIA Northwest Regional Office, located in Portland, Oregon.

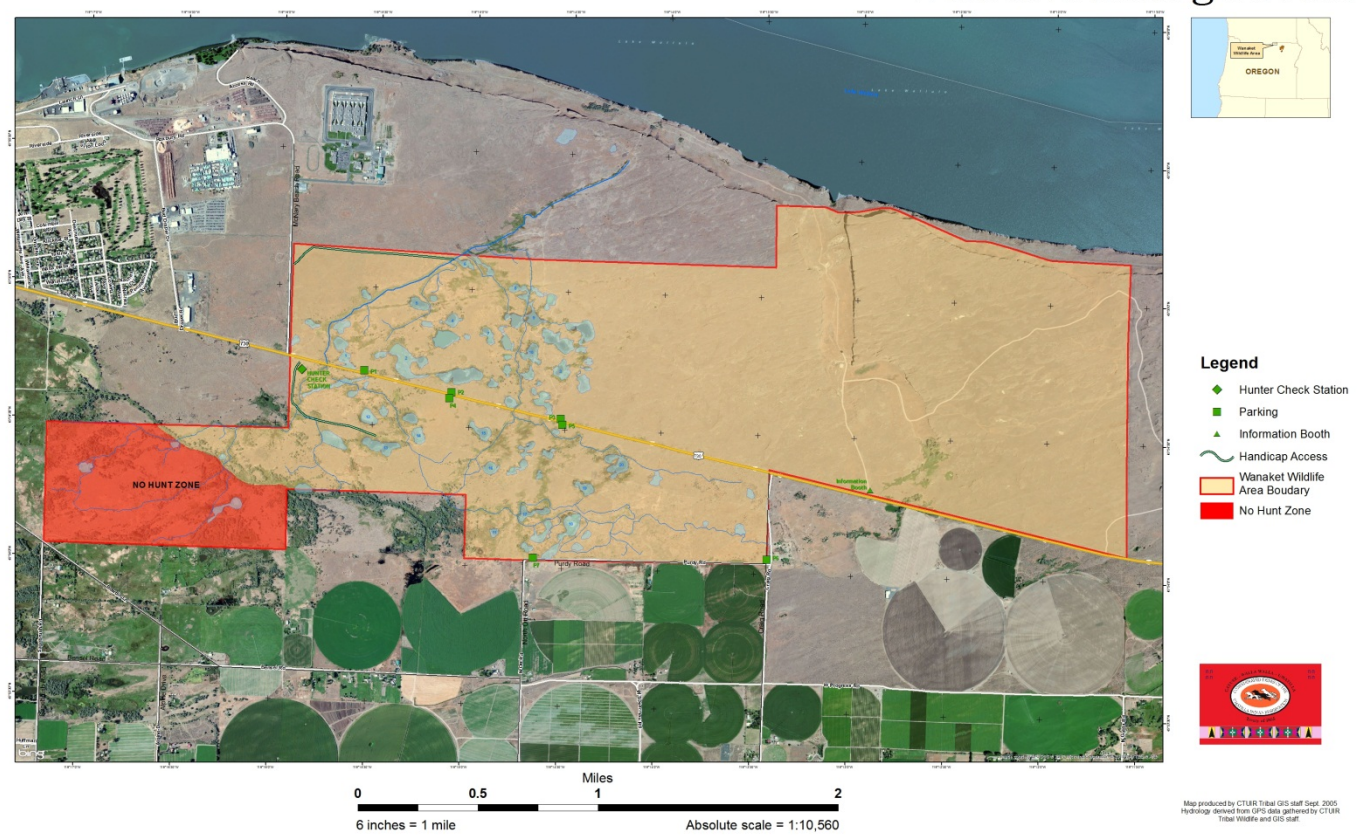
The CTUIR was established by treaty in 1855 and encompassed approximately 245,699 acres. The 1885 Slatter Act diminished the Reservation to approximately 158,000 acres and allotted land to each Tribal member. Approximately one-half of the lands within this diminished Reservation boundary have since been transferred out of trust ownership. In addition, approximately 5% of the lands within the diminished Reservation boundary are in Tribal fee status. This has created a checkerboard ownership pattern of Trust and privately owned lands throughout the CTUIR.

The Restoration Act of 1939 returned 14,140 acres of unclaimed lands within the original 1855 treaty boundary of the CTUIR. This tract, known as the Johnson Creek Restoration Area, is approximately 25 miles southeast of Mission.


MAP AREA
WA
OR
ID
Lands Held by Aboriginal Title
Athena
Weston
Adams
11
Gibbon
Pendleton
Umatilla River
Cayuse
Rieth
Mission
UMATILLA
INDIAN
RESERVATION
84
RESERVATION
BOUNDARY -
TREATY OF 1855
Meacham Creek
395
Meacham
Pilot
Rock
McKay Creek
Kamela
84
N
0 1 2 3 4 5
Miles

WANAKET WILDLIFE AREA

Public Hunting Access



B. Wildfire Occurrence and Historical Data

The official documentation for wildfire occurrence in the Department of the Interior-BIA is the Form DI-1202-BIA ver. 5/2007. This information is documented into DOI's Wildland Fire Management Information System (WFMI). The Umatilla Agency has consistently documented the wildfire response over the last 10 years. This ten-year average is what this WFPP is based upon. The historical BIA fire records from 2002 to 2011 indicate that approximately eighty-four percent (84%) of the wildfires within the jurisdictional boundaries of the CTUIR are human caused. Of these human caused fires fifty-eight (58%) percent are categorized as Equipment, Incendiary and Railroad. Fifteen (15%) of the human caused fires have been categorized as Miscellaneous. Incendiary and Miscellaneous are categories that are often used when little or no investigation into the cause of the wildfire has been conducted.

i. Table 1 shows the overall wildfire cause data for the CTUIR according to WFMI. This table shows the aggregate wildfire occurrence for the last ten years. Equipment is the largest cause of wildland fires according to this chart. Wildfire cause WFMI data from 2012 is consistent with equipment being the major contributor to wildland fire ignitions. Thus, equipment would remain a target for Fire Prevention efforts in the future.
i. Table 1a shows the overall wildfire cause data for the last ten years.

Table 1 – WFMI Wildfire History and Cause Summary (2002-2011)

Cause	Number of Fires	Trust Acres	Percent of Fires	Percent of Acres
CAMPFIRE	4	777	3	14
SMOKING	6	13	4	<1
FIRE USE	12	293	8	5
INCENDIARY	25	37	17	<1
EQUIPMENT	32	1910	22	34
RAILROADS	15	953	10	17
JUVENILES	11	42	7	<1
MISCELLANEOUS	19	557	13	10
HUMAN SUB-TOTAL	124	4582	84	81
NATURAL (LIGHTNING)	23	1098	16	19
TOTAL	147	5680	100.00	100.00

Table 1a. – WFMI Wildfire History by Cause by Year (2002-2011)

Cause	Number of Fires										
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
CAMPFIRE	1						1		2		4
SMOKING		2	1	2			1				6
FIRE USE	5	2	3					1	1		12
INCENDIARY			2	1	7	7	3	1	3	1	25
EQUIPMENT	2	2	2	2	4	6	4	3	4	3	32
RAILROADS	4	5	1	1	1	1	1		1		15
JUVENILES		3		4	1	2	1				11
MISCELLANEOUS	7	2	2	2	1			1	1	3	19
HUMAN SUB-TOTAL	19	16	11	12	14	16	11	6	12	7	124
NATURAL (LIGHTNING)	5	4	1	2	1		5	4	1		23
TOTAL	24	20	12	14	15	16	16	10	13	7	147

C. History of Prevention Efforts

The Umatilla Agency has engaged in a wildfire prevention program since before 2000. Previous Prevention efforts revolved around patrolling the CTUIR Reservation and speaking with the public about fire prevention. Patrols and public contact were heightened during times of high fire danger. For example, since 1994 the Wildhorse Casino has held a Pow-Wow during the 4th of July weekend. Patrols were conducted around the area and prevention material distributed. Prevention material was also distributed during the Pendleton Round-Up in mid-September. The BIA was able to take part in the Happy Canyon parade[L3] in Pendleton, Oregon[L4]. The BIA also had an active Smokey Bear program with the local schools. Collaboration on investigations and collection of evidence occurred with the CTUIR Tribal Fire Department and CTUIR Safety Office.

Upon review of the 2005 RAMS data, the prevention efforts were an over estimate for General, Specific and Community Actions. Given the personnel and money for the program, many of the actions were not realistic to accomplish. The UMA Superintendent and UMA FMO have planned the 012 Plan and the workload will be realistic in scope and outlook. Thus, prevention efforts will be driven to accomplish goals for the entire CTUIR Reservation in the General Actions and Specific Actions. Historic prevention actions will continue, but other efforts will be pursued utilizing the CTUIR Radio Station for Public Service Announcements and possibly having a wildfire history kiosk at the Tama'stslikt Museum.[L5]

The UMA FMP states:

"The BIA Umatilla Agency will attempt to use a cost effective mix of strategies (activities) within the broad categories of education, engineering, enforcement and administration. It is the goal of the BIA Umatilla Agency to emphasize activities of education, engineering and administration as initial priorities."

The UMA FMP categorizes the prevention efforts as:

- Public Information and Education
- Fire and Burning Permit System
- Closures and Restrictions
- Trespass, Arson Investigations and Enforcement
- Prevention Workload Analysis

D. Prevention Strategy

The Umatilla Agency plays an important role in wildfire prevention with its partners. These partners include the Oregon Department of Forestry, the United States Forest Service, volunteer and paid fire departments. Many opportunities exist for the UMA to join forces with these partners in events, activities and training to present a consistent wildfire prevention message to its public. A wildfire prevention strategy has been developed for the UMA using the National Wildfire Coordinating Group publication **Wildfire Prevention Strategies**, (NFES 1572) March 1998. This strategy also specifically addresses the criteria required by BIA Wildfire Prevention Policy.

This prevention strategy is based on the description of the area, ownership distribution, wildfire history, and cause information. The wildfire prevention and hazard mitigation strategy identified in this plan will focus on mitigating the identified primary causes of equipment and incendiary incidents. Utilizing this strategy UMA will work with the ODF, the USFS and the RFDs to provide a broad program of education and action. Patrol will be utilized to identify wildfire occurrence and be a key feature of this strategy.

Signage, mass media and key contacts will be utilized to improve awareness. For example, CTUIR has the rights to a tribal radio station, KCUW/104.3, that welcomes program proposals that inform and engage the Umatilla Reservation Community.

Cultural awareness with sensitivity and respect for traditional values is also crucial to the success of this prevention program. UMA will need to respectfully integrate all prevention education activities with the traditional cultural values of the CTUIR.

E. Planning Unit (FMU) Assessment

Vegetation within the CTUIR Reservation is typical of ecosystems found throughout the Blue Mountain region of northeast Oregon. Specific vegetative species vary and are dependent on elevation differences (ranging from 1,100 to 4,600 feet), aspect, precipitation amount and soil conditions. Most of the vegetation can be generally categorized as forested, mountain brush or grassland type. The vegetation and its relationship as a wildland fuel for fire was a major factor in delineation of the three FMZs for this plan: Lowlands, Foothills and Uplands.

E1. Compartment Assessment Rating

Each compartment has been assessed on several risk factors which wildfire prevention planning is founded on. These risk factors include:

- Fuels Hazard
- Ignition Risk
- Fire Return Interval
- Catastrophic Potential
- Values
- Protection Capability

The final step in the assessment was to rate each compartment according to its protection capability based upon two categories. The first category is initial attack response time. The second category is suppression complexity considering access, barriers, structure problems, etc. Based on these factors, RAMS determined both the Foothills and Lowland FMUs to be of highest priority of Moderate with the Upland FMU rating of Low. Consulting with the UMA Superintendent on these results he concurs that due to the fuel models involved, response time of suppression resources to WUI, and incident coordination, the Lowlands and Foothills were a higher priority among the three FMUs. The Upland FMU needs a quick response time, [L6]as the railroad and Interstate 84 has traffic there but due to the fuel model rate of spread, fires tend to grow at a slower rate allowing initial attack suppression forces more time before the fire grows larger. The UMA Superintendent has been actively involved with range, realty and forestry program on the CTUIR Reservation since October of 1976.

Table 2 Composite Fire Management Unit Assessment Ranking

Fire Management Unit	Compartment	Risk Ranking
Foothills	Compartment #1	**Moderate**
Lowland	Compartment #2	**Moderate**
Upland	Compartment #3	**Low**

F. Community Assessment Narrative

The Federal Register, Volume 66, Number 160, Friday August 17, 2001, lists 11 communities within the CTUIR boundary as Urban Wildland Communities Within the Vicinity of Federal Lands that are at High Risk from Wildfires. Of these communities Meacham, I-84 Corridor, Meacham Lake, and Gibbon rated as High. The communities of Mission, Umatilla, Thornhollow and Cayuse rated as Moderate. Umatilla River, McNary and Mission Highway Corridor rated Low.

The Community Assessment Ranking portion of RAMS is nearly identical to the rankings in the Federal Register with a few exceptions. Fire history in the community assessment required quantified data (number of fires and acres burned). For communities, only relative fire history was required. The value factors rated for the Community Assessment Ranking include:

- Recreation
- Wildlife/Fisheries
- Watershed
- Forest/Woodland
- Private Property
- Cultural Resources
- Special Interest Areas
- Visual Resources
- Threatened and Endangered Species
- Soils (Erosion)
- Air shed

The final variance from compartments is the Community Protection Capability Matrix. In addition to Initial Attack Time, and Suppression Complexity, Firewise Compliance is a rating factor.

Table 3. Composite Community Assessment Rating

	HIGH			MODERATE			LOW
	Meacham			Mission			Umatilla River
	I-84 Corridor			Umatilla			McNary
	Meacham Lake			Thornhollow			Mission Highway Corridor
	Gibbon			Cayuse			

G. Fuels Assessment

The following review of fuels treatments has been included in this analysis to ensure that fuels treatments are considered as options and components (where appropriate) to the community actions identified in the planned program. RAMS was used to conduct the review.

This approach recognizes that all facets of the fire management organization (prevention, suppression and fuels) are interdependent and must work toward a common purpose and complement one another toward sustaining healthy and productive ecosystems and protecting human life and property.

Code	Description
01	Foothills
02	Lowlands
03	Uplands

Detailed information about each FMU follows.

Foothills/Lowlands

FMU 01/02 -- includes the northwest-sloping plains in the western portion of the Reservation. Most of this zone is under agricultural production with winter wheat, dry land peas, and hay as the principal crops. The plain is cut by the east-west trending Umatilla River valley. Slopes tend to be gentle, however steeper slopes 30-50% occur along the Umatilla River and smaller tributaries. Fine fuels, including grasses, forbs, and agricultural crops cover most of the zone. Heavier fuel loadings are encountered in scattered brush lands, hardwood tree cover along riparian zones, and scattered open pine stands along the upper slopes.

Fires tend to be fast moving and strongly influenced by daily weather patterns, mainly upslope winds. Most fires in this zone are human caused, a majority originating near residential areas or home sites along the river valley. The Union Pacific Railroad follows the Umatilla River through this zone, and has been a source of wildland incidents.

FMU 03 -- includes the upper slopes along the western portion of the Blue Mountain Range, which are often characterized as being part of a tilted, elevated plateau with deeply eroded, steep V-shaped canyons with intervening narrow ridges. Elevation differences between top to bottom of the slope may be as much as 1200 feet. Fuel types range from sparse grasslands on lower elevations and south-facing slopes, to grass-woody litter in the open pine stands on mid to upper slopes, to a shrub-tree litter of larger size diameters in the mixed conifer stands occurring on the north aspect of the upper slopes. Increased mortality caused by the Western Spruce Budworm has been a major contributor to the heavier fuel loading found in these mixed conifer stands.

Fires that originate in the finer fuel areas can increase rapidly in size due to the steep slopes and usual upslope winds. The larger size fires noted during this analysis period have occurred in this FMU, partly due to point of origin and partly

because of the torching-crowning-spotting type of fire behavior associated with the timber type and increased down woody/ladder fuels at the higher elevations.

Fuel Models – Fire Behavior

The current ground fuel loading in these various vegetation cover types, is best represented by referring to one or more of the established fuel models. These models, created from on-the-ground and laboratory research, considers fuel loading (amount) by size class, and depth of the fuel bed. A selected fuel model, when analyzed with the moisture content of the fuels, fire weather variables (temperature, relative humidity, wind speed), and environmental factors such as slope steepness, will yield fire behavior outputs such as heat intensity, flame length and rate of spread. These behavioral outputs provide some indication of the appropriate management response to implement with a wildland fire. The management response may involve immediate suppression, or because of firefighter safety and the potential for fast-spreading or erratic fire behavior, the more practical and less resource damaging suppression option may be containment utilizing natural or existing fire lines such as roadways. This suppression option may also be the most compatible with the identified cultural and natural resource values.

In the grass areas of both zones, fires can exhibit high rates of spread especially if there is the influence of wind. Besides the usual diurnal upslope winds, fire ignitions from thunder storms are often influenced by strong and gusty winds associated with a cold front passage. Flame lengths can exceed 4-8 feet which limits direct attack by hand crews. In these situations, the fire either spreads into nearby shrub covered areas or fuels associated with tree covered areas predominately higher on the slope. A decreased wind speed or slight increase in fuel moisture content (either from a light shower or increased relative humidity) can lessen fire spread somewhat in the grass type fuels. Overall, due to a combination of steep topography and the amount of both fine and heavy fuel situations, this area has the potential for an occasional large size project fire.

Two common fuel model systems: National Fire Danger Rating System (NFDRS) and the Fire Behavior System (FBA) are used to further describe the fuel situations found on the Umatilla Reservation.

NFDRS Fuel Model A (FBA 1): This fuel model represents those situations where grass is the primary carrier of fire spread. It represents a majority of FMU 01 and also portions of FMU 02 in the more open areas and as the major ground fuel in the scattered ponderosa pine stands. Fires are generally low to moderate heat intensity with moderate spread rates when the main fuel is grass. Generally, it can be contained using direct attack methods. In steeper areas, rates of fire spread could likely exceed capabilities of being contained by direct attack. It may exhibit higher intensity and even spotting ahead of the fire front. Similar behavior may result on more gentle slopes when the fire is influenced by wind, or when the fire front encounters brush patches or woody fuels in combination with the grass.

NFDRS Fuel Model C (FBA 2 and/or 9): This fuel situation is representative of woody and grass fuels at the ground surface under ponderosa pine stands. In more open pine stands, where grass, forbs and some pine tree litter and/or shrubs are predominant, the fire behavior produced is typical of Fire Behavior Fuel Model 2. In more dense ponderosa pine stands, where the ground surface fuel is primarily tree litter (pine needles, twig and branch particles), the fire behavior produced is more typical of what is represented by Fire Behavior Fuel Model 9.

NFDRS Fuel Model G (FBA 10): This model represents fuel situations with a heavier loading of fuels 3 inch diameter and larger, such as large branches, bolewood and even entire trees. These fuels have resulted from over maturity or natural events such as insect, disease or wind damage. The average fuel bed depth may be around one foot. This fuel situation is typical of the mixed conifer sites located on the north aspects and/or higher elevations of FMU 02.

Fires burn with high intensity and quite often develop erratic behavior such as torching, spotting, and some crown spread. Direct attack is possible, but usually tactics utilizing water, foam or retardant is necessary initially to lessen the heat intensity.

Approximate percentages of the Umatilla Agency represented by these fuel models are as follows:

- Fuel Model A.....60%
- Fuel Model C.....25%
- Fuel Model G.....15%

Natural Fire Regimes

Natural fire regimes for a region/area are a good indication of the general wildland fire effects expected with the vegetation common to the area. The effects may be classed as lethal, non-lethal, or a mix of both. Lethal effects occur when fire intensities exceed the adaptations the vegetation has to survive with fire. Non-lethal effects are those in which the vegetation in the burned area is capable of surviving. When plant species within the same area represent both lethal and non-lethal effects, then a mosaic or "patchwork" of vegetation results over the landscape, providing ecosystem diversity.

Fire from natural ignitions (lightning) has had some influence creating and maintaining a landscape mosaic over the Trust Lands of the Umatilla Agency, some of which is still evident today. The natural fire occurrence for this region of Oregon is a combination of short and long term frequency, resulting in low and high intensity wildland fires. Likewise the resulting vegetation is a mixture of lethal and non-lethal situations. Areas affected by lower intensity burns often rejuvenated with the same plant species, but with an increased amount. In pine stands, the effects of a low-moderate intensity fire is a more open appearance with very little damage or mortality to the overstory. More intense burns in grass fuel types usually result with an extensive covering of cheatgrass. Areas with more shrub species, regardless of the heat intensity, often rejuvenated/sprouted prolifically following the burn. High intensity fires in the ponderosa pine types will probably cause some mortality of the dominate overstory, total mortality of the lower vegetation layers and natural regeneration of pine seedlings. High intensity fires in mixed conifers are usually a stand replacement burn resulting in a return to an earlier seral tree species. In either situation, fire was an agent that influenced, to some degree, landscape components of vegetative succession, species composition and diversity and nutrient cycles and productivity.

Many of the wildland fires that influenced vegetation throughout the Umatilla Reservation originated as low to moderate heat intensity burns in the grass-shrub communities. Then as a result of the usual afternoon winds, or a wind event associated with a passing cold front, the heat intensity increased as did the area affected. Some were human caused and some were natural ignitions caused during late summer or early fall thunderstorms.

Without a major disturbance, such as a rapid spreading high intensity fire, a majority of the native grasses and/or shrubs would re-establish an area. These species would eventually occupy the site along with "invader" species of grasses or shrubs. The following display summarizes expected fire regime with vegetation of this region. In most cases, grass and pine non-lethal species are the expected species.

Fire Regime - Vegetation Relationships

Vegetative type	Fuel Model	Expected Fire Regime
Grass	A	Non-lethal
Grass/pine forest	C	Non-lethal
Mixed conifer	G	Lethal, Mixed

The overall goal of the Fuel Management and Hazard Reduction Strategy is to achieve and maintain a fuel level that ensures protection of life, property, and natural and cultural resources. The UMA FMP promotes the use of prescribed fire as a means to promote native vegetation, and enhance waterfowl and aquatic habitat in existing wetland areas. It reinforces guidelines suggested in the Clean Water Act of 1972.

Current goals from the UMA FMP include:

- Develop planning documents for all fuel management areas and projects
- Develop and implement a fuel management program for natural and activity fuels
- Reintroduce prescribed fire into the ecosystem to maintain historic fuel loading and plant communities

A variety of treatment methods are considered, including prescribed fire, mechanical, biomass removal, and natural abatement. Specific treatment method(s) selected for each FMU will reflect the least cost and most effective method.

H. Fiscal Analysis

1. **Workload Analysis Narrative**

Effective wildfire prevention requires planning and analysis to identify where the prevention efforts will have the greatest impact, either reducing the number of human caused ignitions or minimizing damages when fires do occur. After further review, the UMA Fire Management has determined that the 2005 WFPP was unrealistic in its workload analysis. Primarily, this decision adjusts for the number of employees at UMA delegated the workload of Prevention and implementing the WFPP. Risk Assessment and Mitigation Strategies (RAMS) software has been used in this planning process.

The RAMS wildfire prevention module is designed to determine the number of personnel and program dollars needed to accomplish a particular wildfire prevention program of work. The process consists of an inventory of the wildfire prevention activities that are planned to mitigate damages resulting from unwanted wildfire occurrences. These activities include factors such as Education, Engineering, Enforcement and Administration approaches that wildfire managers consider when developing a wildfire prevention plan.

In the workload analysis, wildfire prevention activities have been grouped into areas of general, specific and community actions.

General actions include activities that affect the entire planning unit. Examples of these activities are public relations programs intended to create public awareness of prevention symbols and slogans, planning, training, etc. General action activities are grouped in the following categories:

- Education
- Enforcement
- Engineering
- Administration

Specific actions include activities that affect a specific geographical area. These activities are targeted programs developed for ignition problems identified in the assessment process. Examples of specific actions are cause specific signing, inspections, individual contacts, patrol, etc.

Specific actions activities are grouped into like categories in the areas of:

- Law Enforcement
- Public Contact
- Administration
- Hazards
- Inspections
- Signs
- Patrol

Community actions are similar to specific actions, but are focused on a community rather than a compartment. These actions are targeted for the ignition problems identified in the community assessment process. Community actions tend to concentrate on increasing public awareness and mitigating risk to structures and infrastructure within the community.

2. **Prevention Program Options**

Strategies and actions to develop program options were selected from the actions recommended for equipment and incendiary cause categories. According to the *Wildfire Prevention Strategies, [NFES 1572]* the most effective actions to reduce equipment cause is enforcement, specific campaign development, increased awareness utilizing the media and patrol. The actions outlined in *Wildfire Prevention Strategies* can be completed by the UMA Fire Staff. In the tables that follow there is not going to be much difference in what actions are taken for each specific community. The primary monetary foundation in and around the CTUIR is agriculture. There is a railroad line that travels the entire length of the CTUIR from Mission to Meacham Lake. I-84 travels through the heart of the CTUIR boundary. Equipment prevention methods will be addressed to reduce the equipment fire starts and other fire causes that the UMA responds to. Therefore, the preventative actions taken will be addressed more to the whole of the CTUIR boundaries than being specific to a community.

Upon review of the 2005 RAMS data, the prevention efforts were overestimated for General, Specific and Community Actions. Given the personnel and money for the program many of the actions were not realistic to accomplish for the 2005 WFPP. The UMA Superintendent and UMA FMO have planned the 2012 WFPP will be more realistic in scope and outlook.

The detailed tables of general and specific are found in the Implementation Section of this plan. A summary of the prevention actions is provided in Table 4 to support the workload analysis and prevention strategy. Table 9, General Actions, lists those actions that have impact over the entire planning unit. Table 10, Specific Actions, lists those actions that are more specific to a compartment. Table 11, Community Actions, contains the actions that are specific to a community but that table has been deleted. The reason for deleting Table 11 was due to the fact that the WFPP would address the needs of the entire CTUIR Reservation rather than specific communities. Each of the actions in these tables is independent; therefore, an action appearing in more than one table is planned more than one time.

Table 4 – Prevention
Workload Analysis

Prevention Category	Pre-Program 2005	012 Plan	12 Alt 1
Specific Actions	**Hours Needed**		
Patrol	48	**192**	408
Signs	108	**0**	84
Law Enforcement	12	**0**	136
Hazards	120	**16**	20
Public Contact	37	**66**	99
Inspections	97	**48**	152
Administration	24	**0**	8
Community Actions	72	**0**	0
General Actions	274	**80**	186
TOTALS	792	**402**	1093

3. Effectiveness

BIA-NIFC has established prevention program performance standards. These performance standards are measured by analyzing the expected efficiency of each prevention option. The selected option must prove to be both efficient and cost effective at reducing ignitions. The RAMS software provides estimates of the effectiveness of the prevention options, based on the actions entered as inputs. Table 5 presents the effectiveness analysis.

The overall cost effectiveness of the planned wildfire prevention program was analyzed using the historical wildfire suppression data previously discussed in the Wildfire Occurrence and Historical Data section and the estimated program costs from the Budget Development Section. The 012 Plan and the 12 Alt 1 plan were evaluated against the Historical Plan. As demonstrated in Table 8 Benefit/Cost Analysis, the 012 Plan is the most effective option. Averages from Table 5 were rounded up.

5. Table 5 Effectiveness Table

Y 05 Planned vs. Historical										
				Cause Category						
FMZ	Light-ning	Equip.	Smoking	Camp-fire	Debris	Rail-roads	Arson	Juvenile	Misc.	Total
Percentage	0%	16%	13%	17%	16%	14%	6%	16%	9%	13.38%
							Planning Unit Average			13.38%
012 Plan vs. Historical Pre-Program										
				Cause Category						
FMZ	Light-ning	Equip.	Smoking	Camp-fire	Debris	Rail-roads	Arson	Juvenile	Misc.	Total
Percentage	0%	14%	10%	16%	15%	11%	5%	13%	7%	11.12%
							Planning Unit Average			11.12%
12 Alt 1 vs. Historical Pre-Program										
				Cause Category						
FMZ	Light-ning	Equip.	Smoking	Camp-fire	Debris	Rail-roads	Arson	Juvenile	Misc.	Total
Percentage	0%	15%	13%	17%	16%	13%	6%	15%	8%	12.85%
							Planning Unit Average			12.85%

4. Budget Development Narrative

Table 8 demonstrates that the 012 Plan option is the most cost-effective option thus, it is the preferred alternative. In the 012 Plan, Staffing requirements are divided between 1 GS-6/5 for 4.5 pay periods and 1 GS-11 for 1/2 pay period.[L7] The Staffing requirement produces a total of $11,337. This figure is rounded down to $11,000 in Table 6 of Estimated Total Funding Needs. The workload analysis produced by the RAMS analysis identifies 402 person hours are needed to implement the 012 Plan option. Table 8 compares the current suppression cost data to the proposed budget for the program implementation at approximately 11.12%.

Personnel costs necessary to implement the 012 Plan option were calculated using a figure of $11,000 per year. This figure is based on the 2012 RUS OPM salary table with Employee Benefits Contributions (EBC). RAMS calculates the amount of time required to complete the work outlined in the prevention program, and derives the personnel costs using this figure. Table 6 presents the proposed budget for FY 2012 through FY 2016 for the UMA.

Table 6 – Proposed Budget Summary Table

Fiscal Year	*Estimated Total Funding Needs	Base Salary	EBC Rate (40 percent)	Recurring Support Funding	Non-Recurring support funding
2012	$11,000	$7,068.00	$2827.00	$1000.00	$0
2013	$11,400				
2014	$11,800				
2015	$12,200				
2016	$12,600				
*rounded to the nearest hundred					

In order to implement the 012 Plan option, program support funding is necessary. Since the UMA program is an established program, it is not eligible for non-recurring, start-up funding. Recurring support funding of $1,000.00 is requested for this position. This recurring funding only covers a portion of the items in Table 7. Supplemental funding requests may be generated and will be consistent with the 2012 Prevention Handbook Supplemental Funding Request Guidelines.

b. Table 7 – Program Support Items

Recurring Expenses		**Non-Recurring Items**
Item		**Item**
GSA Vehicle Lease (Pickup)		AV Equipment (Computer, Software, Printer, Projector)
COE Education Materials		Fire Danger Signs
Training and Travel		Prevention/Education Supplies
Smokey Bear Education Items		New technology items
Public Service Announcements		Smokey Costume Replacement
Cell Phone Service		Radios
Office Supplies		
Overtime		
Copying/Printing		

5. Benefit Cost Narrative

The benefit/cost calculated for this revision is 2.02:1. The benefit/cost ratio is a realistic estimate of the actual program workload by UMA fire staff available to accomplish the work. The benefit/cost calculated for this revision is 2.02:1, which is above the 1:1 value established as national policy. The decrease in the benefit of this revision is due to a more realistic estimate of the actual program workload and a change in the formula used to calculate benefits.

a. Table 8 Umatilla Agency Benefit-Cost Analysis

Region	Agency/Tribe	Fire Management Unit	WFMI Number of Fires	WFMI BIA Acres Burned	WFMI Number of Years
Northwest	Umatilla Agency/CTUIR		124	2,188.0	10

2002-2007 Cost/Fire Estimate	**$16,127.48**	
FMU Average Annual Fire Occurrence		**12**
FMU Average Annual Acres Burned	**219**	
Average Annual Suppression Cost based on Cost/Fire Estimate		**$199,980.75**

	RAMS Staffing Requirements	Program Funding Required	RAMS Projected Program Efficiency*	Benefit - Cost Ratio	Annual Estimated Reduction in Fires **	Annual Estimated Reduction in Burned Acres	Effectiveness savings per year based on per fire
Historical	NA	$0.00	0.00%	**0**	**0**	**0.00**	**$0.00**
Y 05 Plan	1 GS-5, 13 PP	$11,000.00	13.38%	**2.43:1**	**2**	**29.30**	**$26,757.42**
012 Plan	GS-6/5 4.5 PP & 1 GS-11 .5 PP[L8]	$11,000.00	11.12%	**2.02:1**	**1**	**24.35**	**$22,237.86**
12 Alt 1 Plan	GS-6/5 8 PP & 1 GS-11 5 PP	$30,000.00	12.85%	**0.86:1**	**2**	**28.14**	**$25,697.53**

Page Intentionally Left Blank

III. Implementation Plan

A. Wildfire Prevention Program Policy Requirements

The Bureau of Indian Affairs – Branch of Forestry and Wildland Fire Management at the National Interagency Fire Center (NIFC) has established policy for Wildfire Prevention. Wildfire Prevention Plans are a prerequisite to secure long-term prevention program funds. It is also the BIA NIFC policy for a WFPP to address certain required elements (listed below) to secure recurring funding for the wildfire prevention program. This WFPP addresses all of the required elements listed below. A WFPP was first approved by the Regional Director in 2005.

Fire Management Plan: A fire management plan must be completed and approved to be eligible for long-term wildfire prevention program funds. This plan was completed for the Umatilla Agency in May of 2000.

Program Support: Support of wildland fire management practices by the CTUIR Government must be documented and known to the tribal members. While there is no letter of support from CTUIR their authorized representative's signature on the UMA FMP is evidence that the tribe supports the program.

Burn Permits: Dual Burn Permits are required by both ODF and CTUIR Tribal Air Quality before ignition. A burn permitting system must be in place to manage the appropriate time, weather, smoke dispersion, and fire behavior characteristics conducive to safe burning operations. As per Exhibit C of the Local Operating Plan between the Bureau of Indian Affairs, Umatilla Agency and the Oregon Department of Forestry Northeast Oregon District burning permits are issued as a fire prevention measure.

All burning on lands (trust and fee) within the diminished boundary of the CTUIR requires a written burn permit from Tribal Air Quality. This permit is a combination air quality and fire prevention permit. The BIA requires pre-burn authorization for the use of fire as a resource management tool on all lands involving Trust ownership. Each agency will provide timely notification to the others of all planned and known fire activity within their jurisdictional area. Burning procedures, regulations, and restrictions will be coordinated by all agencies to minimize confusion and maximize compliance by the affected public. In the event of closures or restrictions when fire danger conditions warrant, restrictions and/or closures on Trust lands may be necessary. This coordination will be done in cooperation with ODF, CTUIRFD, BIA and CTUIR Tribal Council.

Wildfire Investigation: The Umatilla Agency Widlfire Investigation Policy provides the framework for investigating and documenting cause and origin on human caused fires documented in the Local Operating Plan between ODF and UMA. It states: "Protection of the point of origin is vital in fire cause determination. Initial attack resources will assist in this effort by initiating protection of the point of origin. The initial IC shall make a reasonable attempt to save, protect or gather evidence that reflects the fire cause and may be asked to provide a written narrative of their actions and observations. The protecting agency has the responsibility to investigate the fire."

Law Enforcement: As per the Umatilla Agency Law Enforcement Wildfire Investigation Policy, information pertaining to a wildland fire trespass or arson situation will be forwarded to the Umatilla Tribal Police Department and coordinated with the BIA. If the case warrants, it can be referred to the local FBI agent assigned to the CTUIR for further investigation, or an arson investigation team can be ordered through Blue Mountain Interagency Dispatch Center in La Grande, Oregon for more complex situations.

Community Wildfire Protection Plan (CWPP): The BIA considers WFPP an equivalent document to a CWPP. In order for this CWPP to be met the requirements listed below must be addressed in the prevention plan. This approach recognizes that all facets of the Fire Management organization (prevention, suppression and fuels) are interdependent and must work toward a common purpose and complement one another toward sustaining healthy and productive First Foods ecosystems and protecting human life and property. The following requirements are based upon the Healthy Forest Restoration Act (HFRA).

- **Collaboration**: A CWPP was a partnership effort developed by CTUIR Tribal members, CTUIR Fire Department, Oregon Department of Forestry, United States Forest Service and paid and rural fire departments.[L9]
- **Prioritized Fuel Reduction**: This CWPP identifies and prioritizes two areas for hazardous fuel reduction treatments in Meacham Lake area and Umatilla area. The WFPP recommends the types and methods of treatment that will protect one or more at-risk communities. Both projects are identified in the Federal Register.
- **Treatment of Structural Ignitability**: This CWPP recommends mass media and patrols to communicate fire danger messages that homeowners and communities can use to reduce the ignitability of structures throughout the area.

CWPP/WFPP Equivalency and Approval Comparison

	CWPP	WFPP
Applicable Local Government	County or City Government (tribes may choose to participate)	Tribal Government and/or BIA Agency
Fire Department	Local Fire Department (s) (tribal fire departments may also be included)	The local fire suppression entity (CTUIR FD, BIA Agency Fire Management, VFD, etc.)
Forest/Land Management	The state entity responsible for forest management (tribal forest management plans may be used for priority setting)	Federal or Tribal Land Management Agency

Preventative Actions: Prevention actions are the activities that have been selected and analyzed in the planning process to be the most cost-effective measures in order to reduce the incidence of human caused fires and the risk of loss of life and property. Prevention actions are divided into three categories:

- General Action
- Specific Action
- Community Action

The implementation section of the plan must include a detailed description of these actions and the hours associated. The information is generated from the RAMS software under the prevention/general actions and/or specific actions.

B. General Actions Description

General actions are implemented over the entire planning unit. They are general in nature and provide awareness to the public about preventing unwanted human caused fires. Due to the personnel hours required much of the UMA WFPP will be operating at the general action table.

i. Table 9 GENERAL ACTIONS

Education Totals										
Group	**Action**	**Unit Hours**	**Pre Program**	**2012 Planned**	**2013 Planned**	**2014 Planned**	**2015 Planned**	**2016 Planned**	**Alt 1**	**Total # of Hours Planned Annually**
Signs	Prepare Plan	40								0
Signs	Maintain Plan	4								0
Fire Danger Rating	Adjectives to Field	0.25		12	12	12	12	12	14	3
Mass Media	Media Contacts	1		1	1	1	1	1	1	1
Mass Media - Radio	Media Contacts	1		12	12	12	12	12	14	12
Mass Media - Written	Media Contacts	2		6	6	6	6	6	8	12
Mass Media - Television	Media Contacts	2								0
Mass Media - WWW	Days of Web Design/ Mtc	8								0
Volunteers	Plan For Volunteers	40								0
Volunteer Fire Departments	Train in Fire Prevention	4								0
Wilderness Train/Equip	Train, Equip Employee	2								0
Public Education	Prev Pgms	8								0
Interagency Campaigns	Prepare Plan	24								0
Interagency Campaigns	Program Implementation	80								0
Specific Campaign Development	Prepare Plan	24		1	1	1	1	1	1	24
Programs - Bilingual	# of specific programs	8								0
Childrens' Programs	Cause Specific	8								0
School Program	Lvl 1 Team Teaching	8								0
School Program	Lvl 2 Presentation	20							6	0
Parade	prep Time, Parade	40								0
Fair	Days of Booth Time	20								0
Sports Activity	Sports/Rodeo Activity	48								0
Fire Education Materials	Fire Prevention Materials	8								0
Printed Material - Other	Design	16								0
Exhibits	# of Exhibits	16								0
Character Appearance	# of Appearance	8								0
Public Contact	2 Hr/key Person	2		1	1	1	1	1	1	2
Public Contact	3 Hr/Group	3								0

GENERAL ACTIONS TABLE

Group	Action	Unit Hours	Pre Program	2012 Planned	2013 Planned	2014 Planned	2015 Planned	2016 Planned	Alt 1	Total # of Hours Planned Annually
Public Utilities Management	Inform of Req's	40								0
Govt. Agency	Govt. Agency Coordination	40								0

Law Enforcement Totals

Group	Action	Unit Hours								
Permits	Burn, Blas, Weld, Campfire	0.5								0
Training Permits	Train Issuing Employee	4								0
Restriction Closure	Restrict Plan/Procedures	8		1	1	1	1	1	1	8
Spark Arrestors	Train Inspectors	8		1	1	1	1	1	1	8
Spec Use Inspections	Fire Criteria in Permit	1								0
Indust Ops Inspection	Fire Criteria in Contract	2		5	5	5	5	5	6	10
Structure Improvements	Develop Struct Imp Plan	8								0
Fire Prevention Patrol	Develop patrol plan	16								0

Administration Totals

Group	Action	Unit Hours								
Prevention Plan	Prepare Unit Plan	80								0
Prev. Committee	Participate in Mtgs.	8								0
Training	Provide Intro. Trng.	8								0
Develop Early Warning System	Preparedness	8								0
Implement Corporate Programs	Develop plan	16								0
Total General Action Hours Annually										**80**

C. **Specific Actions Description**: Specific actions refer to those activities/actions that target specific causes in a localized area (compartment, Fire Management Unit, etc.) Specific actions are more focused than general actions and their effect is easier to see and quantify.

i. Table 10 SPECIFIC ACTIONS

Group	Action	Unit	Unit Hours	012 Planned	2013 Planned	2014 Planned	2015 Planned	2016 Planned	Alt 1	Total # of Hours Planned Annually
Patrol										
Patrol	When danger or risk dictates	days	4	48	48	48	48	48	408	192
Signs										
Group	Action	Unit							84	
Maintenance	Maintain Existing Signs	each	6							
Construction	Build Additional Signs	each	12							
Law Enforcement										
Group	Action	Unit							136	
Issue cite or warning	1 hr per incident	each	1							0
Court Appearance	8 hrs. per case	each	8							0
Fire Unknown Suspect	8 hrs. per investigation	each	8							0
Known Suspect	5 days per case	each	40							
Fire Invst - PFI	4 hrs. per investigation	each	4							
Hazards										
Group	Action	Unit							20	
Reoccuring Project	10 days per year	hrs.	80							0
Special Project	# of hours	hrs.	1	16	16	16	16	16		16
Public Contact										
Group	Action	Unit							99	
Individual	15 min. per contact	hrs.	0.25	46	46	46	46	46		46
Group	3 hrs. per contact	hrs.	3							0
Key People	2 hrs. per contact	hrs.	2	20	20	20	20	20		20

SPECIFIC ACTIONS TABLE

Group	Action	Unit	Unit Hours	2012 Planned	2013 Planned	2014 Planned	2015 Planned	2016 Planned	Alt 1	Total # of Hours Planned Annually
Inspections										
Group	Action	Unit							152	0
Electronic site	4 hrs. / site initial	hrs.	4	7	7	7	7	7		28
Residence	0.5 hrs. initial	hrs.	0.5	4	4	4	4	4		2
Residence	0.25 hrs. follow-up	hrs.	0.25							0
Powerline	1 Mi/Hr	hrs.	1							0
Railroad	10 Mi/Hr	hrs.	1	2	2	2	2	2		2
Resorts/Camps	4 Hrs. Initial	hrs.	4							
Resorts/Camps	2 Hrs. Follow-up	hrs.	2							
Site-Other	4 Hrs./Site	hrs.	4							0
Improved C.G.	1 Hr Annually	hrs.	1							0
Unimproved C.G.	15 Min Ind Unit	hrs.	0.25	45	45	45	45	45		11
Special Risk	8 Hrs. Inspect/ Prob Anal	hrs.	8							0
Timber Sales	2 Hrs Initial	hrs.	2							0
Timber Sales	1 Hr Follow-up	hrs.	1	2	2	2	2	2		2
Sawmills	4 Hrs Initial	hrs.	4							0
Sawmills	2 Hrs Follow-up	hrs.	2							0
Mining Ops.	4 Hrs Initial	hrs.	4							0
Mining Ops.	4 Hrs Follow-up	hrs.	4							0
Gas/Oil Wells	1 Hrs Initial	hrs.	1							0
Gas/Oil Wells	0.5 Hrs Follow-up	hrs.	0.5							0
Large Construction	4 Hrs Initial	hrs.	4							0
Large Construction	2 Hrs Follow-up	hrs.	2							0
Small Construction	2 Hrs Total	hrs.	2							0
Dumps	1 Hrs per Dump	hrs.	1	1	1	1	1	1		1
Spark Arrestors	0.5 Hrs	hrs.	0.5							0
Burning Permit	0.5 Hrs per Inspection	hrs.	0.5							0
Target Range	2 Hrs	hrs.	2	1	1	1	1	1		2
Administration										

Group	Action	Unit								
Recruit, Train Equip/ Super	Volunteered	hrs.	0.15							0
Planning	Compartment Specific Plan	hrs.	8							
Total Hours										**322**

D. **Community Actions Description**: Community actions are those activities/actions to be implemented in a specific community. They focus around raising community awareness, reducing structural ignitability, and building partnerships. Community actions will not be considered due to the workload of 402 hours and the budget of $11,000.00 for the current staff. Therefore, Table 11 is not included with this document.

E. Structural Ignitability Description: These actions are closely tied to the community actions and focus on reducing structural ignitability. In the process of assessing community risk, special attention was paid to the factors affecting structural ignitability according to Firewise. Overall, the level of Firewise compliance throughout the CTUIR is relatively good. The factors assessed were:

- Roofing-type of material
- Siding-type of material
- Landscaping-type and location of material
- Roof Hygiene-Quantity of debris
- Landscape Hygiene-maintenance of yards
- Structural Hygiene- maintenance of buildings
- Flammables-location of flammables

A generalized evaluation was made for the entire community; the evaluation was then assigned a numeric value and summed. The sums are presented as percentages.

Table 12: Structural Ignitability

Evaluation Factors	Compliance Rating		
	High	Moderate	Low
	Percentages		
Overall Firewise Compliance	13	77	10
Roofing material	34	56	10
Siding	20	78	2
Landscaping	24	70	6
Roof Hygiene	20	73	7
Landscape Hygiene	19	78	3
Structural Hygiene	27	68	5
Flammables	15	85	0

Based on the assessment conducted to gather data for this plan, the following issues should be addressed through the actions identified in this plan.

- Prepare news releases that discuss the hazards presented by the choice of roofing materials, roofing hygiene and landscaping alternatives.

F. **Fuels Treatment Options** (Prioritized Hazardous Fuels Reduction Areas)

The top priorities for fuels treatment options are the communities at risk, the Foothills and Lowlands of the CTUIR. NFPORS is the system of record for hazardous fuel reduction treatments for the BIA. Fuels treatments are identified and prioritized annually through collaboration with the BIA fire staff and the CTUIR Natural Resources Forestry staff. The treatments identified on this list are subject to change based on changes in available funding, weather, fuels, WUI conditions and CTUIR priorities.

Currently, there are two projects identified for implementation in the National Fire Plan Operations and Reporting System (NFPORS), Meacham Lake and Umatilla Range burn. Both projects are within the Foothills and Lowlands of the CTUIR. The Meacham Lake project is a mechanical thinning reduction of hazardous fuels and the Umatilla Range burn is identified as a broadcast burn to eradicate hazardous fuels. Of the two projects, Meacham Lake takes first priority due to WUI factors. The Federal Register, Volume 66, Number 160, Friday August 17, 2001, lists 11 communities within the CTUIR boundary as Urban Wildland Communities Within the Vicinity of Federal Lands that are at High Risk from Wildfires. Meacham Lake and Umatilla are two of those communities that have been identified by the Federal Register.

G. **Annual Calendar**

The following calendar details a fire prevention planning aide with major actions listed by month. Not all prevention actions were included in this calendar, since it is assumed that some would occur throughout the year or as opportunities occur or were minor in terms of time commitment. However, many actions are seasonal and can be planned to ensure implementation occurs.

BIA Umatilla/CTUIR Yearly Planning Calendar - Fall			
Month	**Action Description**	**Type of Actions**	**Notes**
October			
	Deliver School Programs and Conduct Smokey Appearances	General and Specific	Fire Prevention Week.
	Maintain Signs	Specific	To prepare for fall fire season.
	Make Media Contacts	General	Fire Prevention Week.
	Review Patrol Plan	General	Prepare for Fall/Winter Season
	Inspect Campsites and Campgrounds	Specific	To prepare for Fall Hunting Season.
	Review Burn Permit System and train any involved staff	Specific	This is in anticipation of entering dormant season.
November			
	Patrol as warranted	Specific	Conduct inspections and public contacts while on patrol.
	Investigate Wildfires	Specific	Follow up with trespass or cost recovery where appropriate.
	Deliver School Programs	General and Community	Continuing opportunity
December			
	Investigate Wildfires	Specific	Follow up with trespass or cost recovery where appropriate.
	Deliver school programs and public education programs	General and Community	Continuing opportunity
	Update agreements	General	Continuing opportunity

BIA Umatilla/CTUIR Yearly Planning Calendar - Winter			
Month	**Action Description**	**Type of Actions**	**Notes**
January			
	Deliver school programs and public education programs	General and Community	Continuing opportunity
	Make Media Contacts	General	The current Winter/Spring fire season is a good topic.
	Set up exhibits	General and Community	Winter/Spring Fire Season is a great topic.
	Renew and visit with key contacts	Specific and Community	In preparation for spring season.
	Investigate Wildfires	Specific	Follow up with trespass or cost recovery where appropriate.
	Review Burn Permit System and train any involved staff	Specific	
February			
	Make Media Contacts	General	Fire Season is a great topic.
	Investigate Wildfires	Specific	High priority action this month. Follow up with trespass or cost recovery where appropriate.
	Deliver School Programs	General and Community	Continuing opportunity
	Order Smokey and Fire Education Materials	General	
March			
	Patrol as warranted	Specific	Conduct inspections and public contacts while on patrol.
	Investigate Wildfires	Specific	High priority action this month. Follow up with trespass or cost

			recovery where appropriate.
	Make Media Contacts	General	Broadcast Prevention PSA at Wildhorse Cinemas.

BIA Umatilla/CTUIR Yearly Planning Calendar - Spring			
Month	**Action Description**	**Type of Actions**	**Notes**
April			
	Deliver school programs and public education programs, team teaching events	General	Spring creates opportunity for outdoor classroom events
	Make Media Contacts	General	Broadcast Firewise PSA on CTUIR Radio.
	Renew and visit with key contacts	General & Specific	Meet with Tamastslikt Director about wildfire history kiosk
	Patrol as warranted	Specific	Conduct inspections and public contacts while on patrol.
	Investigate Wildfires	Specific	Follow up with trespass or cost recovery where appropriate.
May			
	Deliver school programs and public education programs, team teaching events	General	Spring creates opportunity for outdoor classroom events
	Renew and visit with key contacts in “hot spots” from past season.	Specific	To gather information for investigations and planning.
	Review Burn Permit System and train any involved staff	Specific	This is the opportunity to review prior to the summer season.
June			
	Maintain Signs	Specific	To prepare for Summer fire season.
	Patrol as warranted	Specific	Conduct inspections and public contacts while on patrol.
	Make Media Contacts	General	Broadcast PSA on CTUIR Radio station.

BIA Umatilla/CTUIR Yearly Planning Calendar - Summer			
Month	**Action Description**	**Type of Actions**	**Notes**
July			
	Make Media Contacts	General	Broadcast Prevention PSA on CTUIR Radio station.
	Set up exhibits	General	Summer Fire Safety, feature equipment caused fires as a topic.
	Renew and visit with key contacts	General & Specific	Broadcast Prevention PSA on CTUIR Radio station.
	Check on signs for maintenance needs	Specific	In preparation for Summer season.
	Patrol as warranted	Specific	Conduct inspections and public contacts while on patrol.
	Investigate Wildfires	Specific	Follow up with trespass or cost recovery where appropriate.
August			
	Patrol as warranted	General & Specific	Conduct inspections and public contacts while on patrol.
	Renew and visit with key contacts	General & Specific	Broadcast Prevention PSA on CTUIR Radio station.
	Investigate Wildfires	General & Specific	Follow up with trespass or cost recovery where appropriate.
	Deliver School Programs	General & Specific	School starts again.

September			
	Patrol as warranted	Specific	Conduct inspections and public contacts while on patrol.
	Investigate Wildfires	Specific	Follow up with trespass or cost recovery where appropriate.
	Train CTUIR Fire on prevention techniques.	General & Specific	Opportunity to train CTUIR Fire in FI-110.
	Deliver School Programs	General and Community	Continuing opportunity.
	Pendleton Round-Up	General	Participate as Interagency partner.
	Pendleton Round-Up Parade.	General	Participate as Interagency partner.

IV. Appendices
Note: All Appendices supplied on USB Flash Drive

Appendix A Documentation of Program Support and Operating Plan

A1 Umatilla Agency Fire Management Plan & Environmental Analysis

A2 BIA Umatilla Agency 2012 Annual Operating Plan

A3 CTUIR Map

A4 Wanaket Map

Appendix B Documentation of Tribal Support

B1 Cooperative Agreement NO. GTP07T14310 Between the Bureau of Indian Affairs, Umatilla Agency and the Confederated Tribes of the Umatilla Indian Reservation

Appendix C Law Enforcement Standard Operating Procedure

Appendix D RAMS Analysis Printouts, Tables and .mdb File

D1 Table 1 Fire Cause History and Cause Summary

D2 Table 2 Composite Fire Management Unit Assessment Ranking

D3 Composite Community Assessment Ranking

D4 Table 4 Prevention Workload Analysis

D5 Table 5 Effectiveness Table

D6 Table 6 Proposed Budget Summary

D7 Table 7 Program Support Items

D8 General Actions Table

D9 Specific Actions Table

Appendix E Preparedness Plan

E1 Bureau of Indian Affairs Umatilla Agency Wildland Fire Prevention DRAFT Plan

Appendix F Burn Permit System

F1 Exhibit C Local Operating Plan between Bureau of Indian Affairs, Umatilla Agency and the Oregon Department of Forestry Northeast Oregon District

Appendix G INVF Policies and Procedures

G1 Cooperative Agreement NO. GTP07T14310 Between the Bureau of Indian Affairs, Umatilla Agency and the Confederated Tribes of the Umatilla Indian Reservation

G2 Policy and Procedures for Law Enforcement and Coordination of Fire Investigations

Appendix H Community Assistance Information

H1 Community Assistance Project Proposal Form

H2 Community Assistance Projects

Appendix I Smokey Bear Guidelines

I1 Smokey Bear Guidelines

Appendix J Accomplishment Reporting Forms

J1 BIA Fire Prevention Activity/Event Accomplishment Documentation

J2 ICS 214 Form

Appendix K Inspection Forms

K1 Community Assessment Form

K2 Powerline Inspection Record

K3 Railroad Track Inspection Record

K4 Photo Log BIA Confidential/Protected Investigation Work Product

Appendix L Communications Plan

L1 2012 Wildland Fire Prevention Communications Plan BIA Umatilla Agency

Appendix M Patrol Plan

M1 2012 Wildfire Prevention Patrol Plan Umatilla Agency

Appendix N Sign Plan

N1 BIA Umatilla Agency Wildfire Prevention Sign Plan

Appendix O DOI Standard Position Description

Bridge Creek Fire, August 2001 - near Hwy 395

Umatilla County

Community Wildfire Protection Plan

(Blue Mountains and Foothills Region)

This is a working document that will serve as a resource for enhancing community safety through hazard and risk reduction in the wildland-urban interface areas of Umatilla County.

06/16/05

This page was intentionally left blank.

TABLE OF CONTENTS

1. Signature Page

The contents of this document have been agreed upon and endorsed by the Umatilla County Commissioners, the District Forester of the Northeast Oregon District for Oregon Department of Forestry, and the County's structural fire representative. This plan is not legally binding in that it does not create or place mandates or requirements on individual jurisdictions. It is intended to serve as a planning tool for the fire and land managers of Umatilla County, and to provide a framework for those local agencies associated with wildfire suppression and protection services to assess the risks and hazards associated with wildland-urban interface areas and to identify strategies for reducing those risks. This is a working document to be reviewed at least annually by members of the Steering Committee and updated as necessary, as outlined in the Monitoring and Evaluation section. The contents, vision, mission, goals, and objectives of this plan will become a part of any operation plan of the agencies represented below:

William S. Hansell — 6/16/05

Bill Hansell, Umatilla County Commissioner — Date

Emile M. Holeman — 6-16-05

Emile Holeman, Umatilla County Commissioner — Date

Dennis L. Doherty — 6-16-05

Dennis Doherty, Umatilla County Commissioner — Date

John Buck — 6-16-05

John Buckman, Northeast Oregon District Forester — Date
Oregon Department of Forestry

James K. Stearns — 6-16-05

Jim Stearns, Umatilla/Morrow/Gilliam County Fire Defense Chief — Date

This page was intentionally left blank.

2. Executive Summary

In response to state and federal legislation, the private sector and community organizations across Oregon have worked collaboratively with local, state, and federal wildland fire protection agencies to reduce the impact of wildfire on lives, property, and the landscape. Local communities now have a unique opportunity to influence where and how federal agencies implement fuel reduction projects on federal lands, and how federal funds may be distributed on non-federal lands. The Umatilla County Commissioners tasked a committee of local, state, and federal wildfire agencies, land managers, and private citizens with creating a Community Wildfire Protection Plan (CWPP) for the wildland-urban interface (WUI) areas in Umatilla County. The urban-interface area is the zone where structures and other human development meet and interact with undeveloped wildland or other vegetative fuels.

The committee chose to focus resources on the forested areas of the county since that landscape more nearly meets the criteria for wildland-urban interface. The project area for the CWPP encompasses the eastern and southern portions of Umatilla County (the Blue Mountains and foothills region). The remainder of Umatilla County will need to be covered under another planning document.

Goals of the CWPP include:

- ✓ promote wildfire awareness and target fire prevention and safety information across at-risk communities
- ✓ promote cooperative emergency fire response, identify available resources and needs, and review interagency communication and suppression strategies
- ✓ identify, assess, and reduce hazardous fuels, coordinate risk reduction strategies, and prioritize fuel reduction areas and projects
- ✓ complete annual monitoring and evaluation to assess progress and effectiveness and recommend changes as appropriate

Those communities and WUI areas most at-risk from a wildfire event were identified and prioritized based on public input, local area knowledge of the committee, and an assessment of hazard factors using federal and non-federal data. Information from this hazard assessment was used to develop a scoring matrix. The committee designated and prioritized thirteen WUI areas within Umatilla County:

<u>High Priority</u>
I-84 Corridor
Battle Mountain
Lehman / Hidaway
Weston Mountain / Umatilla River
Mill Creek / Government Mountain

Moderate Priority	Low Priority
Upper 204 / Tollgate	Walla Walla River
Pine Grove	
Camas	
Ukiah	
Birch	
Pearson Guard Station	
McKay	

Specific action items for education, treatment, and emergency response activities were developed for each WUI. Common themes often presented themselves. These repeated themes include presenting FireWise workshops to at-risk communities, general forest health and management activities (such as mechanical thinning and prescribed burning), and treatment strategies along roadways to control noxious weeds and thick, flashy brush. With the continually increasing influx of year-round and seasonal residences, creating and maintaining defensible space around structures remains a top priority for agencies. Wildland fire protection agencies continue to provide updated information to both landowners and tourists on Public Use Restrictions including safe debris burning and campfire restrictions.

The Umatilla County CWPP is a working document that will serve as an informational resource for landowners, agencies, and other stakeholders. It will become a part of the Umatilla County Natural Hazard Mitigation Plan as the wildland fire section of that plan. While some strategies and activities could be individually accomplished by landowners, the CWPP is not intended to mandate treatment activities. It is provided only as a resource and guidance document.

3. Introduction

Background of Wildfire Planning Efforts[1]

Wildland fires are a common and widespread natural hazard in Oregon; the state has a long and extensive history of wildfire. Oregon has over 41 million acres (more than 64,000 square miles) of forest and rangeland that are susceptible to wildfire. Significant portions of Oregon's wildlands and areas adjacent to rural communities, especially in central and eastern Oregon, are dominated by ecosystems that are fire dependent. Agricultural areas in northeastern Oregon grow crops such as wheat that are especially prone to wildfire damage. Many landowners are also converting large acreages over to the Conservation Reserve Program (CRP) and Conservation Reserve Enhancement Program (CREP), administered by the Farm Service Agency. These lands, especially once in these programs for several years, seem to have a high vulnerability to wildfire events. Communities are also at risk. In the *2001 Federal Register*, there were 367 communities in Oregon identified as being at risk of damage from wildfire.

Over the last few decades, wildland fires in Oregon and across the western United States have increased public awareness to the potential losses of life, property, and natural and cultural resources. The 1995 Oregon Legislature directed the Oregon Department of Forestry (ODF) to "specifically examine the wildland/urban interface situation." To meet this directive, ODF formed the Wildland/Urban Interface Technical Working Group, and in 1997, the Legislature passed the Oregon Forestland Urban-Interface Fire Protection Act, which recognized that the scope of the wildland/urban interface fire problem was beyond what the suppression forces could handle. The key problem was too much fuel around homes in the form of vegetation, as well as the homes themselves. Research showed that the homes were burning because they supplied fuel for the wildfires, but if that fuel load was reduced on and around the home, then the chances of survival increased dramatically. Lawmakers felt that fuel modification on residential property could only be done by the homeowners, and ODF was tasked with implementing the Act.

> ***Wildland-Urban Interface (WUI)***
> This is the area or zone where structures and other human development meet or intermingle with wildland or vegetative fuels.

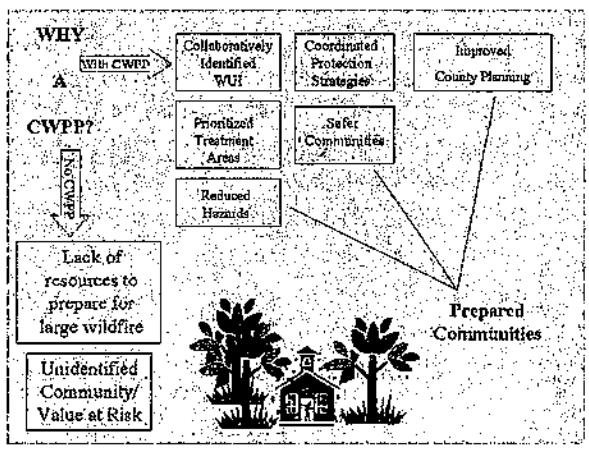
Wildfires exact enormous financial and social costs, from the escalating costs of fighting larger and more complex wildfires, to the loss of homes and lives. There are both short and long-term economic and environmental consequences of large-scale fires. Reducing the impact on lives, property, and the landscape can be realized through preparedness and risk reduction efforts, including a coordinated planning effort for fire protection and implementing activities among local, state, and federal agencies, the private sector, and community organizations. Individual property owners have a major role to play in this coordinated effort, especially in the wildland-urban interface areas.

Over the last three years, ODF has obtained grant dollars to assist Umatilla County private landowners in fuels reduction projects. Grant sources have included National Fire Plan (NFP), the Department of Interior, the Department of Agriculture, Oregon Watershed Enhancement Board, Title III Secure Rural Schools, and Bureau of Indian Affairs. These grant monies have been combined with ODF and participating landowner matching/cost-share dollars to finance these treatment projects. Statewide, ODF units have taken the lead in the development of strategic community wildfire protection plans for implementation of the NFP and Healthy Forests Restoration Act (HFRA) on lands adjacent to or near federal ownership. With funding obtained from a Umatilla County grant, ODF initiated the formation of a steering committee in May 2004, to develop the Umatilla County Community Wildfire Protection Plan (CWPP). The planning process will help identify, prioritize and implement fuels reduction projects, fire prevention education, and other fire-related programs, and support ongoing coordination among fire agencies. By working together to create a local CWPP, Umatilla County, through its association with state and federal forest managers, will continue to stay competitive for federal funding programs such as HFRA, NFP, and Federal Emergency Management Agency (FEMA) Pre-Disaster Mitigation Program.

Preparing a Community Wildfire Protection Plan[2]

Both the *National Fire Plan* (NFP) and the *Ten-Year Comprehensive Strategy for Reducing Wildland Fire Risks to Communities* have placed a priority on a collaborative and local involvement in the effort to reduce the risk from large-scale wildfire events. The incentive for communities to engage in comprehensive forest planning and prioritization was given new momentum with the enactment of the Healthy Forest Restoration Act (HFRA) in 2003. The language in HFRA allows flexibility for communities to determine the substance and detail of their plans and the procedures they use to develop them. HFRA emphasizes the need for federal agencies to work collaboratively with communities in developing hazardous fuels reduction projects and places a priority on those treatment areas identified in the local fire plan document.

The participation of local government in the development and implementation of a community wildfire protection plan is also supported by FEMA direction to prepare county hazard mitigation plans and the implementation of Oregon SB 360.



Slide by Angie Johnson, ODF

Fire Policies and Local Planning[3]

Extensive efforts have been undertaken at local, state, and federal levels related to land use planning, community fire planning, and fire protection. This section describes these various efforts as well as related county, state, and federal programs and policies.

Healthy Forests Restoration Act (HFRA)

The Healthy Forest Initiative (HFI), announced in 2002, was designed to identify and remove barriers for implementing restoration projects across national forests. HFI gave federal land managers the authority to treat land as Categorical Exclusions (CE) allowing agencies to move through the NEPA process more quickly, when conditions were appropriate (without an Environmental Assessment (EA) or Environmental Impact Statement (EIS) being required for actions taken on public lands). Review processes were streamlined and new regulations were created under the Endangered Species Act for National Fire Plan projects, to streamline consultation with federal regulatory agencies. HFI set the stage for discussion between Congress and the administration, resulting in new legislation addressing forest health issues.

The Healthy Forest Restoration Act (HFRA) was enacted by Congress in November 2003, providing new tools and additional authorities for treating more acres more quickly in order to meet restoration goals. It provides for new authority to treat fuels on federal land that require NEPA at the EA or EIS level. HFRA strengthens public participation by providing incentives for the local communities to develop their own community wildfire protection plans. It limits the complexities of Environmental Analyses for hazard reduction projects. It provides a more effective appeal process and instructs the Courts to balance short-term affects of implementing projects against the harm caused by delay and long-term benefits of a restored forest.

HFRA Title I addresses vegetation treatments on National Forest System and Bureau of Land Management lands that are at risk of wildland fire or insect and disease epidemics (emphasis is on Fire Regime I, II, and III in Condition Class 2 & 3). Title II encourages each community to develop their own CWPP and to designate their own specific WUIs where restoration projects might occur. Half of all fuel reduction projects under the HFRA must occur in the community protection zone as defined by HFRA. It also encourages biomass energy production through grants and assistance to local communities to help create market incentives for the removal of otherwise valueless forest material.

National Fire Plan (NFP)

Following the explosive fire season of 2000, the National Fire Plan was established to respond to severe wildland fires and their impacts to communities. It is an umbrella term that covers a variety of government programs and ideas addressing wildland fire issues. The NFP is a long-term investment that will help protect human lives, communities, and natural resources, while fostering cooperation and communication among federal, state, and local governments, tribes, and interested publics. Federal

fire agencies worked closely with these partners, and the Western Governor's Association completed a 10-Year Comprehensive Strategy in August 2001. An Implementation Plan was developed in May 2002 to provide consistent and standard direction for implementing the NFP and the Strategy.

The NFP is focused on firefighting, rehabilitation, hazardous fuels reduction, community assistance, and accountability. The guiding principle for dealing with fire risks is the reduction of hazardous fuel loads threatening communities and wildland ecosystems. Most NFP funding in Oregon goes to wildfire preparedness and hazardous fuel treatment projects.

Federal Emergency Management Agency (FEMA)

Federal Emergency Management Agency (FEMA) has requirements under Title 44 CFR Part 201 of the Disaster Mitigation Act of 2000. This legislation specifies criteria for state and local hazard mitigation planning which require local and tribal governments applying for Pre-Disaster Mitigation (PDM) funds to have an approved local mitigation plan. These may include countywide or multi-jurisdictional plans as long as all jurisdictions adopt the plan. Activities eligible for funding include management costs, information dissemination, planning, technical assistance and mitigation projects.

Oregon Senate Bill 360 (SB 360)

Senate Bill 360, known as the Oregon Forestland-Urban Fire Protection Act of 1997, is currently being implemented across Oregon on a priority basis. Currently, only Jackson and Deschutes Counties have been enacted. ODF recently hired one staff person to work on implementing SB360 in the Northeast Oregon (NEO) District, which covers 1.6 million acres in four counties: Umatilla, Union, Baker, and Wallowa.

The Oregon Legislature passed the law in response to several escalating problems such as:

- Wildland fires burning homes
- Firefighters risking their lives in conflagrations
- Rising suppression costs
- Reduced fire protection for wildland areas

Lawmakers concluded that dealing with the escalating issue of wildland interface fires must involve not only the fire protection agencies, but also the community leaders and individual property owners. It recognized that the Oregon landscapes vary considerably from the west of the Cascades to the central and eastern Oregon counties, and that one solution would not apply to all.

For the first time in Oregon, SB360 established a comprehensive and statewide policy regarding fire protection and mitigation in wildland-urban interface areas. It provides a process to define, identify, and classify the WUI. The Act has established standards for property owners to more effectively manage the hazards and minimize the risks that could ignite or spread fire on their property. It has also provided the means for establishing adequate, integrated fire protection systems in WUI areas, including education and prevention efforts.

Once SB360 is initiated in a county, a committee of local representatives will work with county officials to formally identify and classify their specific interface areas. Landowners will then be notified of the standards required to make their property less prone to damage or loss from wildfires. Property owners will have up to two years to evaluate their homes and lands, make minimum-standard modifications if necessary, and certify that their lands comply with The Act. Failure to obtain certification will subject landowners to a liability of up to $100,000 for the cost of suppressing any wildfire that ignited on their property and spread to other property, due to their failure to comply.

Oregon Statewide Land Use Planning Goals

Since 1973, Oregon has maintained a strong statewide program for land use planning. The foundation of that program is a set of nineteen statewide planning goals. The goals express the state's policies on land use and related topics. The program is a partnership among the state, administered through the Department of Land Conservation and Development (DLCD), and Oregon's cities and counties. Cities and counties implement the requirements of the statewide planning goals through state-approved local comprehensive land use programs.

Planning goals with particular relevance to WUI fire hazards are Goal 4 – Forest Lands, Goal 7 – Natural Hazards, and Goal 14 – Urbanization. Goal 4 requires local governments to minimize risks associated with wildfire when new dwellings or other structures are allowed in forestlands. Goal 7 requires local governments to develop programs to reduce risks to people and property from a variety of natural hazards, including wildfire. Goal 14 mandates that cities have urban growth boundaries (UGBs) to provide for- urban uses and limit urban-type development on rural resource lands outside of UGBs.

Umatilla County Emergency Operations Plan

The purpose of Umatilla County's Emergency Operations Plan is to ensure a coordinated, integrated response by the Umatilla County government, with maximum use of all resources, to mitigate the effects of any natural or man-caused disaster affecting the county. This plan specifies, to the extent possible, the core actions to be taken by Umatilla County, its municipalities, and cooperating private institutions to respond to a disaster situation. The plan is designed around the four phases of Emergency Management: Planning (Preparedness), Mitigation, Response, and Recovery. This plan was written to identify means to prevent disasters, if possible

(Planning); to reduce the vulnerability to disasters and to establish capabilities for protecting the public from the effects of disasters (Mitigation); to respond effectively to actual disasters (Response); and to provide for recovery in the aftermath of any emergency involving extensive damage to or debilitating influence on the normal pattern of life in Umatilla County (Recovery).

Umatilla County Natural Hazard Mitigation Plan (NHMP)

Umatilla County's Natural Hazard Mitigation Plan, currently being developed, is designed to provide direction to all jurisdictions in the county; eleven cities have participated in the planning process. County staff has met with each city council to discuss the county's project to develop a NHMP and to elicit their support for the project. A natural hazard mapping workshop (for small cities) was held to gather data from the city staff related to where their hazards are, what they are, and how to mitigate the effects of each potential disaster. The workshop was well attended and follow-up meetings were scheduled to make sure that all cities had an opportunity to map their hazards. Once the Umatilla County CWPP has been approved and adopted, it will become a chapter in the County's NHMP.

Umatilla County has received assistance from Oregon Emergency Management, FEMA, US Army Corps of Engineers, and the University of Oregon's Community Planning Workshop and Natural Hazards Working Group. The NHMP is a collaborative effort involving many citizens, agencies, non-profits entities, and local, regional, and state organizations. Along with staff from Umatilla County Emergency Operations and Planning Departments, the NHMP steering committee is comprised of representatives including Oregon Department of Forestry, NOAA, US Army Corps of Engineers, Hermiston Fire & Emergency Services District, OR Dept of Agriculture, and members of the public.

Local Fire Agreements

Wildland fire agencies work closely to provide statewide, comprehensive fire suppression services through agreements such as the 1998 Master Cooperative Fire Agreement and the Local Operating Plan approved in 2004. Partner agencies involved in this agreement include the Bureau of Land Management, Bureau of Indian Affairs, US Fish and Wildlife Service, USDA Forest Service, National Park Service, the State of Washington Department of Natural Resources, and Oregon Department of Forestry.

Locally, wildland fire agencies are actively involved in mutual aid agreements to share fire fighting equipment and fire fighters. Supplemental Agreements are also developed regarding the financial and procedural aspects of shared staffing and equipment, including the operations of the Pendleton Interagency Communications Center, referred to as PICC. There are eighteen partners in the Umatilla/Morrow Counties Fire and Emergency Services Mutual Aid Agreement. This is an agreement among recognized tribal, rural protection districts, and city fire departments, along with the Umatilla National Forest and the ODF Pendleton Unit, that allows for a

mutual assistance response in the bi-county area. Other mutual aid agreements exist with other volunteer fire agencies.

---

[1] State of Oregon Emergency Management Plan, *Natural Hazards Mitigation Plan, Fire Chapter*, November 2003.
[2] http://www.communitiescommittee.org/pdfs/cwpphandbook.pdf
[3] Josephine County Integrated Fire Plan, August 2004.

This page was intentionally left blank.

4. Planning Process

Umatilla County provided PL106-393 "Secure Rural Schools and Community Self-Determination Act of 2000" Title III funding to ODF to complete a community wildfire protection plan. Once funding was secured, ODF sent letters to various fire cooperators and interested citizens, inviting them to participate in the planning process. The process was patterned on a March 2004 document from the Society of American Foresters titled, *Preparing a Community Wildfire Protection Plan: A Handbook for Wildland-Urban Interface Communities.* This handbook is a guide for local communities, but not a legal document, although the recommendations conform to both the spirit and the letter of the HFRA. The handbook outlines step-by-step recommendations to help communities develop a plan that addresses the core elements of community protection.

Local plans can be simple or as complex as the community desires. However, there are a few *minimum requirements* for a CWPP as described in the HFRA.

1) **Collaboration:** A CWPP must be collaboratively developed by local and state government representatives, in consultation with federal agencies and other interested parties.
2) **Prioritized Fuel Reduction:** A CWPP must identify and prioritize areas for hazardous fuel reduction treatments and recommend the types and methods of treatment that will protect one or more at-risk communities and essential infrastructure.
3) **Treatment of Structural Ignitability:** A CWPP must recommend measures that homeowners and communities can take to reduce the ignitability of structures throughout the area addressed by the plan.

HFRA requires that three entities must mutually agree to the final contents of the CWPP:

- The applicable local government (i.e., counties or cities)
- The local fire department(s)
- The state entity responsible for forest management

Step One: Convene Decision Makers

The development of the Umatilla County CWPP relied upon the collaboration of multiple agencies and organizations working together to define common goals and objectives. Once project funding was secured, ODF distributed letters to the primary wildland fire services cooperators in the county, inviting them to participate in the planning process as members of the Steering Committee or as resource advisors to the committee. Members of the Umatilla County CWPP Steering Committee were:

- Ray Denny – homeowner in the wildland-urban interface area
- Dale Jenner – forestry consultant

- Rob Burnside – Confederated Tribes of the Umatilla Indian Reservation
- Don Jackson – East Umatilla County Rural Fire District
- John Buckman – Oregon Dept. of Forestry (ODF), Committee Chair
- Tom Groat – Umatilla County Emergency Management
- Nancy Lee Wilson – Umatilla National Forest (UNF)
- Angie Johnson – ODF, GIS Support/Project Resource
- Marty King – Project Coordinator

Other resource advisors that participated in the project included:

- Jim Beekman – UNF
- Nancy Rencken – UNF
- David King – ODF
- JR Cook – County
- Amber Mahoney – UNF
- Dan Eddy – UNF
- Joani Bosworth – UNF
- Hal Thomas – City of Walla Walla
- Jim Steams – Area 9 Fire Defense / Hermiston Fire & Emergency Services

The Steering Committee prepared this plan in compliance with the National Fire Plan, the 10-Year Comprehensive Strategy, Oregon Senate Bill 360, and Healthy Restoration Act. The plan is mutually agreed to and endorsed on the Signature Page by the three signing entities: the Umatilla County Commissioners, the NEO District Forester on behalf of ODF, and the County Structural Fire Representative, who mutually agree to the contents of the plan (see page 3). This plan is not legally binding and should be viewed as a working document and planning tool for fire and land managers of Umatilla County.

Fire Protection Managers in Umatilla County

There are several wildland fire protection managers working in Umatilla County. The following is a breakdown of those departments and agencies.

Oregon Department of Forestry - Pendleton Unit

The ODF Northeast Oregon (NEO) District is comprised of three Units: Wallowa, La Grande, and Pendleton. The protection boundary for the Pendleton Unit covers almost 535,000 acres in Umatilla, Grant, and Morrow Counties. ODF Pendleton Unit is the primary protection agency for 518,220 acres of non-federally owned forest and rangelands in Umatilla County. These lands lie primarily south and east of the foothills of the Blue Mountains and are all within the CWPP project area.

USFS - Umatilla National Forest

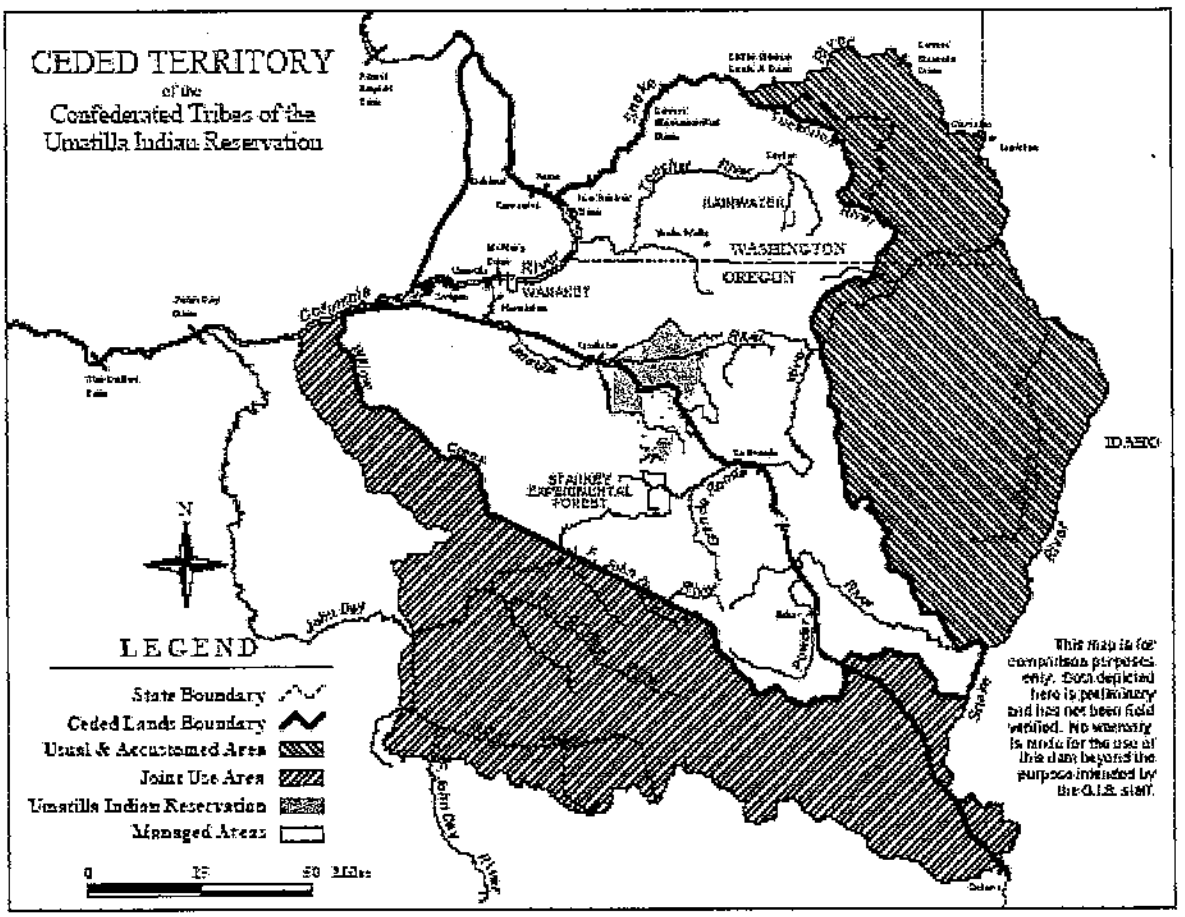
The Umatilla National Forest extends over 1.4 million acres in Oregon and Washington, and falls across eleven counties. Twenty-seven percent (375,669 acres) lies within Umatilla County and the CWPP project area. Two of the Forest's four Ranger Districts (the Walla Walla RD and the North Fork John Day RD) all have some portion inside the CWPP boundary. There are parts of two federal wilderness

areas that lie within the project area (North Fork John Day Wilderness and North Fork Umatilla). A third wilderness, the Wenaha-Tucannon Wilderness, is located in the northern Blue Mountains and straddles the Oregon-Washington border. This wilderness area is within 1-2 miles east of the county boundary and is the eastern boundary of Mill Creek watershed. It covers the northeastern corner of Umatilla County and the CWPP project area.

Confederated Tribes of the Umatilla Indian Reservation[4]

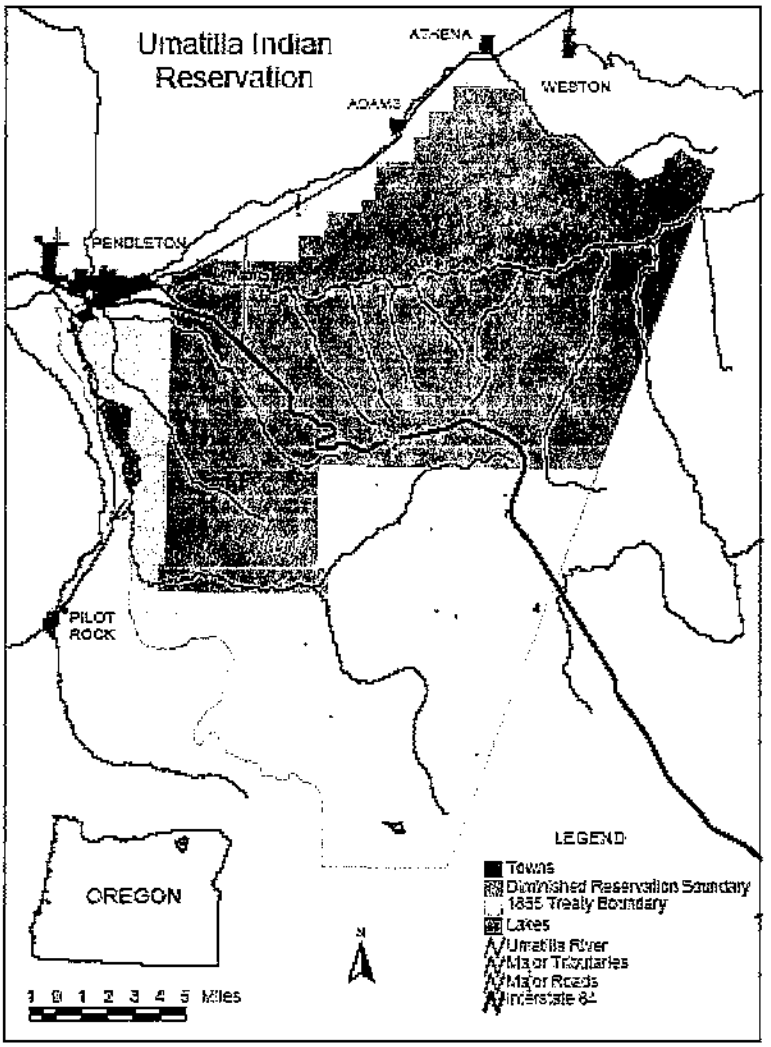
The people of the Cayuse, Umatilla, and Walla Walla Tribes make up the Confederated Tribes of the Umatilla Indian Reservation (CTUIR). They were the first inhabitants on the Columbia River Plateau; they once had a homeland of 6.4 million acres in what is now northeastern Oregon and southeastern Washington. In 1855, the Tribes and the US Government negotiated a Treaty in which the Tribes "ceded" or surrendered possession of much of the 6.4 million acres in exchange for a reservation homeland of 500,000 acres (Figure 1).

Figure 1. Map of the Ceded Territory of CTUIR (taken from CTUIR website)



As a result of surveying and other federal legislation in the late 1800's that reduced its size, the Umatilla Indian Reservation today consists of 172,000 acres east of Pendleton and southeast of Pilot Rock (Figure 2).

Figure 2. Map of the Umatilla Indian Reservation (taken from CTUIR website)



The Bureau of Indian Affairs (BIA) has wildfire management responsibilities on tribal Trust and Indian-owned lands within the Umatilla Indian Reservation. Approximately half of those lands (over 54,000 acres) fall within the ODF protection district while CTUIR has roughly 13,500 acres of tribal owned lands within the ODF district. CTUIR is actively pursuing self-determination for management of Trust lands. This would shift the wildland fire protection responsibility for those affected lands over to the CTUIR Fire Department.

Rural Fire Protection Districts

Fire protection coverage in Umatilla County can be broken into two categories: structural and wildland. Most fire protection agencies provide one or the other, but some do handle both. The vast majority of the CWPP project area has fire protection coverage by at least one agency, with a few areas falling under multiple jurisdictions.

Rural fire protection exists in several incorporated municipalities within the CWPP project area including Ukiah, Pilot Rock, and Weston. The unincorporated community of Meacham and nearby residents has a volunteer fire organization that provides a level of wildland and structural protection. CTUIR Fire Department, along with the Bureau of Indian Affairs (BIA) provides wildland and structural fire protection within the reservation boundaries.

- East Umatilla County RFD has both volunteers and paid staff, and has three stations in its protection area. They provide both wildland and structural fire protection over 260 square miles northeast of Pendleton. Service is provided to a population of about 2,000 (1,000 in towns and 1,000 in rural setting), from the town of Weston up along Highway 204 into the Tollgate recreational area. (Service is also provided to the towns of Athena and Adams but both communities are located just outside the CWPP project area.) This WUI area has a high density of year-round dwellings and seasonal cabins, and is a major recreational destination in the Blue Mountains area. This is a tax-based supported district.

- Pilot Rock RFD, another tax-based fire district, is a volunteer department that provides fire suppression (both wildland and structural) for the City of Pilot Rock (population 1,540) and the surrounding 342 square miles. Difficult terrain with limited road access, as well as limited labor resources during daytime hours, provides unique challenges. Boundaries are adjacent to ODF protected lands as well as the Umatilla Indian Reservation.

- Walla Walla County Fire District #4 provides wildland and structural fire protection to some Oregon residents in the Mill Creek area through individual contracts. They provide service about two miles into Oregon (on County Road 582), but will go further up if requested under mutual aid agreement.

- The cities of Ukiah, Milton-Freewater, and Pendleton all have city-operated fire departments that provide wildland and structural protection inside their respective city limits. The Pendleton Fire Department also has contracted with three rural fire districts outside city limits to provide structural protection services; McKay Dam RFD, Lower McKay RFD, and Riverside RFD are all tax-based fire districts within five miles of Pendleton.

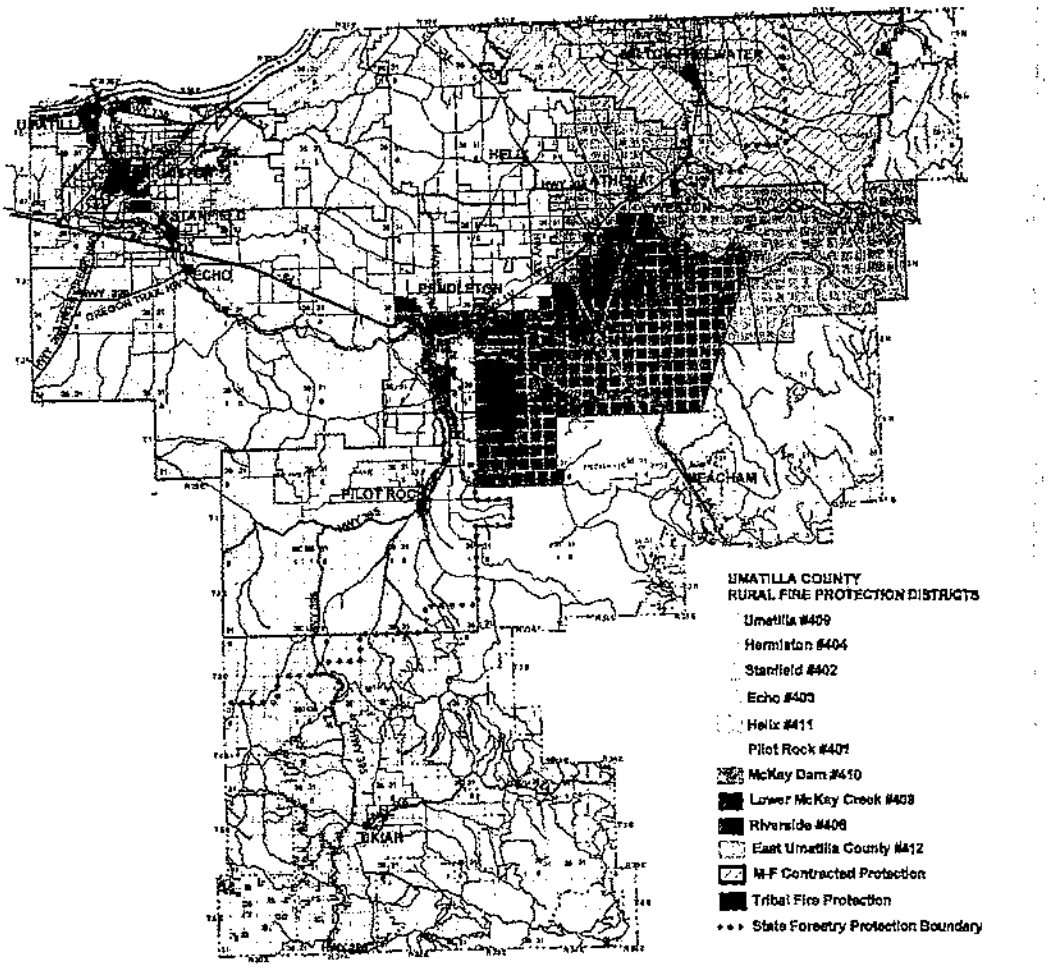
- Subscription service is offered in the northern end of the County through Milton-Freewater Rural Fire Department. They provide both structural and wildland fire suppression services to residents around the Milton-Freewater area on a

contractual paying basis. A mutual aid agreement has been in place between MFRFD and ODF for several years.

- The unincorporated community of Meacham, Oregon and its neighboring residents are provided with a level of wildland and structural fire protection through a volunteer fire department.

Figure 3 shows the locations of Umatilla County Rural Fire Protection Districts, in relation to ODF protection boundary and the tribal fire protection boundary.

Figure 3. Umatilla County Fire Protection Districts (Umatilla Co. Planning Dept. Feb. 2005)



This map was created for planning and research purposes only.
Umatilla County makes no warranties regarding the content, quality or adequacy of this information.

y:workspace/PLANNING/Projects/CountyFireDistricts.gws

June 14, 2005

Unprotected Lands

Umatilla County has land that is **unprotected,** both inside and outside the CWPP project boundary. These areas generally fall just outside of any agency's primary protection coverage. Examples include:

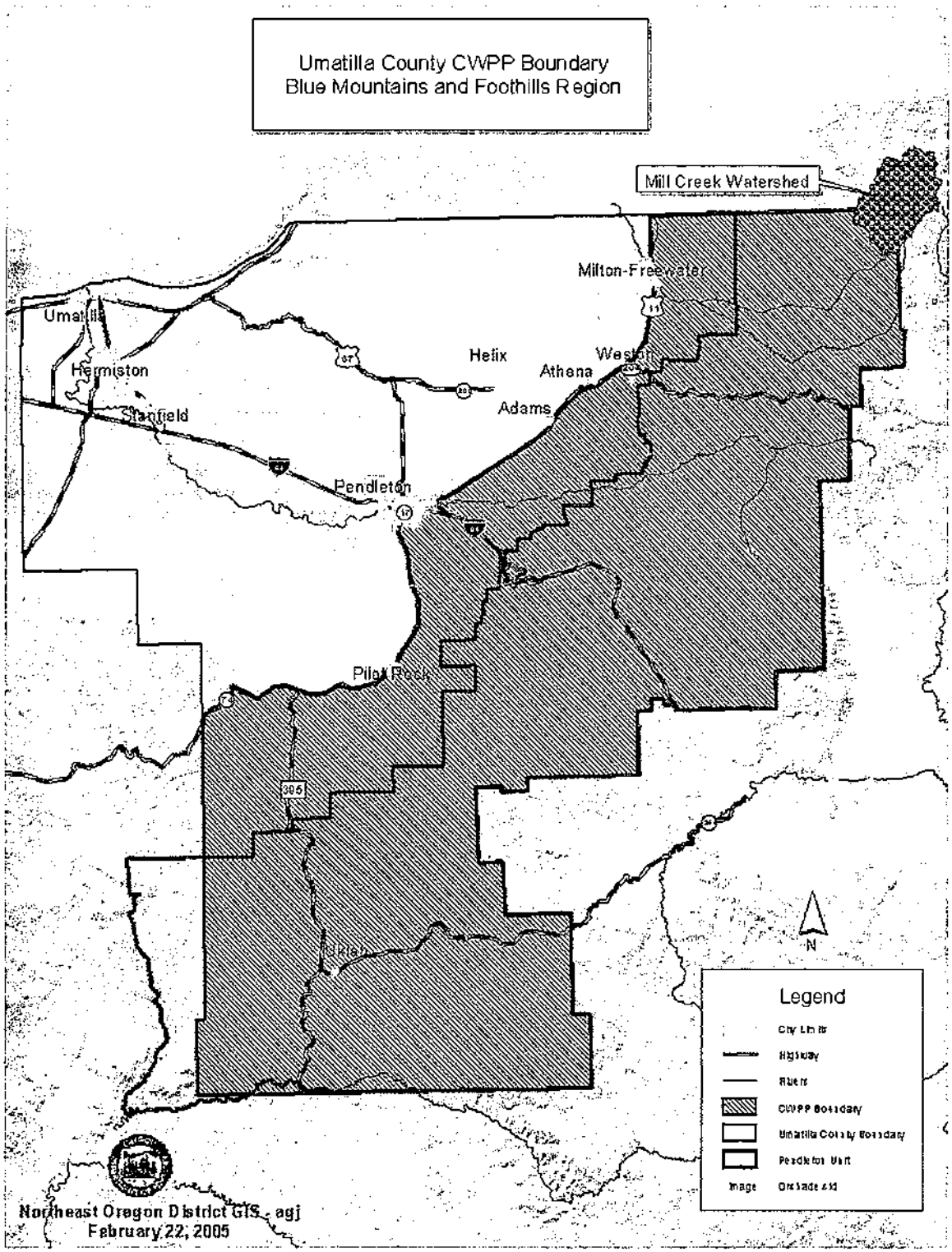
- Remote areas of Coombs Canyon, Birch Creek, and Reith (south and west of Pendleton)
- Several tracts of land between Highway 395 and the CTUIR reservation (east of Pendleton)
- The area between the southern border of Pilot Rock RFD and the ODF protection boundary (west of Gurdane and Cape Horn areas to county line)
- Areas on the north end of the county that fall outside of East Umatilla County RFD protection area and are not covered by contract through Milton-Freewater RFD

Fires that occur within unprotected lands become the responsibility of the Umatilla County Commissioners; coordination will be handled through the Emergency Management office and the Oregon State Fire Marshall's County Fire Chief to determine the appropriate response. In an attempt to deal with unprotected lands, the State Fire Marshall's Office, along with support from the Governor's Office, released a strategy for all counties to consider. (This proposal is discussed in detail in VII. Mitigation Action Plan.) As a long-term strategy, the CWPP committee encourages efforts that would provide some level of wildland fire protection coverage for all unprotected lands. This might include working with local government and rural fire districts to: 1) incorporate unprotected areas into already existing rural districts; 2) to help fund an additional substation in an existing rural district; or 3) attempt to form an entirely new fire district (tax-based). ODF's Eastern Oregon Area office (which includes Northeast Oregon units) has submitted a NFP proposal to address unprotected lands. At this time, no information has been received on grant awards.

Step Two: Establish Planning Area Boundaries

Umatilla County has a large and diverse landscape. The western side of the county (including Hermiston, Umatilla, Stanfield, and Echo) is predominantly low elevation desert and agricultural ground. The Blue Mountains range lies along the eastern border of the county, moving from rolling foothills to open pine grasslands, and then into steeper canyons with heavy mixed conifer stands. Because the urban interface areas are found along the eastern and southern borders of the county, the decision was made to use the established highway system as a project boundary line and focus planning resources on this eastern region. (State Highway 11 runs northeast from Pendleton to Milton-Freewater and the Oregon/Washington border. Highway 395 runs south out of Pendleton to the southern boundary of the county. Highway 74 breaks off from Highway 395 at Nye Junction, running west into Morrow County.) The CWPP project area is referred to as the Blue Mountains and Foothills Region of Umatilla County as shown in Figure 4. The remainder of the county will need to be covered under another CWPP.

Figure 4. Umatilla County CWPP Project Area



Mill Creek Watershed

The northern edge of Umatilla County borders the Oregon-Washington border (refer to Figure 4). Mill Creek Watershed is partially located in the northeastern corner of Umatilla County, about 15 miles east of Milton-Freewater. This watershed covers two states and four counties, including Umatilla County. Mill Creek Watershed falls within the Walla Walla Ranger District of the Umatilla National Forest and, as mentioned previously, is adjacent to the Wenaha-Tucannon Wilderness area.

Mill Creek Watershed is the primary municipal water source for Walla Walla, Washington. In 1918, the U.S. Secretary of Agriculture signed a cooperative agreement with the City of Walla Walla to conserve and protect the city's water supply. This agreement set aside the Mill Creek Watershed as a restricted management area, limiting the use of the area to activities that benefit water quality. The Forest Service retained resource management responsibility; a full suppression policy for all fires was implemented and a fire lookout was placed at Table Rock by 1930. Entry into the watershed became limited to persons holding permits for conducting management activities for the benefit of the watershed. This policy is still currently enforced by the Umatilla National Forest.

County Road 582 runs east-southeast from Walla Walla and is the main roadway into this canyon bottom area. It crosses back into Oregon and Umatilla County about 14.3 miles from the Walla Walla Post Office and dead ends at the City's intake facility's locked gate almost four miles further up the road. A network of Forest Service roads run along the watershed boundary, but the watershed itself is roadless. Both year-round residential homes and recreational cabins and trailers are found in the area leading up to the locked gate.

Because of the complexities associated with the Mill Creek watershed being the municipal water source for a major urban area, the Umatilla County CWPP will not address the closed watershed specifically. The City of Walla Walla is developing its own CWPP, which will include risk assessment and strategies more specifically addressing the Mill Creek watershed and the surrounding areas in both Oregon and Washington. Members of the Umatilla County CWPP Steering Committee have been and will continue to participate in the development of the City's plan, to ensure coordinated planning and implementation efforts as appropriate on the Oregon lands that are common to both CWPP documents.

The City of Walla Walla's CWPP Steering Committee has agreed to work collaboratively with appropriate agencies in the development of their plan. Upon completion of the City's CWPP, approval by the participating agencies, and being signed off by those representatives identified through the planning process, the City of Walla Walla's CWPP will be included in this document as Appendix A. At the next review of the Umatilla County CWPP, the document will be amended as deemed appropriate by the Steering Committee members.

Step Three: Establish Planning Goals

Mission Statement

Create a Community Wildfire Protection Plan for the Blue Mountains and foothill regions of Umatilla County.

Goals and objectives

- Promote wildfire awareness and target fire prevention and safety information across at-risk communities:
    - Coordinate community meetings to discuss fire related concerns with landowners
    - Distribute information on FireSafe home site standards

- Promote cooperative emergency fire response for the protection of life, property, and natural resources:
    - Identify resource equipment inventory, training needs and level of protection of participating fire agencies
    - Review interagency communications and suppression strategies for emergency fire response situations

- Identify and reduce hazardous fuels and coordinate risk reduction strategies across the landscape:
    - Develop and utilize a common set of base information for risk assessment
    - Promote landowner assistance programs
    - Gather local and community knowledge of fire related concerns through public outreach
    - Prioritize fuel reduction areas and projects

- Monitoring and Evaluation
    - Evaluate the progress of the plan annually and recommend changes as needed
    - Conduct monitoring of selected projects and activities to assess progress and effectiveness

Step Four: Community Outreach and Education Resources

CWPP Public Meetings

The CWPP relies on input from citizens and communities about what they perceive to be most at risk from a wildfire event and what they value most about their surroundings. A series of five public meetings were held across Umatilla County during November 2004. The purpose was two-fold: first, to inform interested citizens of the planning effort covering the WUI areas of the County, and second, to gather information from the local knowledge base about the risks of wildfire events specific to their communities. These meetings were helpful in identifying the values and

resources that the communities and residents wanted most strongly to protect from wildfire.

Information about the CWPP project and upcoming meetings was distributed across the region. An informational brochure was created providing background and local project information; a public meeting flyer was designed listing dates and locations. Over 150 brochures and meeting notices were distributed to local agencies, businesses, and community gathering places such as grocery stores, hardware stores, city halls, and post offices. Information was also posted on ODF and Umatilla County websites. Packets of information were also mailed to over 200 property owners in the forested areas, including NFP cost-share project participants and homeowner associations. In addition to the brochure and meeting flyer, these packets also included introductory letters and a postage-paid questionnaire asking them about what they've already done on their property to decrease hazards from wildfire and what they valued most about living in the wildland-interface areas of the County.

Each public meeting included a PowerPoint presentation followed by discussion and a question and answer session. Various members of the Steering Committee attended each meeting, and overall, 35 private citizens participated in the meetings.

Meadowood Speech Camp on November 18, 2004.

Meetings took place in strategic areas across the county:

- Meacham Fire Station in the community of Meacham
- Meadowood Speech Camp off Hwy 244 in the Weston Mtn/Tollgate area
- Ukiah Senior Center in the City of Ukiah
- Pilot Rock Community Center in the City of Pilot Rock
- CTUIR Fire Station in Mission, on the Umatilla Indian Reservation

CTUIR Fire Dept. on November 30, 2004.

Out of 205 total informational packets mailed, 70 were sent to property owners living in Oregon towns outside the immediate area, Washington State, and California. There was a questionnaire return rate of 20%.

Results from the returned forms of this informational questionnaire include:

- 61% reported an awareness of programs such as Firewise or Living with Fire
- 58% had participated in some type of cost-share NFP fuel reduction project
- 76% have taken steps to protect their home/property and to reduce the risk from wildfire
- 73% have property located in Weston Mountain/Tollgate or Meacham areas

Another public meeting occurred on April 14, 2005. It was conducted jointly by the Umatilla County CWPP and the City of Walla Walla Mill Creek Watershed Committee. The meeting was held at the Walla Walla County Fire District #4 station and was targeted to the residents of the Mill Creek area. Around forty people attended and heard general fire season information presented by Oregon Department of Forestry and Washington Department of Natural Resources (WA-DNR) representatives. A Firewise slide presentation was used to help illustrate different ways for residents to protect their homes and property from a possible wildfire event in the area.

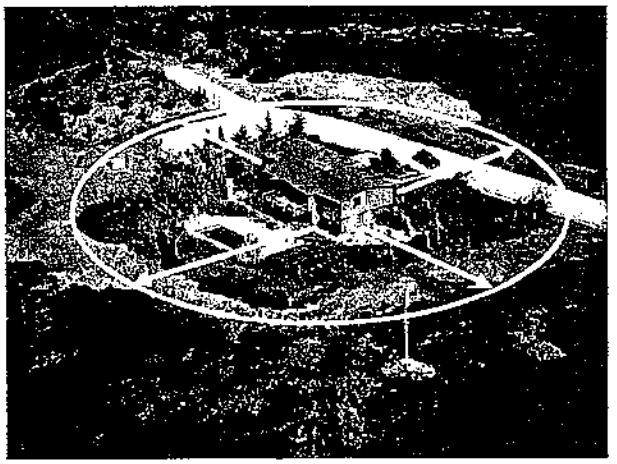
Other Fire Prevention Education Resources

As more of the population migrates from high-density urban areas into rural and forested regions of Oregon, whether for lifestyle or economic reasons, the number of large wildfires affecting homes has escalated dramatically. Many people take with them an expectation of structural fire protection similar to the urban area they left behind. The property owner in the wildland-urban interface area is the first-line of defense against the wildfire event. Homeowners and forest landowners need to be aware of and understand the types of hazards found in this environment, and become active participants in defending their property.

Cost-Share & Rebate Grant Programs through National Fire Plan

Over the last three years, ODF has secured over $800,000 in grant dollars to assist private landowners in Umatilla County with fuels reduction projects, distributed to landowners in cost-share and rebate programs. Rebate dollars have been used for the homesite assessment project, with ODF completing assessments on all structures within the WUI areas. A maximum of $580 per property for vegetation removal and other activities to create survivable space around structures was offered to landowners. Interested property owners were provided technical advice as to what could be done to decrease the structural ignitability rating for their property. All structures within the WUI areas have been geo-referenced for future planning needs by ODF and the county. To date, over 70 contracts have been written for work around homesite structures.

Cost-share dollars were targeted to the landowner with larger acreages within the WUI, and even more ideally, adjacent or near federal land. This program offered cost-share funds of 33-75% (depending on the funding source) for pre-commercial thinning, slash removal, brush removal, and/or ladder fuel removal. From October 2002 through April 2005, 1680 acres of fuels reduction has occurred in the ODF Pendleton Unit. Another 1200 acres are currently signed up and scheduled for completion by the end of 2005.



Living with Fire

This national prevention program guides homeowners step-by-step through the process of eliminating hazards around their home. This newspaper publication shows how to create survivable space around your home, taking into account the topography and vegetation that surrounds it. It has previously been provided to homeowners in Umatilla County. The newspaper is available locally through ODF or on-line at www.or.blm.gov/nwfire/docs/Livingwithfire.pdf.

Firewise

This is a program developed by the National Fire Protection Association (NFPA) and features templates to help communities reduce risk and protect property from the dangers of wildland fires. Along with an interactive and resource-filled website full of free materials, the program offers training throughout the nation. A Firewise workshop was held in 2001 at CTUIR's Tamastslikt Cultural Institute for local agencies. For information concerning the Firewise program, visit online at http://www.firewise.org.

FireFree

Developed in Oregon, this model predates the more recent and nationally known Firewise. In 1997, four local agencies in the Bend area joined with SAFECO to create "FireFree! Get in the Zone", a public education campaign designed to increase resident participation in wildfire safety and mitigate losses from wildfire. The campaign aims to educate the public about wildfire safety and promote behaviors and attitudes that translate into creating defensible space around homes and businesses. The partnership includes the Bend Fire Department, Deschutes County fire agencies, City of Bend Development Service, the Deschutes National Forest, Oregon Department of Forestry, the Office of the State Fire Marshall, Keep Oregon Green, and other local, regional, and federal partners, including private businesses. For more information, check out the website at http://www.firefree.org/.

Fire-Resistant Plants for Oregon Home Landscapes

The OSU Extension Service in Redmond has developed a pamphlet suggesting specific types of vegetation that may reduce wildfire risk around the home. Most people landscape their property with aesthetics in mind, not thinking about whether a plant or shrub material is flammable and could actually increase the risk around their home. This brochure describes the different plant materials that homeowners can use for landscaping that will complement their home while improving the chances of their home surviving a wildfire. Brochures have been distributed at public meetings and are available at the ODF office or through the OSU Extension Service office in Redmond. Visit their online site at http://www.extension.oregonstate.edu/emergency/FireResPlants.pdf.

> ***Fire-resistant*** plants are plants that don't readily ignite from a flame or other ignition sources. Although fire-resistant plants can be damaged or even killed by fire, their foliage and stems don't contribute significantly to the fuel and, therefore, the fire's intensity.

Step Five: Establish a Project Base Map & Develop a Community Risk Assessment

A base map of the project area was developed using Oregon Department of Forestry and Umatilla National Forest data and created within the Forest Service projection NAD27 UTM11North. Geographical Information System (GIS) based maps were provided to the Steering Committee who made assessments and recommendations regarding protection and risk-reduction priorities based on this information.

A community risk assessment was developed to help the committee prioritize areas for treatment and identify the highest priority uses for available financial and human resources. Factors considered in the assessment included (vegetative) fuel hazards; the risk of wildfire occurrence; homes, businesses, and essential infrastructure at risk; other community values at risk; and local preparedness and firefighting capability. A rating of high, medium, and low was used to represent the level of risk to

the community posed by each factor. This information was incorporated into the base map as appropriate.

Step Six: Establish Community Priorities and Recommendations

Results of the risk assessment were discussed from both a project basis and individual at-risk communities and WUI areas across the county. The Steering Committee discussed a range of alternatives addressing wildfire concerns on both federal and non-federal lands within the WUIs. Recommendations were developed and prioritized for projects on both federal and nonfederal lands in the WUI areas, along with the preferred treatment methods for those projects. Recommendations were noted as to whether they were related to the protection of communities and essential infrastructure or to reducing wildfire risks to other community values. Specific recommendations by WUI areas are captured in the Mitigation Action Plan in Section VII. Types of projects considered include:

- Hazardous fuels (mechanical) reduction treatment
- Prescribed fire
- Reducing structural ignitability
- Improving fire response capability of fire protection agencies
- Improving emergency preparedness
- Target educational efforts at homeowners in the WUI areas

Step Seven: Develop an Action Plan and Assessment Strategy

Before finalizing the CWPP, the committee will develop an action plan that identifies roles and responsibilities, funding needs, and timetables for carrying out the highest priority projects. An assessment strategy will be agreed upon to ensure that the document maintains its relevance and effectiveness over the long term; this may be accomplished by reconvening the Steering Committee on an annual basis.

Step Eight: Finalize CWPP

The final step in developing the CWPP involves the Steering Committee to reconvene and mutually agree on the fuels treatment priorities, preferred methods for fuels treatment projects, the location of the wildland-urban interface areas, structural ignitability recommendations, and other information and actions to be contained in the final document. If an associated action plan has not been developed, the committee should identify a strategy for conveying the results of the planning process to community members and key land management partners in a timely manner. (A combination of newsletters, public meetings, mailings, and handout material designed to reach the maximum number of property owners in the planning area was identified.)

---

[4] http://www.umatilla.nsn.us/geninfo.html

This page was intentionaliy left blank.

5. Umatilla County Profile

Historical

The creation of Umatilla County in 1862 can be traced back to the regional gold rushes, which spawned the riverport of Umatilla City and brought stock raisers to the lush grasslands. Pendleton was selected as the county seat in the 1868 election, succeeding Marshall Station and Umatilla City. Although Lewis & Clark and the Oregon Trail pioneers passed through the area, Umatilla County did not flourish until the railroad arrived in 1881 and following the development of dryland wheat farming. The first census in 1870 counted 2,916 inhabitants. Population eventually shifted to the north and eastern parts of the county after the Pendleton area opened up due to the increased wheat production.

Environment

Umatilla County has an area of 3,231 square miles. From an elevation of 296 feet at Umatilla, the county rises to an elevation greater than 5,800 feet in the Blue Mountains on its eastern boundary. Umatilla County is bordered by the Columbia River and Walla Walla County, Washington, to the north, Morrow County to the west, Grant County to the south, and Union and Wallowa Counties to the east. The Umatilla River originates in the Blue Mountains along the eastern boundary and flows generally westward across the Columbia Plateau approximately 100 miles, discharging into the Columbia River at the town of Umatilla.

The basin has a continental climate with a winter precipitation pattern. Precipitation levels vary from 8-10 inches along the Columbia River, to as high 60 inches in the higher elevations of the Blue Mountains[5]. Peak flows in the Umatilla River normally occur in the spring with high elevation snowmelt and diminish throughout the summer to the lows in August or September.

Weather Emergencies

According to a Hazard Vulnerability Analysis, part of the county's Emergency Operations Plan adopted in December 2003, weather emergencies pose the greatest risk to the residents of Umatilla County. A dust storm swept across the I-84 corridor in September 1999, setting up a chain reaction accident killing seven people. In December 2003, an intense winter storm dropped snow, ice, and freezing rain on a significant portion of the county, closing I-84 for several days; 27 Oregon counties, including Umatilla County, were included in a Presidential Disaster Declaration.

Wildfire continues to be a significant threat in the county. Approximately 12% of Umatilla County consists of forestland used by the timber industry and small-woodland owners, and for recreation activities by the public. The forestry sector employment has declined dramatically in recent years primarily because of harvest reductions on national forest lands. Insect and disease damage, along with wind and ice storm damage add to the increasing fuel load on timber ground. Additionally, around 10-15% of the area's cropland has been retired from crop production, enrolled in the Conservation Reserve Program, and seeded to grass, shrubs, and trees. The threat of fires from large areas of rangeland and dry land crops adjacent with the higher fuel-load areas of timber and structures in residential interface areas continues to increase.

Demographics

Umatilla County has twelve incorporated areas and two-thirds of the total population resides in these incorporated areas. Only two incorporated communities are completely within the CWPP project area (Weston and Ukiah) while three more have portions partially inside the boundary (Pilot Rock, Pendleton, and Milton-Freewater). According to the US Census Bureau's estimate for 2000, Umatilla County's population totaled 70,548 residents, ranking 12th among Oregon counties. The majority of these people (51.2%) live in rural areas and towns of less than 2,000 people. In 2000, approximately 49% of the county's population lived in the three largest towns, all found along the mainstem Umatilla River: Pendleton (population 16,354), Hermiston (population 13,154), and Umatilla (population of 4,978). The overall population of Umatilla County is somewhat racially diverse, with 16% Hispanic or Latino origin, and 3.4% Native American.

Residents of Umatilla County primarily live in single-family homes that were built in the 1970's. Most homes are valued below $100,000 (median home value at $98,100), and in 2000 there was a home ownership rate of 64.9%. There were 325 housing units authorized by building permits in 2002.

CTUIR currently has 2,446 enrolled members, down from an estimated population of 8,000 prior to European contact. About 1,500 American Indians and approximately 1,500 non-Indians live on the Umatilla Indian Reservation. Of the current Reservation acreage, approximately 52% is under Indian ownership, and 48% is non-Indian owned. About 51% of the Native American population resides primarily on the Reservation.

Economy

Water, in the form of irrigation, has been a key to the economic diversification and growth of Umatilla County, which includes agriculture, forest products, tourism, manufacturing, recreation, aggregate production and power generation. According to Oregon State statistics, there were over 36,000 jobs in Umatilla County as of May 2003. Private sector employment leads the list followed by manufacturing, trade, transportation and utilities, local government, education and health services. Food manufacturing accounts for a significant number of jobs.

The county is regarded as one of the state's major agricultural centers and ranked fourth in the state in agricultural commodity sales in 2002. The agriculture sector is divided into two segments, production (growing) and processing, with the production side accounting for $50 billion a year. Wheat is the major commodity, followed by cattle and potatoes. Hay and vegetables are also large contributors, with vineyards, canola, and other alternative crops emerging as new commodities. There are essentially two irrigated regions in the county: the west end near Hermiston, known for its watermelons, potatoes, and other vegetables, and the north near Milton-Freewater, known for its fruit orchards. The central part of the county is mainly dryland farming, with wheat as the primary crop, and other grains, canola, and peas as secondary crops. Limited timber harvesting still takes place in the south and eastern parts. Livestock, mainly cattle and some sheep, are found throughout the county.

Recreation opportunities in the Blue Mountains and tourism events, including the annual Pendleton Round-Up rodeo, the Pendleton Woolen Mills, McNary Dam, and Recreation Area are becoming increasingly important to the local economy. CTUIR is now the second largest employer in the county with roughly 1,000 employees (CTUIR website). Wildhorse Casino & Resort, with its hotel, RV Park, and golf course is considered a destination attraction for many people. Tamastslikt Cultural Institute, opened in July 1998, is considered its centerpiece attraction.

Land Use and Ownership

Umatilla County has an area of 3,231 square miles (approximately 2.07 million acres). The Umatilla County CWPP is focused only on the south and eastern parts of the county, referred to in the plan as the Blue Mountains and Foothills region; this project area is approximately 56% of the entire county and encompasses all of the

forestland, interface areas. The Umatilla National Forest manages 375,669 acres of federal forest in Umatilla County, while ODF protects 520,000 acres of private and non-federally owned forest and grazing lands.

According to a 1980 Umatilla County Planning Land Uses Report, the breakdown by land use classification was as follows:

Land Use	Acres	%
Range	760,000	36.9%
Cropland	700,000	34%
Forested	520,000	25.2%
Urban and Built-up	40,000	1.9%
Pasture	36,000	1.7%
Lakes, Rivers, and Streams	4,000	0.2%

Transportation

Umatilla County is a major transportation hub in northeastern Oregon, linked to areas in the Northwest by freeway, railway, and river. Umatilla County is bisected by Interstate 84, running west to east up over the Blue Mountains. U.S. Highway 395 runs north to south down into Grant County, while Highway 11 is the major artery running northeast out from Pendleton through Milton-Freewater, Oregon and into Washington State. In addition to the road system, there are also significant water transportation facilities along the Columbia River, including the Port of Umatilla. The Union Pacific Railroad travels east and west the length of the county.

[5] http://www.wrh.noaa.gov/mfr/climo/AvgAnnPcpnOR.gif

6. History of Wildfire in Umatilla County

In one of the oldest accounts dated 1904, W.H.B. Kent, in describing the proposed Wenaha Forest Reserve (now fully incorporated into the Umatilla National Forest) wrote:

> "Practically every portion of the reserve has suffered more or less from fire. The largest and most important of these was one which came from the present Umatilla Indian Reservation about fifty years ago, burned up the river Umatilla, into the Reserve, then turned north along the west slope, across the heads of the Walla Wallas, and reached as far as the head of the Wenaha. This burn has generally restocked finely, principally to tamarack and lodgepole pine."

The fire area Kent describes is over 60,000 acres with much of it in what is now Umatilla County.

Types of Wildfires[6]

Wildfires burn primarily in vegetative fuels outside the urban areas. Wildland fires require some type of suppression response because they are burning out of control or are threatening to spread out of control. Wildland fires can generally be categorized as agricultural, forest, range, or wildland-urban interface fires.

- An *agricultural fire* burns in areas where the primary fuels are flammable cultivated crops such as wheat. This type of fire tends to spread very quickly, but is relatively easy to suppress if adequate resources are available.

- The classic example of a wildfire is the *forest setting*. Timber fuels this type of fire, along with associated fuels such as brush, grasses, logging residue and thick stands of reproduction. The forest type of wildfire can be extremely dangerous and difficult to suppress due to fuel and topography factors. These fires are often very costly to suppress.

- *Range fires* burn across ground typically used for grazing or wildlife management purposes, and are typically open landscapes that lack heavy stands of timber or large accumulations of fuel. Juniper, bitterbrush, and sage are common fuels involved in a range fire.

- *Wildland-urban interface fires* occur in portions of the state where urbanization and natural vegetation fuels allow a fire to spread rapidly from natural fuels to structures and vice versa. Structural suppression resources can be quickly overwhelmed, especially in the early stage of such fires, increasing the number of structures destroyed. Nationally, these wildland interface fires commonly produce widespread losses since large numbers of structures are

simultaneously exposed to fire. So far, the level of property losses for Oregon is not as high as neighboring states.

Probability

Wildfires in Oregon are inevitable. The majority of wildfires burn during the July to October period. Extended dry periods during the winter months can combine with winds and dead fuels, often resulting in fires that burn with a greater intensity and rate of spread. Other factors influencing the occurrence and severity of wildfires include poor forest health, abnormally high amounts of vegetation arising from a century of aggressive fire exclusion, and long-term changes in weather patterns.

On an average year, there are approximately 2,500 wildland fires ignited on forest and range lands in Oregon. Approximately two-thirds of these fires are caused by human activity; the other third is due to lightning. While data show a downward trend in the number of wildland fires per 1,000 population over the past ten years, the number of acres being burned in these fires, and the frequency of structural losses, has been growing.

Wildland Fire Risk

Wildfire risk refers to the chance of a wildfire starting. Fire starts are recorded as either statistical (stat) or non-statistical fire starts (non-stat). Fire starts are also categorized as either lightning or human caused. Human-caused fires are further broken down into eight categories: railroad activity, small or heavy equipment use, recreational activities, smoking, debris burning, arson, juveniles, or miscellaneous (a catchall group that also includes fires started by automobile accidents).

Statistical Fire (Stat):
A fire that originates on land protected by the reporting, jurisdictional agency and that requires some level of fire suppression action.

For example, a fire that started on federal forest ground would be reported as a Stat Fire by the reporting USFS office, but reported as a Non-Stat fire by ODF if they also responded to the fire and provided suppression activity.

Fire starts pertaining to lands protected by state and federal agencies go back a couple decades. However, comprehensive computer-based summaries for tribal and RFPDs are not yet readily available. State and federal fire data can be used to interpolate fire risk within the CWPP boundary. Fire starts in these districts are often captured as non-stat fires by either ODF or UNF.

Fires on Federal Lands

A detailed fire history for the Umatilla National Forest dating to 1970 is available in achieved fire reports. Less specific information on fires prior to 1970 can be found in various Forest reports.

In 1996, four major fires burned 72,000 acres on the Forest: Wheeler Point (8,236 acres), Bull Complex (8,332), Summit (37,835), and Tower (50,633). Some of these fires burned across protection boundaries and consumed an additional 33,000 acres. Suppression costs for the four fires exceeded $29,000,000.

Tower Complex began on August 13, 1996 burning a total of 50,633 acres of which 46,000 were in Umatilla County. This was a lightning caused fire. More than 28,000 acres of this burn were in roadless and wilderness areas. Total suppression costs approached $25 million dollars.

Human caused fires often start on lower slopes and can burn rapidly uphill. The Meacham Canyon railroad right-of-way has been the source of many large fires, including the Milepost 244 Fire. This fire began on August 15, 2000 and burned a total of 4,800 acres of private and federal lands. The fire was started by a passing freight train in the Meacham Canyon. Suppression costs exceeded $3,000,000.

1970-2004 Statistics

From 1970 to 2004 there were 4,592 fires reported on the Umatilla National Forest. Sixteen of these burned more than 1,000 acres. Lightning started 3,089 fires (66%) and burned a total of 149,034 acres. Human starts for the same period total 1,503 (33%) and burned a total of 45,843 acres. The average annual area burned for the 35 fire seasons (1970-2004) is 5,568 acres.

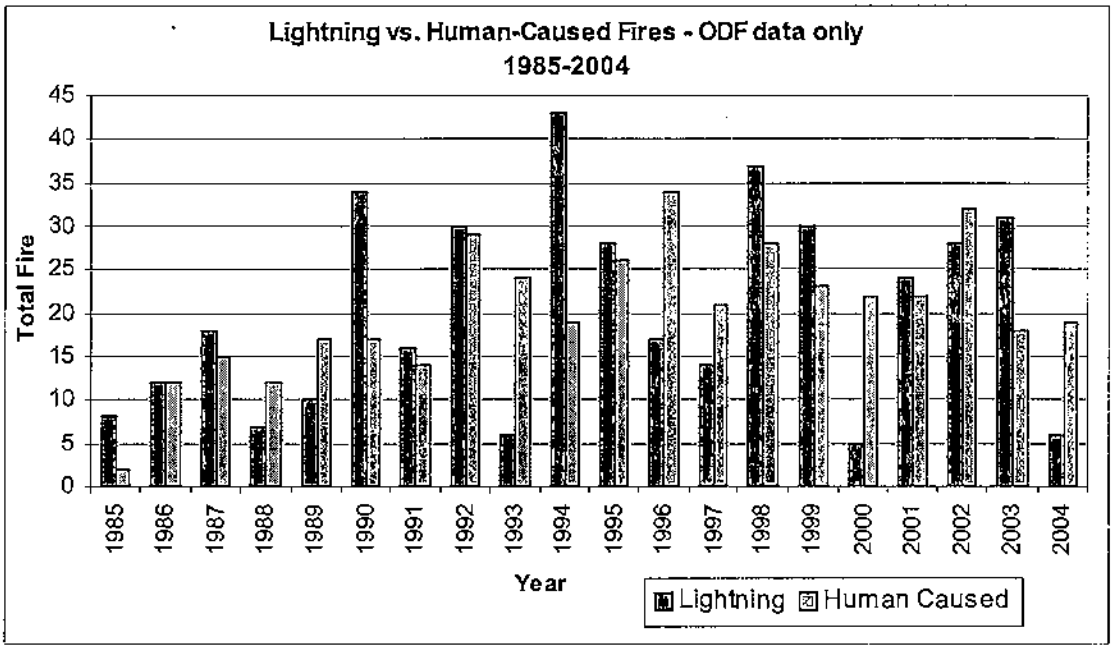
1970-2004 Fire Seasons	Lightning Caused	Human Caused
Number of Fires by Cause	3,089	1,503
Acres Burned by Cause	149,034	45,843
Acres Burned Per Fire	48	30

Lightning fires are more prevalent on federal lands. Lightning storms tend to build up over mountainous terrain. Much of the high mountainous terrain is in federal ownership. That fact coupled with fewer forest residents on federal land contribute to the fact that lightning fires are the source of 66% of fires on federal lands. Fires in rural fire protection districts and state protected lands are closer to a fifty percent split between lightning and human caused.

Fires on State Protected Lands

The total number of ODF Pendleton Unit fires (Stat and Non-Stat) from 1985-2004 is shown below as lightning versus human caused (Figure 5). For twelve out of the last twenty years the number of lightning caused fires was equal or greater than the number of human caused fires.

Figure 5. Total Number of ODF Fires: Lightning vs. Human Caused Fires (1985-2004)



Historical data for ODF statistical fires going back to 1960 is shown in Table 1 as the percentage of fires by general cause, either lightning or human related. Categories are broken into five periods: the last 5 years, 10 years, 20 years, 30 years, and 45 years respectively. For example, the 5-year average shows that 47% of all fires in this period were caused by lightning while 53% were human related (debris burning the leading cause). Slightly more than half of all fire starts during the last 45 years are attributed to lightning. Table 2 shows the number of fires averaged by the same period.

Table 1. ODF Pendleton Unit – Percentages & Trend Data of Statistical Fires by General Cause

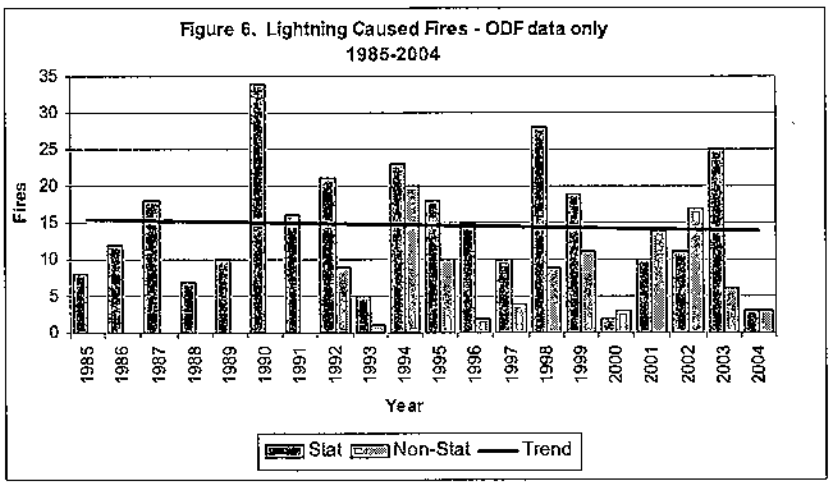
	Lightning	Railroad	Equip Use	Recreation	Smoking	Debris Burn	Arson	Juvenile	Misc	Total Fires
45 Yr Avg.	52%	6%	12%	8%	5%	9%	2%	1%	5%	100%
30 Yr Avg.	50%	4%	13%	9%	4%	11%	2%	1%	5%	100%
20 Yr Avg.	51%	5%	14%	8%	3%	12%	2%	1%	6%	100%
10 Yr Avg.	49%	6%	14%	8%	3%	10%	3%	1%	5%	100%
5 Yr Avg.	47%	7%	10%	7%	3%	14%	5%	1%	5%	100%

Table 2. ODF Pendleton Unit – Average Number of Statistical Fires by General Causes

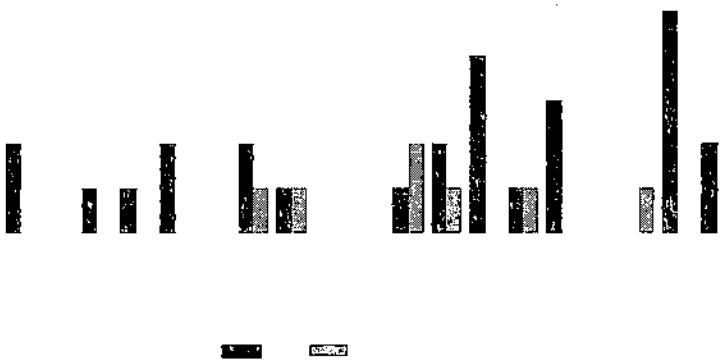
	Lightning	Railroad	Equip Use	Recreation	Smoking	Debris Burn	Arson	Juvenile	Misc	Total Fires
45 Yr Avg.	12.3	1.3	2.8	1.9	1.2	2.0	0.4	0.3	1.2	23.5
30 Yr Avg.	13.2	1.2	3.5	2.4	1.1	2.8	0.5	0.2	1.4	26.2
20 Yr Avg.	14.8	1.4	4.1	2.4	0.8	3.4	0.6	0.3	1.7	29.2
10 Yr Avg.	14.1	1.8	3.9	2.4	0.8	2.9	0.9	0.2	1.5	28.5
5 Yr Avg.	14.0	2.2	3.0	2.2	0.8	4.2	1.4	0.4	1.4	29.6

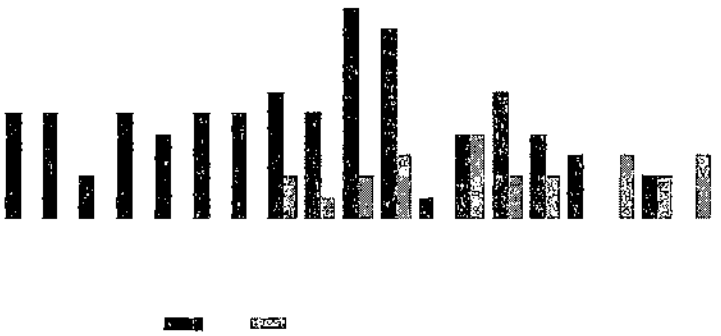
Trend Information for Fires on State Protected Lands

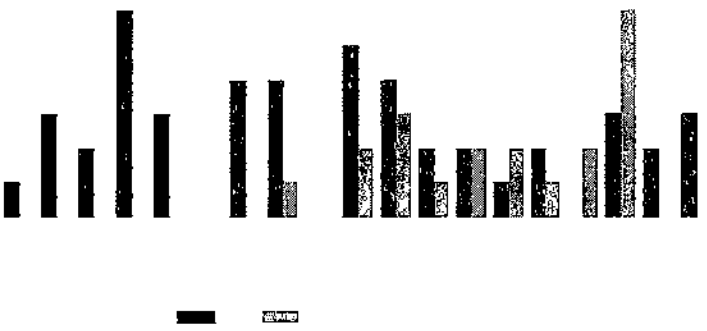
The following graphs shown below (Figures 6-14) reflect data collected from those lands protected by the ODF Pendleton Unit and are used to provide an illustration of trends on those non-federal lands. The trend lines may not be statistically valid.

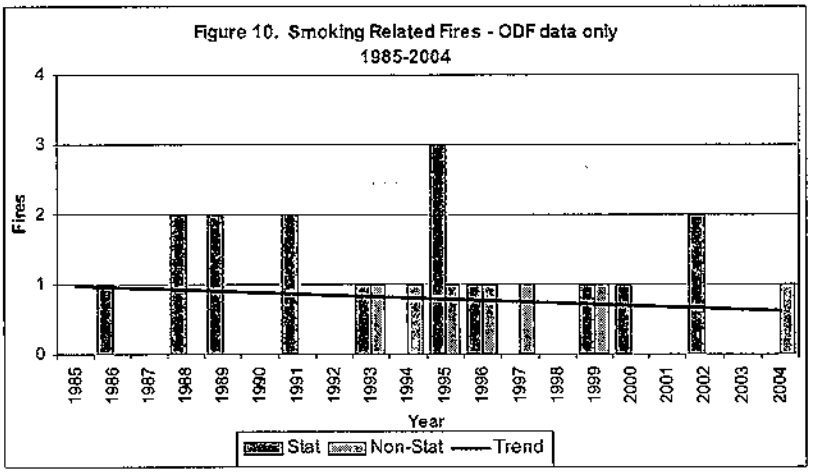


The frequency of **lightning** and related fire starts in northeast Oregon is higher than on the west side. Some of the largest fires in the county have been started by lightning during dry years. While lightning fires cannot be prevented, they can be kept small by quick-acting suppression resources. These fires tend to be clustered around storm events.

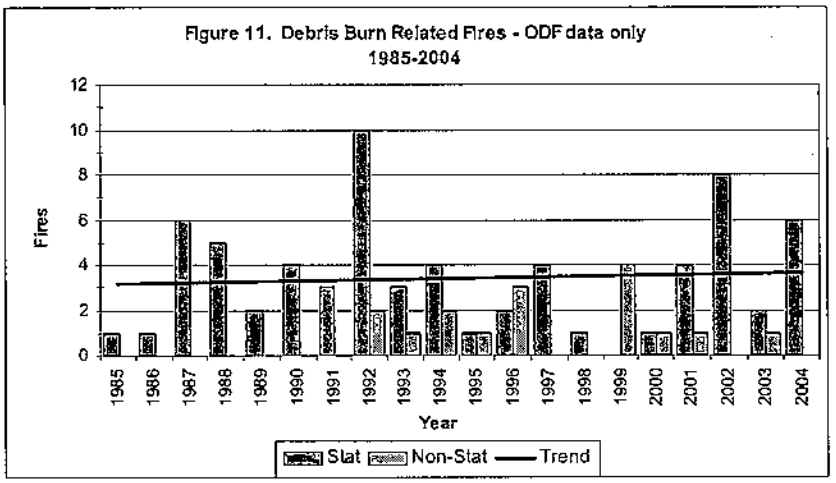




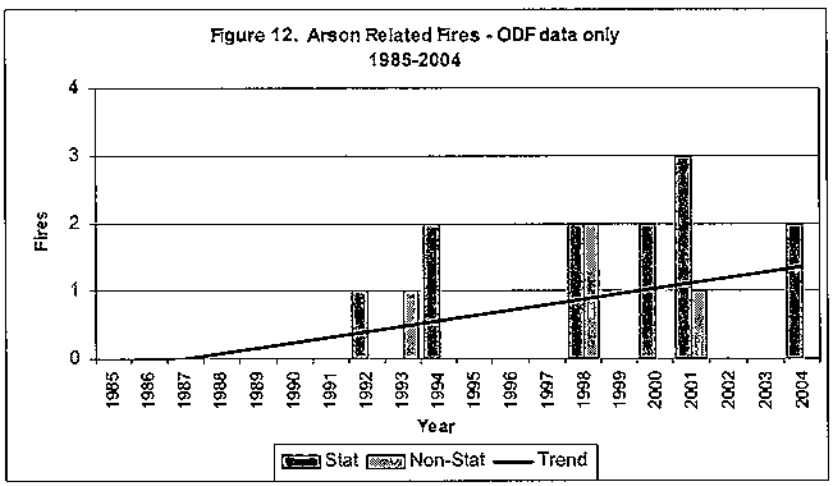




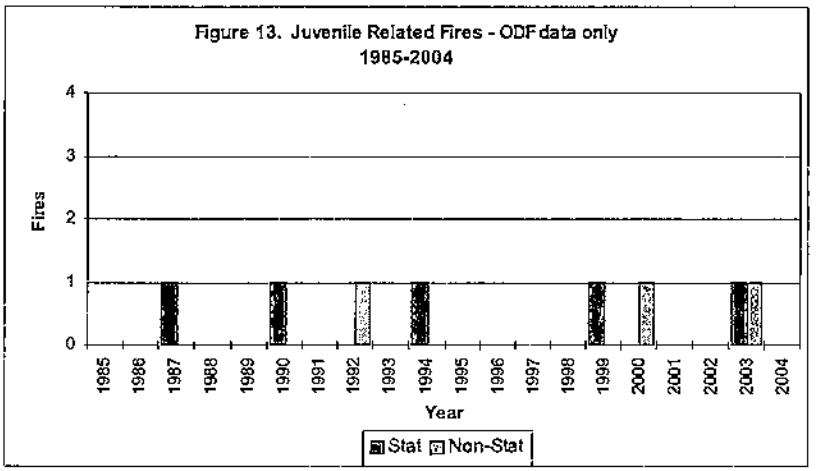
The trend in wildland fires caused by **smoking** and improperly discarded cigarettes is moving downward. It is unclear if this is due to fewer people smoking, better investigation of fire cause, or a combination of the two.



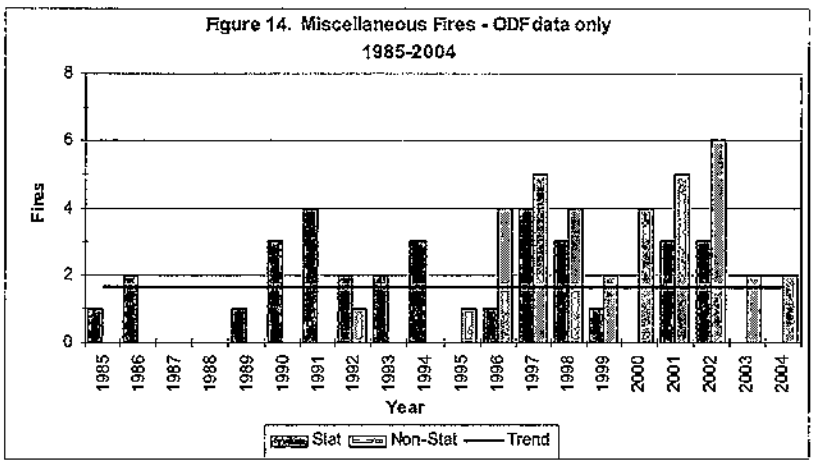
Historically, fires resulting from **debris burning** activities have resulted in at least 10% or more of the total number of statistical fire starts in the county over the last few decades. Unfortunately, even though these fires are preventable, there has been an increase in the last 5-year period even with the increased local burning bans during the fire season.



While the overall number across Oregon is decreasing, **arson** related fires seem to be trending upwards over the last few years in Umatilla County.



Juveniles starting wildfires has been sporadic. There have only been three fire starts in the last 5-year period. The education and prevention efforts in school classrooms (such as Smokey Bear) appear to be having an effect.



Miscellaneous fire cause is a catchall classification for fires resulting from a wide array of causes. Automobile accidents, burning homes and electric fence use are but a few of the causes. The overall trend of such fires has stayed constant

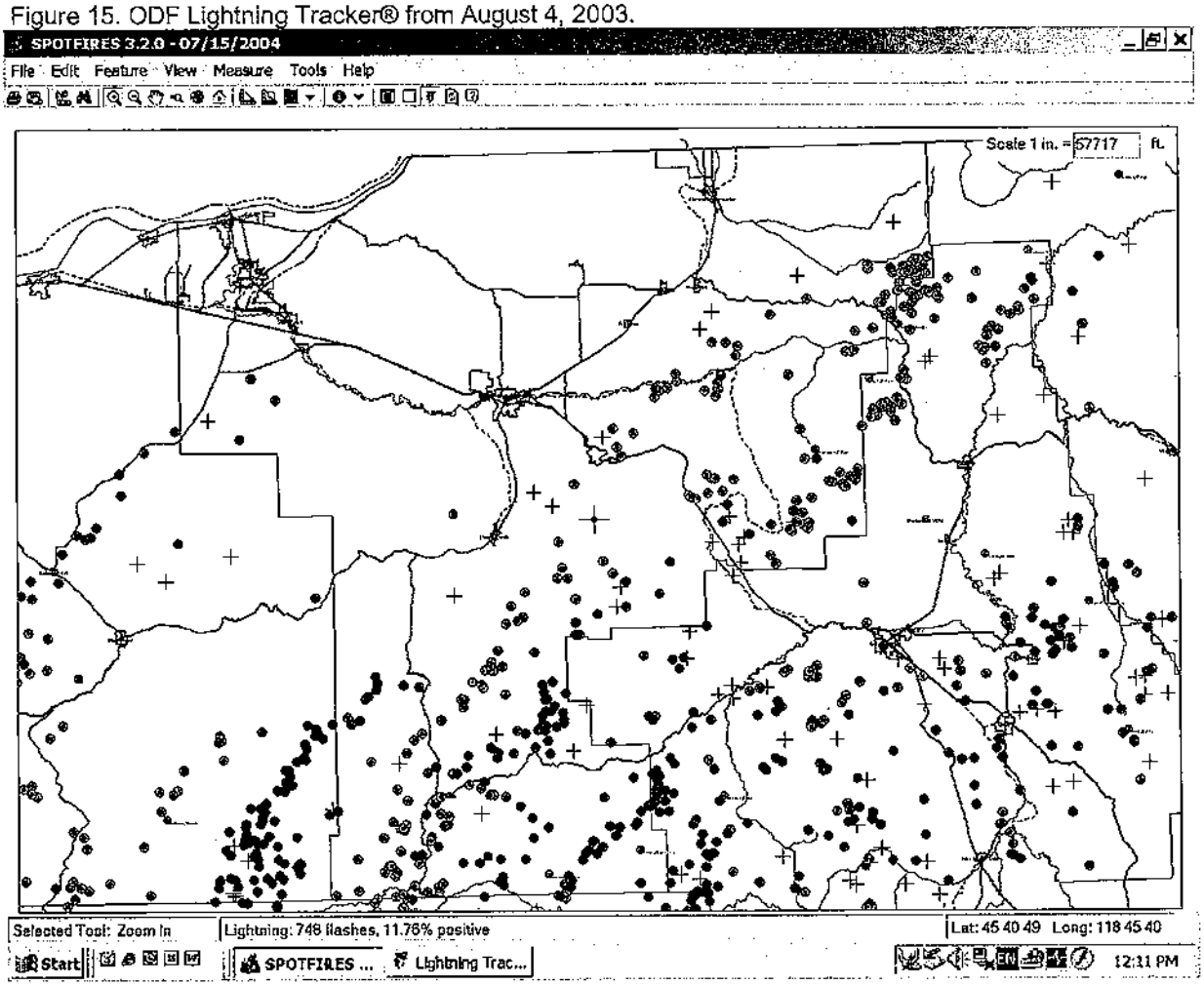
Fire Prevention & Detection

All wildfire protection agencies utilize similar tools to reduce the risk of a large wildfire event. These include prevention, detection, and the prompt suppression of known fire starts. All the agencies in the county work collaboratively as much as possible in all areas of fire protection.

While lightning fires can be potentially kept to a small size, they can't be prevented from actually starting. **Prevention** is a key component in reducing the number of human caused fires. All fire protection agencies rely on a prevention program that emphasizes education. Human caused fires often occur near populated areas or areas easily accessed by road. They are also seasonal and may occur during periods of high visitor use such as holidays or hunting seasons.

Fire **detection** for the Umatilla National Forest and associated private lands is primarily done through seven lookouts that are staffed throughout the fire season. During periods of high fire risk, an aerial fire detection aircraft may fly for wildland fire protection agencies. The aerial observation aircraft is also used in locating fire starts more efficiently, especially following heavy lightning activity. Pendleton Interagency Coordination Center (PICC) utilizes BLM's lightning detection program as well as ODF's GIS based software called Lightning Tracker®. These programs record in real-time, all down-strikes associated with a lightning storm. This information can then be mapped along with topographic and ortho maps and can be provided to firefighters to help locate potential fire starts. An example of the ODF software is shown in Figure 15 below.

Figure 15. ODF Lightning Tracker® from August 4, 2003.



Fire **suppression** resources are often rapid and utilize fire fighters, engines, and aircraft from the local area and neighboring agencies and Forests. Agencies also utilize private landowners and their available equipment such as dozers and water

tenders when additional resources are required. Agreements or contracts are made with both state and federal agencies, but can be used through the mutual aid and supplemental agreements already in place. USFS and ODF suppression forces are dispatched through PICC, while the Bureau of Indian Affairs (BIA) and CTUIR resources utilize CTUIR Police Department dispatch for suppression response notification.

The efforts of the combined fire suppression resources in Umatilla County have been very effective in suppressing wildfire in the CWPP area. On average, 96% of the fires are suppressed at 10 acres or less. Unfortunately, the remaining 4% of the fires tend to be damaging and very difficult to suppress.

---

[6] State of Oregon Emergency Management Plan, *Natural Hazards Mitigation Plan, Fire Chapter*, November 2003.

7. Wildfire Risk Assessment[7]

To identify and prioritize wildland-urban interface areas-at-risk in Umatilla County, an assessment of factors was conducted; these factors contribute to large wildfire events that can leave communities vulnerable. This section will outline the process used and highlight unfamiliar definitions. Two key guidance documents were referenced in the assessment of communities-at-risk and the wildland-urban interface areas, as instructed by the State of Oregon:

1. *Field Guidance: Identifying and Prioritizing Communities at Risk.* National Association of State Foresters. June 27, 2003. (Available at: http://www.stateforesters.org/reports)
2. *Concept for Identifying and Assessment of Communities at Risk in Oregon.* Draft prepared by Jim Wolf, Fire Behavior Analyst, Oregon Department of Forestry. July 19, 2004. (Available at: jwolf@odf.state.or.us)

In Umatilla County, a ***community-at-risk (CAR)*** is defined as a group of homes or other structures with basic infrastructure (such as shared transportation routes) and services within or near federal land. A ***wildland-urban interface (WUI)*** area surrounds a community-at-risk, including that community's infrastructure or water source, and may extend 1 ½ miles or more beyond that community. This boundary depends on topography and geographic features that could influence the when creating an effective firebreak, or Condition Class 3 lands.

It is important to understand the meaning of risk and hazard in relation to wildfire. ***Risk*** is the chance or probability of occurrence of fire. ***Hazard*** is the exposure to risk; in a wildfire situation, those hazards can be related to either the natural or the man-made environment. Natural hazards include fuel type and amount of fuels, topography, and weather. Man-made hazards include the availability of water, access to structures, having limited greenspace around structures, and the ignitability of structures. The capability of firefighting resources will be compromised by the severity of both natural and man-made hazards.

Fire Occurrence/Risk of Ignition

The rate of fire occurrence is an important component of the assessment. Historical fire records were used for the last ten years (1994-2003). Fire history data was compiled from the Umatilla National Forest, Oregon Department of Forestry Pendleton Unit, and the BLM. Data from tribal and BIA agencies, and city, rural and volunteer fire departments was not available in GIS format at the time of this plan.

The fire occurrence rate (FOR) per 1,000 acres was used to yield a statistical analysis of the project area. The number of fires for the past ten years for Umatilla County was determined in order to calculate fire occurrence per 1,000 acres. This resulted in an overall county fire occurrence rate. Using this factor, a fire occurrence

rate for each identified WUI was calculated. The majority of the WUI areas had a fire occurrence rate higher than the overall fire occurrence rate for the county.

Fuels / Vegetation

Data used to create a fuels inventory in GIS was derived from Landsat imagery provided by Oregon Department of Forestry for private lands and the Umatilla National Forest GIS Library (UM Veg01 from the USFS vegetation inventory data, a combination of aerial photo interpretation and a stand exam stocking survey from 2001). For Umatilla County, the increased risk of a large wildfire event is caused by the buildup of forest fuels and changes in vegetation composition over time. Dense timber stands compete for limited water and nutrients and are at increased risk of wildfire, and from insect and disease epidemics.

Fire Regime Condition Class Definition[8, 9, 10]

A natural fire regime is a general classification of the role fire would play across a landscape in the absence of modern human mechanical intervention, but including the influence of aboriginal burning (Agee 1993, Brown 1995). Coarse-scale definitions for natural (historical) fire regimes have been developed by Hardy et al. (2001) and Schmidt et al. (2002) and interpreted for fire and fuels management by Hann and Bunnell (2001). There are five natural (historical) **fire regime** groups adapted for all lands managed by the federal agencies. They are based on average number of years between fires (fire frequency) combined with the severity (amount of replacement) of the fire on the dominant overstory vegetation. These five regimes include:

I – 0-35 year frequency and low (surface fires most common) to mixed severity (less than 75% of the dominant overstory vegetation replaced); located primarily in low-elevation forests of pine, oak, and pinyon-juniper.

II – 0-35 year frequency and high (stand replacement) severity (greater than 75% of the dominant overstory vegetation replaced); located primarily in low- to mid-elevation rangeland, grassland, or shrubland (a lot of the rolling foothills land).

III – 35-100+ year frequency and mixed severity (less than 75% of the dominant overstory vegetation replaced); located primarily in forests of mixed conifer, dry Douglas fir, or wet ponderosa pine.

IV – 35-100+ year frequency and high (stand replacement) severity (greater than 75% of the dominant overstory vegetation replaced).

V – 200+ year frequency and high (stand replacement) severity.

A combination of activities may have contributed to this departure from the historic condition class of a fire regime: federal fire exclusion policy, timber harvesting, livestock grazing, introduction and establishment of non-native (exotic) plant species, introduced or native insects and disease, or other past management activities.

A **fire regime condition class** (FRCC) is a classification of the amount of departure from the natural regime (Hann and Bunnell 2001). Coarse-scale FRCC classes have been defined and mapped by Hardy et al. (2001) and Schmidt et al. (2001) (FRCC). They include three condition classes for each fire regime. The classification is based on a relative measure describing the degree of departure from the historical natural fire regime. This departure results in changes to one (or more) of the following ecological components: vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated disturbances (e.g. insect and diseased mortality, grazing, and drought). There are no wildland vegetation, fuel conditions, or wildland fire situations that do not fit within one of the three classes.

The three classes are based on low (FRCC 1), moderate (FRCC 2), and high (FRCC 3) departure from the central tendency of the natural (historical) regime (Hann and Bunnell 2001, Hardy et al. 2001, Schmidt et al. 2002). The central tendency is a composite estimate of vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated natural disturbances. Low departure is considered to be within the natural (historical) range of variability, while moderate and high departures are outside.

Characteristic vegetation and fuel conditions are considered to be those that occurred within the natural (historical) fire regime. Uncharacteristic conditions are those that did not occur within the natural (historical) fire regime. These include invasive species (e.g. weeds, insects, and diseases), "high graded" forest composition and structure (e.g. large trees removed in a frequent surface fire regime), or repeated annual grazing that maintains grassy fuels across relatively large areas at levels that will not carry a surface fire. Determination of amount of departure is based on comparison of a composite measure of fire regime attributes (vegetation characteristics; fuel composition; fire frequency, severity and pattern) to the central tendency of the natural (historical) fire regime. The amount of departure is then classified to determine the fire regime condition class. A simplified description of the fire regime condition classes and associated potential risks follow in Table 3.

Across Umatilla County, condition class 2 and 3 are more dominant. Fire regimes altered from their historic range, set up the eastern and southern parts of the county (Blue Mountains region) for wildfires to be larger in scale, more intense in severity, and significantly changed landscape patterns. One or more of the following activities may have caused this departure: fire suppression, timber harvesting, livestock grazing, introduction and establishment of exotic plant species, introduced insects and disease, or other pest management activities.

Table 3. FRCC Description and Associated Potential Risks

Fire Regime Condition Class	Description	Potential Risks
Condition Class 1	Within the natural (historical) range of variability of vegetation characteristics; fuel composition, fire frequency, severity and pattern; and other associated disturbances	Fire behavior, effects, and other associated disturbances are similar to those that occurred prior to fire exclusion (suppression) and other types of management that do not mimic the natural fire regime and associated vegetation and fuels characteristics. Composition and structure of vegetation and fuels are similar to the natural (historical) regime. Risk of loss of key ecosystem components (e.g. native species, large trees, and soil) is low.
Condition Class 2	Moderate departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances	Fire behavior, effects, and other associated disturbances are moderately departed (more or less severe). Composition and structure of vegetation and fuel are moderately altered. Risk of loss of key ecosystem components is moderate.
Condition Class 3	High departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances	Fire behavior, effects, and other associated disturbances are highly departed (more or less severe). Composition and structure of vegetation and fuel are highly altered. Uncharacteristic conditions range from moderate to high. Risk of loss of key ecosystem components is high.

A **total vegetation hazard** was created by considering both the crown and the surface fuels hazards. Surface fuels hazard was determined by using fire behavior fuel models and/or potential flame length (for ground and ladder components). Fuel Models are descriptions of the fuel types that are used in surface fire behavior modeling and the Fire Behavior Prediction System (FBPS). Values were assigned for each fuel group and Table 4 below displays the grouping of fuel models to determine hazard:

Surface Fuels	*Value*
Group 1	1
Group 2	3
Group 3	5

Table 4. Fuel Models Used to Determine Hazards

Fuel Hazard Factor	Fuel Types	Fire Characteristics
1	Grass, Low/less Flammable brush, and short-needle timber litter (FM 1, 5, 8)	Typically produces a flame length of up to 5 feet; a wildfire that exhibits very little spotting, torching, or crowning, and which results in a burned area that can normally be entered within 15 minutes. Low severity.
2	Grass/Timber, Moderate brush, conifer reproduction, open sage and juniper (FM 2, 6, 9)	Typically produces a flame length of 5-8 feet; a wildfire that exhibits sporadic spotting, torching, or crowning, and which results in a burned area that can normally be entered within one hour. Mixed severity.
3	Tall, flammable grasses, Heavy/flammable brush, timber/slash (FM 3, 4, 10-13)	Typically produces a flame length of over 8 feet; a wildfire that exhibits frequent spotting, torching, or crowning, and which results in a burned area that normally cannot be entered into for over one hour. Stand replacement severity.

Crown fuels hazard was derived from the vegetation conditions of the landscape considered the canopy closure and structure [ODF's crown of closure; USFS' crown density; species and size].

Crown Fuel Group	*Value*
Low	1
Moderate	3
High	5

Total vegetation hazard was determined by combining the points assigned to the crown fuels hazard and the points assigned to the surface fuels hazard. The total possible value for the vegetation hazard is ten and an adjective rating was assigned to the point breaks (Historical notes have been kept for the GIS processes used and archived at the Oregon Department of Forestry Northeast Oregon District office in La Grande, Oregon):

Adjective	*Value*
Low	1 to 4
Moderate	5 to 7
High	8 to 10

A layout displaying the total vegetation hazard for Umatilla County can be found in Appendix B. (For more detailed description of each fuel model, a copy of USDA Forest Service publication "Aids to Determining Fuel Models for Eliminating Fire Behavior" (Anderson, 1982) is available through the Umatilla National Forest.)

Topographic Hazard

Slope and aspect affect both the intensity and rate of spread of a wildfire. The topography factor was derived from the Digital Elevation Model for Umatilla County. The following values were assigned to the combination of slope and aspect working together on the landscape:

Slope	*Value*
0 – 25%	1
25 – 50%	2
> 50%	3

Aspect	*Value*
N, NE	1
NW, E	2
W, SE	3
S, SW, Flat	4

Total topographic hazard was determined by combining the points assigned to both slope and aspect hazards, with a maximum of seven points possible. A layout displaying the total topographic hazard for Umatilla County can be found in Appendix B.

Overall Natural Hazard

The total topographic hazard rating and the total fuels hazard rating were combined using *Spatial Analyst* (an ESRI product) to determine overall natural hazard of the Blue Mountains region of Umatilla County. The maximum points assigned for total topographic hazard was seven and the maximum points assigned for total vegetation hazard was 10. The breakpoint used to determine high hazard or low/moderate hazard was 10; anything that scored 10 points or more was considered high hazard, and anything below 10 was considered moderate or low hazard (there was no delineation between low and moderate). (Refer to Appendix B)

Weather Hazard

In Umatilla County, weather patterns can produce summer lightning storms that start many fires. These multiple starts can put a strain on the wildland firefighting resources spread across the county. With the drying of fuels over time and the low relative humidity factored in, the probability for large fires can significantly increase during these lightning events. The number of days per season that forest fuels are capable of producing a significant fire event is also important to consider. Oregon Department of Forestry has already determined that eastern Oregon is at the highest hazard rating for weather. This value was assigned through an analysis of daily wildfire danger rating indices in each regulated use area of the state. This assigned value is constant across Umatilla County. However, since weather patterns vary due to the mountainous landscape of the project area, the high hazard value was offset with annual rainfall levels as part of the scoring process. This helped to prioritize the WUI areas as well as reflecting a more realistic assessment of weather hazard.

Annual Rainfall	*Value*
< 12 inches	1
13 – 24 inches	2
> 25 inches	3

Overall Fire Protection Capability Hazards (Structural Vulnerability)

For Umatilla County, it was decided that the local fire departments would determine for themselves what they thought their overall capability was for responding to a fire in their district. Each district was provided with a written questionnaire and asked to submit information about roads that prohibit access to structures, water shortages, unprotected locations, structure density, building materials, defensible space around structures, and any other issue(s) that might pose a hazard to their fire district. That information is being digitized using GIS and will be available in the next update of the plan.

Homesite Assessment

A separate project being conducted by ODF involves the assessment of all homesites within the ODF protection boundary (both year-round residential and recreational cabins). This work has been funded to date using NFP dollars; a proposal for Umatilla County Title III dollars to finish the work is pending. To date, there have been over 900 homes assessed and inventoried by ODF staff within the Pendleton Unit. There is an estimated 300-500 left to review, mostly in the Tollgate and Weston Mountain area.

ODF has attempted to locate all known homesite structures in the interface areas by utilizing county assessment information. When possible, ODF has explained to property owners the purpose of the assessment and has provided information to those interested, on how to create and improve defensible space around a structure. A geospatial positioning unit (GPS) was used to obtain location information (latitude/longitude). Some of the other information collected includes:

- Addressing & Roadway Access
  - Visible and readable address
  - Accessible to fire equipment
  - Adequate turnouts
  - Alternate escape route
- Firebreak or Greenbelt
  - Flammable vegetation removed
  - Ladder fuels removed
  - Roof free of limbs and debris
  - Degree of adjacent fuels
- Building Characteristics
  - Non-combustible roof and siding materials
  - Decks enclosed or screened
- Miscellaneous

- Vegetation around power lines cleared
- Location of gas/diesel/propane tanks
- Vegetation cleared around fuel tanks
- Additional water sources available

Using the assessment checklist, a classification was attributed to each homesite and entered into the database as "Livable Structure Value". Structure Value is defined by roof type and siding type and is used as a general estimate of the survivability of the property since the survivability cannot be guaranteed.

Green: Non-Combustible Roof/Non-Combustible Siding (with help from firefighters, the structure is **likely to survive** a wildfire).

Yellow: Non-Combustible Roof/Combustible Siding or Combustible Roof/Non-Combustible Siding (with help from firefighters, the structure **may survive** a wildfire).

Red: Combustible Roof/Combustible Siding (even with help from firefighters, the structure **may not survive** a wildfire).

A general breakdown of the 970 properties reviewed to date and put into the ODF database includes:

- 9% are classified as Green, 7% are classified as Red, and 84% are Yellow
- Of the properties reviewed, 42% had Good access to the structure (ingress/egress) while the rest where either Fair or Poor
- 72% have some level of Defensible Space
- 24% have Light Adjacent Fuels – considered grasses and forbs
- 36% have Medium Adjacent Fuels - include short, light brush and small trees
- 39% have Heavy Adjacent Fuels – include tall, dense brush, timber, and hardwoods
- Less than 1% have Slash Fuels adjacent to the structure – logs, chunks, bark, branches, stumps, and broken understory trees and brush
- 35% of the properties have some type of containerized fuel tank (gas/diesel/propane)
- 22% of the properties have no apparent domestic water source available

Home Construction Materials

A wildland fire incident could generate radiant heat, sparks, and embers over a prolonged period, subjecting the outside of a home to fire ignition prior to any type of safe fire suppression activity at the home. Studies completed by the Missoula Fire Lab have shown that most structures lost due to wildfire are the result of radiant heat, sparks, and embers igniting flammable materials in direct contact with the building. After the fire front has passed, creeping and residual fires are typically all that are present, and these types of fires rarely burn down structures.

The two most common places for sparks or embers to ignite a home are the roof and exposed decks. New fire resistant building materials and treatments are available to homeowners and contractors. Manufacturers have designed these materials to replicate traditional building materials, but they reduce the ability of sparks and embers to ignite the building.

The following was taken from the Umatilla County Development Code GF Grazing/Farm Zone §152-080: This zone is designed to protect grazing lands, forest uses, and inclusions of agricultural land that are found within the county's mixed use farm/forest areas.

§152-084(B) (3) (g) The dwelling must meet the following fire siting and fire safety design standards:

1. Shall have a fire retardant roof;

2. Will not be sited on a slope greater than 40%;

3. If the dwelling has a chimney or chimneys, each chimney shall have a spark arrester;

4. Dwelling is located upon a parcel within a fire protection district or is provided with residential fire protection by contract;

5. If the dwelling is not within a fire protection district, the applicant provides evidence that the applicant has asked to be included in the nearest such district;

6. If the county determines that meeting the requirement of division (B) (3) (g) 4. above is impractical, the county may provide an alternative means for protecting the dwelling from fire hazards. Such means selected may include a fire sprinkling system, on-site equipment and water storage or other methods that are reasonable, given the conditions. If a water supply is required under this division, it shall be a swimming pool, pond, lake or similar body of water that at all times contains at least 4,000 gallons or a stream that has a minimum flow of at least one cubic foot per second.

7. Owner(s) provide and maintain a primary fuel-free break area surrounding all structures and clear and maintain a secondary fuel-free break area in accordance with the provisions in "Recommended Fire Siting Standards for Dwellings and Structures" dated March 1, 1991 published by the Oregon Department of Forestry.

8. Road access shall be provided to within 15 feet of the water's edge for fire-fighting equipment and pumping units.

9. Road access shall accommodate the turnaround of firefighting equipment during the fire season.

10. Permanent signs shall be posted along the access route to indicate the location of the emergency water source.

11. Road design standards shall meet the appropriate rural fire protection district and forest protection district standards for private roads and bridges, except for private roads and bridges accessing only commercial forest uses. If no such standards exist, the county shall, on a site by site basis, consult with the appropriate fire or forest protection district to determine mutually agreed upon road and access standards considering maximum grade, road width, turning radius, road surface, bridge design, culverts, and road access taking into consideration seasonal weather conditions.

Insurance Services Office Fire Hazard Rating

The Insurance Services Office (ISO) is an independent, advisory organization that serves insurance companies, fire departments, and others by providing information about risk, including public fire protection. They help establish appropriate fire insurance premiums for residential and commercial properties by providing the insurance industry with up-to-date information about a community's fire protection capabilities.

ISO uses the Fire Suppression Rating Schedule (FSRS) to review and evaluate the fire fighting capabilities of communities across the country. The rating schedule measures the major elements of a fire suppression system and develops a numerical grade called the Public Protection Classification (PPC™). A number from 1 to 10 is assigned - Class 1 represents exemplary public protection and Class 10 indicates that the area's fire suppression program does not meet minimum criteria.

The PPC depends on:

- Receiving and Handling Fire Alarms (10%) – reviews the fire alarm and communications systems including telephone systems, telephone lines, staffing levels, and dispatch systems.

- Fire Department (50%) – reviews the fire protection company including the staffing, training, equipment, and the geographic distribution of the fire companies.

- Water Supply (40%) – reviews the water supply system that is available for fire suppression in the community including condition and maintenance of hydrants, and an evaluation of the amount of available water compared with the amount needed to suppress fires. (Per Don, as part of the fire protection classification, these are always combined for structural protection.)

Communities are evaluated based on nationally recognized standards developed by the National Fire Protection Association and the American Water Works Association. The PPC rating can provide a benchmark for fire departments and local officials in measuring the effectiveness of their fire protection services and is an additional tool for planning and budgeting efforts. Virtually all U.S. insurers of homes and business property use ISO's PPC in calculating premiums. In general, communities with superior fire protection services and good Public Protection Classifications have lower fire losses, and typically lower fire insurance premiums than communities whose fire services are not as comprehensive.

Values at-Risk

This category was based on public input collected during community meetings and from informational questionnaires. Steering committee members provided input based on their local experience and knowledge of the areas.

Values at-risk are an important, but highly subjective component of the assessment. Values lost because of a devastating wildfire would affect residents in different ways. Umatilla County's economy could be impacted if a large wildfire eliminated valuable timber, which might affect local businesses and industry. A fire could destroy recreational areas that draw tourists to the area. Tourism is becoming a large component of the county's economy. Social values-at-risk include home and property, animals, and cultural and historical sites. Reduced visibility can be an environmental concern and can reduce the scenic views, considered one of the great assets of rural Oregon. Comments from property owners identified the loss of scenic beauty and natural landscape as being of a high value. Numerous families maintain their primary residential property within the identified WUI areas across the county. Loss of human life and the loss of beloved domestic animals could be overwhelming for families. There are also hundreds of recreational cabins found in the forested lands, some of which have been used by multiple generations.

Ecologically, general wildlife habitat and diversity, as well as threatened and endangered species of fish, wildlife, and plant life could be wiped out or severely harmed in the long-term depending on the intensity of the wildfire. Water quality could be impacted if a moderate to high intensity wildfire burned through watersheds, affecting the health of fish and wildlife as well as domestic water supplies for residents. Umatilla County has good air quality compared with larger urban areas west of the Cascades; the smaller population and fewer large industrial emission sources generally mean fewer pollutants entering the air. However, pollutants from large scale or numerous smaller wildfires can affect residents already suffering from health concerns. The City of Pendleton is working with residents to reduce woodstove smoke. Umatilla County works with farmers and area fire districts/agencies to manage agricultural field burning smoke. The Forest Service

works with Oregon DEQ to ensure smoke from prescribed forest burns does not enter into populated areas. EPA works with several entities to monitor and reduce smoke impacts throughout the Pacific Northwest.

---

[7] This section is based upon *Methodology for Hazard Assessment (2005authored by Angie Johnson, Oregon Department of Forestry Northeast Oregon District, and edited by Trish Wallace, USDA Wallowa-Whitman National Forest.*

[8] Protecting People and Sustaining Resources in Fire-Adapted Ecosystems – A Cohesive Strategy, October 13, 2000.

[9] Fire Regime Condition Class Definition. 06/20/2003. Obtained from Umatilla National Forest Fire Planning.

[10] Expanded Fire Condition Class Definition Table. Available at http://www.frcc.gov.

8. Mitigation Action Plan

Current Projects and Policies (i.e. ordinances, policies)

1. Unprotected Lands

In February 2005, the Oregon State Fire Marshall's Office, along with support from the Governor's Office, released a strategy for all counties to consider. The Umatilla County CWPP Steering Committee will recommend that the Umatilla County Commissioners officially adopt the following proposal:

Conflagration Response to Unprotected Areas

GOAL: Reduce interface fire incidents and related structural threat and loss.

PROPOSAL: The Governor will continue to consider Conflagration response to unprotected areas where the county has done the following:

2005 fire season

a) Demonstrated that the county is completing a fire protection plan (elements for NFP/Healthy Forests, FEMA mitigation, and where appropriate SB 360) Note: Counties can use Title III funds for this purpose.
b) Adopted DLCD Goal 4 to require minimum fire defense standards for new construction.
c) Changed property tax statement language for ODF assessment from "fire protection" to "ODF non-structural fire suppression" so homeowners and insurers are not led to believe they have structural fire protection.

2006 fire season

a) All of above
b) Demonstrated that the county is actively implementing a fire protection plan to strategically remove fuels.

By adopting this proposal and making it an official county ordinance/policy, the county retains the ability to request additional help in a large-scale wildfire event and enact the Conflagration Act.

The committee also recommends developing a long-term strategy to encourage and support efforts to bring all unprotected lands within Umatilla County under some type of formalized wildland fire protection coverage. This would involve ideas such as working with local government and rural fire districts to incorporate those unprotected areas into pre-existing fire protection boundaries or to enhance coverage through additional resources such as creating another substation in an existing district.

2. Grants – Current and Pending

In February 2005, ODF applied for PL 106-393 Title III funds ("Secure Rural Schools and Community Self-Determination Act of 2000") for two projects. Both projects were

recommended for funding by the local advisory group. The County Commissioners have passed the recommendations on to the regional level and are pending.

a. One proposal was for the 'Partners in Protection' program. This program will use components obtained through the state and federal excess property programs (ODF already has all the parts) to construct four slip-on pumper units. The portable pumpers are designed to slip onto a flatbed pickup. They would be available to interested landowners located in strategic points across the county. The program is intended to supplement the wildland suppression resources already available and provide additional equipment in high priority areas of the county. ODF staff will provide training to the landowners, as well as maintenance and off-season storage of the units. If funding allows, ODF intends on implementing this program during summer 2005.

b. The second was for funds to complete the Homesite Assessment project. This would finish the work previously funded using NFP dollars. ODF has worked on completing assessments of all homesites located within the wildland-urban interface areas within the ODF protection district of the Pendleton Unit. There are approximately 300-500 structures left to review, mostly in the Tollgate Mountain area. This information will then be added to the ODF database and into the project notebooks. Information collected includes structural vulnerability, ingress/egress, and presence of various risk factors. ODF anticipates completing this project by the end of 2005.

3. Senate Bill 360

In 2005, ODF hired an individual to work on the SB 360 program across the NEO District. Within the next 1-3 years, an assessment will be conducted on the wildland-interface areas of Umatilla County to determine if SB 360 should be implemented in that location. ODF will coordinate with County staff on its findings. Landowners will be notified about implementation efforts.

4. Education and Community Outreach

Education is an ongoing process. Multiple Firewise presentations have been made in the county within the last five years. The Living with Fire newspaper has been mailed and provided in various meetings to landowners. Smokey Bear continues to be an advocate for fire prevention measures and general forest health. ODF has used grants to place weekly and monthly notices from June-October over the last two years promoting wildfire safety awareness in local newspapers, including the Confederated Umatilla Journal (CUJ), the East Oregonian, and the Walla Walla Union-Bulletin. ODF also routinely runs Public Service Announcements (PSA's) and news releases throughout the year regarding wildfire awareness efforts.

Oregon Wildfire Awareness Week 2005 was held May 9-15th. This public awareness and fire prevention campaign typically precedes the normal fire season and is coordinated through the Oregon State Fire Marshall with many agencies participating. Governor Kulongoski signed a proclamation that made May 9th to May

15th "Wildfire Awareness Week" in Oregon. Many of the other western states have designated similar weeks during May. The Oregon proclamation was jointly requested by ODF, the Office of State Fire Marshall, Keep Oregon Green and the National Weather Service.

The Governor's proclamation read as follows:

WHEREAS: Wildfires increasingly threaten homes and communities; and

WHEREAS: The number, size and intensity of wildfires continues to challenge efforts to protect citizens, property and our natural resources; and

WHEREAS: Two-thirds of wildfires in Oregon are human caused, are therefore preventable, and a need exists to reduce the number of such fires through information and education; and

WHEREAS: Each year, more people move into Oregon and into wildland-urban areas and they need information, at the community and at the individual homeowner level, on how they can more effectively prevent fires and protect their property from wildfires; and

WHEREAS: Weather affects the potential for wildfire ignitions and subsequent fire behavior, making weather forecasting and observations critical to wildfire prevention success and to public and agency cooperation; and

WHEREAS: Local, state and federal firefighting agencies and the National Weather Service work together to prevent wildfires; and

WHEREAS: All Oregonians share in the responsibility for preventing wildfires and fire safe behavior must be practices by all who work and enjoy Oregon's forested areas.

NOW THEREFORE, I, Theodore R. Kulongoski, Governor of the State of Oregon, hereby proclaim May 9-5th, 2005 to be

WILDFIRE AWARENESS WEEK

In Oregon and encourage all Oregonians to join me in this observance.

In response to the Proclamation:

- The Fire Marshal's Office has developed a media toolkit, for use by agency personnel and others, to promote Wildfire Awareness Week;

- Wildfire Awareness Week will be highlighted on the front pages of the ODF and Keep Oregon Green websites and will be a part of the Governor's Drought and Fire Information website; and

- ODF and Keep Oregon Green will issue a different topical fire safety news release to media, each day during the week.

Most agencies now maintain websites that provide up-to-date information on fire conditions, public use restrictions, and regulated fire closures.

- Education opportunities at landowner group meetings and schools (includes Firewise, Living With Fire newspaper, Smokey Bear campaigns)
- Public use restrictions
- Regulated fire closure
- Burn permit program
- Railroad prevention program
- Evacuation plans needed to be reviewed
- As part of the Emergency Alert system
  - Consider a public outreach campaign to educate the wildland interface residents to tune into the weather station for emergency wildfire information
  - Put signs up along the major roadway informing people to "Tune to AM 1620 for Wildfire Information"
  - In case of an evacuation, the message could be sent out over the weather channel since these radios will now pick up the station with the addition of the tower. Look at grant money for making a bulk purchase of weather radios targeted at WUI residents

Visit the following websites for more information on different programs and look for links to other sites.

- **Umatilla National Forest,** Supervisor's Office
  (541) 278-3716
  http://www.fs.fed.us/r6/uma/

- **Oregon Department Of Forestry**
  (541) 276-3491
  http://www.odf.state.or.us/areas/eastern/northeast/

- **Umatilla County Emergency Management**
  (541) 966-3700
  www.co.umatilla.or.us/emergency_management.htm

- **CTUIR Fire Station**
  (541) 276-2126 daytime and (541) 278-0550 after hours

- **Area 9 Fire Defense Board**
  (Rural fire protection districts in Umatilla County)
  (541)567-8822

- **Office of State Fire Marshall**
  (503)373.1540
  www.sfm.state.or.us

5. Training Resources and Needs

Rural fire protection districts have a need for additional wildland fire equipment such as hoses, nozzles, portable pumps, and vehicles. The need for storage buildings for vehicles and equipment as well as additional substations on Weston Mountain continue to be discussed. Training for both paid staff and volunteers needs to be conducted on an annual basis. Acquiring additional funds for the rural fire districts, both the volunteer and tax-based departments, will be an ongoing item for assistance.

6. Mutual Aid Agreements

ODF has several mutual aid agreements currently in place. These agreements are reviewed annually by the participating agencies to maintain appropriate levels of protection across jurisdictions. Additional agreements will be written as needed to provide the most up-to-date collaboration among fire managers. ODF is currently working on creating and strengthening agreements with Washington Department of Natural Resources (WA-DNR) and the Walla Walla County Fire District #4 for protection services in the Mill Creek/Government Mountain WUI area.

7. Other Projects (to be identified)

Strategy for Risk & Fuels Reduction

Using the Hazard Assessment to Score and Prioritize WUI Areas

The Steering Committee identified communities-at-risk across the forested landscape using several factors. As previously defined, this could mean a group of homes or structures with basic infrastructure and services within or near federal land. The next step was to designate wildland-urban interface boundaries that would incorporate those communities-at-risk as appropriate by using assessment information (described more fully in the previous section). The hazard assessment information was used to develop a scoring matrix that would provide results that could be used for prioritizing the WUI areas within Umatilla County (see Table 5). The weighting of each element of the matrix was based on input received from the community, members of the steering committee, and information derived from the statewide assessment and scoring, and was not scientifically proven in any way. A statistician was not involved in the process, as this was meant to be community-driven, with input captured in its raw form by the community and the committee involved with its development. The list of priorities helped the committee build a comprehensive inventory of projects and action items that could be implemented to protect the WUI areas from large wildfire. A more complete explanation of each category is found in Appendix D. An aggregate score of 21 points was established as the overall high score.

Table 5. Scoring Matrix Factors Used for Ranking Umatilla County Wildland-Urban Interface Areas

Rating Factors for Communities-at-Risk	Point Breakdown
Likelihood of Fire Occurring (historical fire starts data from ODF and USFS; based on occurrence rate per 1,000 acres)	1 pt – low occurrence 2 pts – moderate occurrence 3 pts – high occurrence
Topographic Hazard (slope and aspect combined)	1 pt – 0% - 25% 3 pts – 25% - 40% 5 pts – more than 40%
Total Fuel Hazard (surface and ladder fuels combined)	1 pt – low hazard 3 pts – moderate hazard 5 pts – high hazard
Overall Fire Protection Capability (equipment, training, preparedness, access to homes, structure density, etc.)	1 pt – low capability 3 pts – moderate capability 5 pts – high capability
Weather Factor (high lightning hazard potential and low precipitation)	1 pt – low (~0-12" annually) 2 pts – moderate (~13-24" annually) 3 pts – high (~ 25+" annually)
Values at Risk (taken from surveys and public input; major infrastructure, municipal water source, utility lines/pipelines, etc.)	1 pt – present 0 pts – not present
	Total Points Possible = 21

While the risk of fire occurrence and topographic hazard would be hard to change in order to manipulate the scoring of a WUI, the total fuel hazard could be affected through fuels treatment projects and fire prevention campaigns. The overall fire protection capacity takes into account the capability of firefighting resources to respond and suppress a wildfire in the wildland-urban interface. It combines the type of fire protection training and equipment with structural vulnerability factors such as access to structures, ingress/egress, amount of defensible space, building materials used in structures, and available water sources. Local knowledge of firefighting agencies, structural and wildland, was utilized.

As a means to reflect the unique weather patterns found in the Blue Mountains region of Umatilla County, the steering committee used annual rainfall to offset the high hazard rating assigned across northeast Oregon area (for weather hazard. This category has a high point value of three. (Note: The layer used to determine annual rainfall came from the Oregon Department of Forestry GIS library).

Even though values at-risk is a subjective category, input provided by the public and members of the planning committee was considered during the assessment process and when scoring the WUI for values protected. Citizens of Umatilla County identified several common themes that were of high value to them, including their homes, the rural environment and scenic beauty in which they live, wildlife, timber, grazing, and various recreational opportunities. Municipal watersheds and major utility transmission lines and corridors were added since those values are part of the legislation that was put forth under the Healthy Forest Restoration Act (HFRA). The

score assigned was a value of one if values at-risk were noted in a particular WUI or zero for "no values at-risk present".

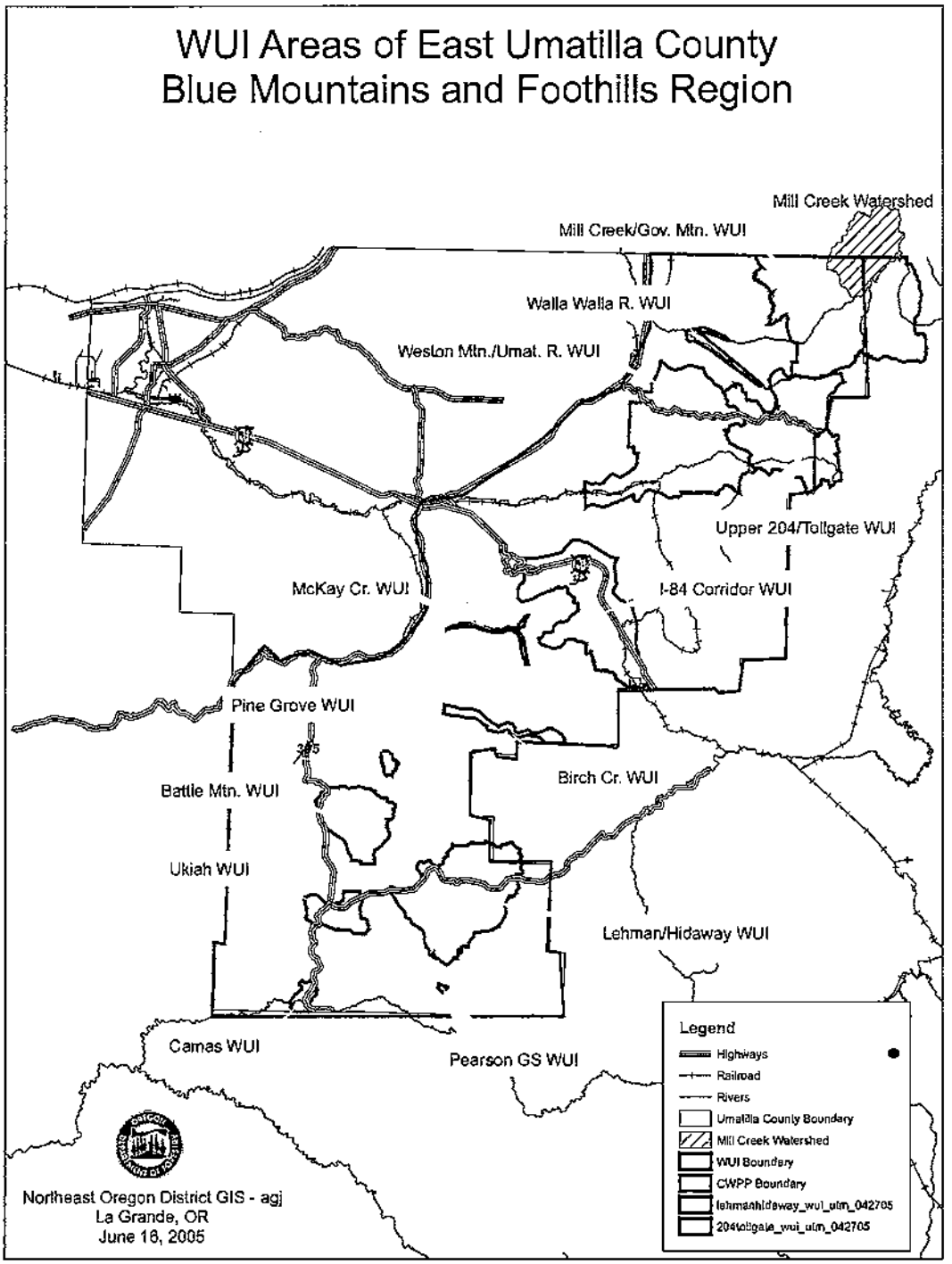
Prioritization

The WUI boundaries were drawn to capture the overall limitations of each fire protection district, fuel hazard, CAR's, and values-at-risk. Logical anchor points on the landscape were used to designate WUI boundaries, including natural fuel breaks, ridgelines, roads, and 6th field HUC boundaries (identified using the GIS layer available in the Oregon Department of Forestry GIS library). Other sections discuss additional public involvement in this planning process.

Thirteen WUI's were identified for the Blue Mountains region of the county. Based on the total points scored, each WUI was ranked as an area of High, Moderate, or Low Priority for the potential for projects and reducing the risk of wildfire hazards. Projects and Action Items for each WUI were developed based on the reasons that a WUI received a particular score in a particular category of the overall scoring matrix.

Table 6. Umatilla County Wildland-Urban Interface Areas – Listed by Total Score

Priority Level	WUI Name	Total Score
HIGH Priority (16-22 points)	I-84 Corridor	18
	Battle Mountain	17.5
	Lehman / Hidaway	17
	Weston Mountain / Umatilla River	16
	Mill Creek / Government Mountain	16
MODERATE Priority (10-15 points)	Upper 204 / Tollgate	15
	Pine Grove	15
	Camas	15
	Ukiah	13
	Birch	12
	Pearson Guard Station	12
	McKay	11
LOW Priority (<10 points)	Walla Walla River	9


WUI Areas of East Umatilla County
Blue Mountains and Foothills Region
Mill Creek Watershed
Mill Creek/Gov. Mtn. WUI
Walla Walla R. WUI
Weston Mtn./Umat. R. WUI
Upper 204/Tollgate WUI
McKay Cr. WUI
I-84 Corridor WUI
Pine Grove WUI
Birch Cr. WUI
Battle Mtn. WUI
Ukiah WUI
Lehman/Hidaway WUI
Camas WUI
Pearson GS WUI
Legend
Highways
Railroad
Rivers
Umatilla County Boundary
Mill Creek Watershed
WUI Boundary
CWPP Boundary
lehmanhidaway_wui_utm_042705
204tollgate_wui_utm_042705
Northeast Oregon District GIS - agj
La Grande, OR
June 16, 2005

The following sets of tables (#7-19) and WUI maps (Fig. 16-28) were designed to provide specific strategies for risk and fuels reduction projects for each designated WUI area in Umatilla County. The tables have been broken into three categories (education, treatment, and emergency response) and include timeframes and agencies involved in completing the tasks. These lists will be reviewed and updated as new projects and ideas are available.

Each map outlines a designated wildland-urban interface area (WUI) as identified by the Steering Committee. The wildland fire points (indicated by *on each map) are based on the combined ODF and USFS historical fire occurrence data for the period 1994-2003. (Note: The historical fire starts shown on the following maps represent ***wildland fires*** and not structural fires. They are a combination of both lightning-caused and human-caused fires.) As additional years of data become available, this hazard layer will be updated. Structure density is taken from data collected through ODF's Homesite Assessment project and inputted into the Spotfires database. (Note: some homesite points may be located in an incorrect location because of latitude/longitude errors. The database is being reviewed for errors, but at the time of this publication, that work was not yet completed. Additionally, the number of structures represented on the two WUIs covering Weston Mountain and the Tollgate area are incomplete. There are approximately 300-500 structures left to review, mostly in these two WUIs. ODF will be completing this project by the end of 2005.)

There are common themes repeated on the WUI planning sheets, including educational opportunities such as the FireWise workshops, general forest health and management activities, and treatment strategies along roadways to maintain noxious weeds and thick, flashy brush. Creating defensible space around structures and providing updated information Public Use Restrictions (including burn permit programs and the regulated closures for campfire, hunting, and use of power equipment) to both landowners and tourists are also ongoing activities for agencies. ODF's Partners in Protection (the pumper program designed to increase citizen response capability in strategically located areas across the county) will operate the same but be located only in certain areas. While the timing might vary from the north to the south ends of the county, information presented to the public will be consistent.

However, each WUI area should have identified education, treatment and emergency response items more specific to that area. Some items listed in the tables should be considered as 'possible' projects or strategies that may not be readily executed in the immediate future without additional funding or help from an involved community member.

Table 7. I-84 WUI Planning Sheet
WUI Name: I-84 Corridor **Priority Category:** HIGH

Description: Relatively flat corridor with radiating deep timbered canyons; major east-west interstate travel corridor; three major clusters of homesites as well as scattered homes along the freeway; major petroleum, natural gas, and BPA transmission lines; reverted CRP lands covered with heavy ponderosa pine reprod growth;

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Structural Vulnerability	Weather	Values At-Risk	Aggregate Score
2.5	2.5	5	4	3	1	18

Education Projects	Timeframe	Lead Agency/Cooperators
• Implement Public Use Restrictions to address human-caused ignition(Meacham)	• Summer-fall	• ODF & CTUIR
• Promote ATV and motorcycle use awareness and information	• Ongoing	• ODF & CTUIR
• Review, monitor & enforce UPRR prevention plan	• Completed	• UPRR, ODF & USFS
• Develop cost-share options to create firebreaks on CRP acres (Poverty Flats)	• Ongoing	• ODF & NRCS
• Evaluate area for SB360 program & implement as appropriate	• 1-3 years	• ODF & County
• Participate in FireWise presentation or day-long community workshop	• By 2006	• ODF & County
•	•	•
Limitations: Funding for personnel in summer months;		

Treatment Projects	Timeframe	Lead Agency/Cooperators
• Review & evaluate fuels treatment projects along WUI boundaries for possible joint operations with USFS, BIA, and CTUIR	• Ongoing	• USFS, ODF & landowners
• Maintain travel corridor right-of-ways (noxious weeds and other fuels)	• Summer-fall ongoing	• ODOT, UPRR & County
• Encourage & support Oregon Parks fire prevention activities	• Ongoing	• Oregon State Parks
• Plan & complete fuels treatment including: roadways, commercial and non-commercial thinning	• Ongoing	• USFS, ODF & CTUIR
• Create defensible space around structures	• Ongoing	• ODF & CTUIR
• Maintain areas near utility transmission lines (weeds and brush)	• Ongoing	• Utility providers
Limitations: Funding for fuels treatment programs; inability to use National Fire Plan dollars on CRP ground;		

Emergency Response Projects	Timeframe	Lead Agency/Cooperators
• Implement Partners in Protection program (Meacham/Poverty Flats area)	• Summer-fall ongoing	• ODF & landowners
• Work to enhance Meacham Volunteer Fire Department program capacity	• Ongoing	• Meacham FD, ODF, County & CTUIR
Limitations: Finding an interested landowner in a strategic location for pumper program;		

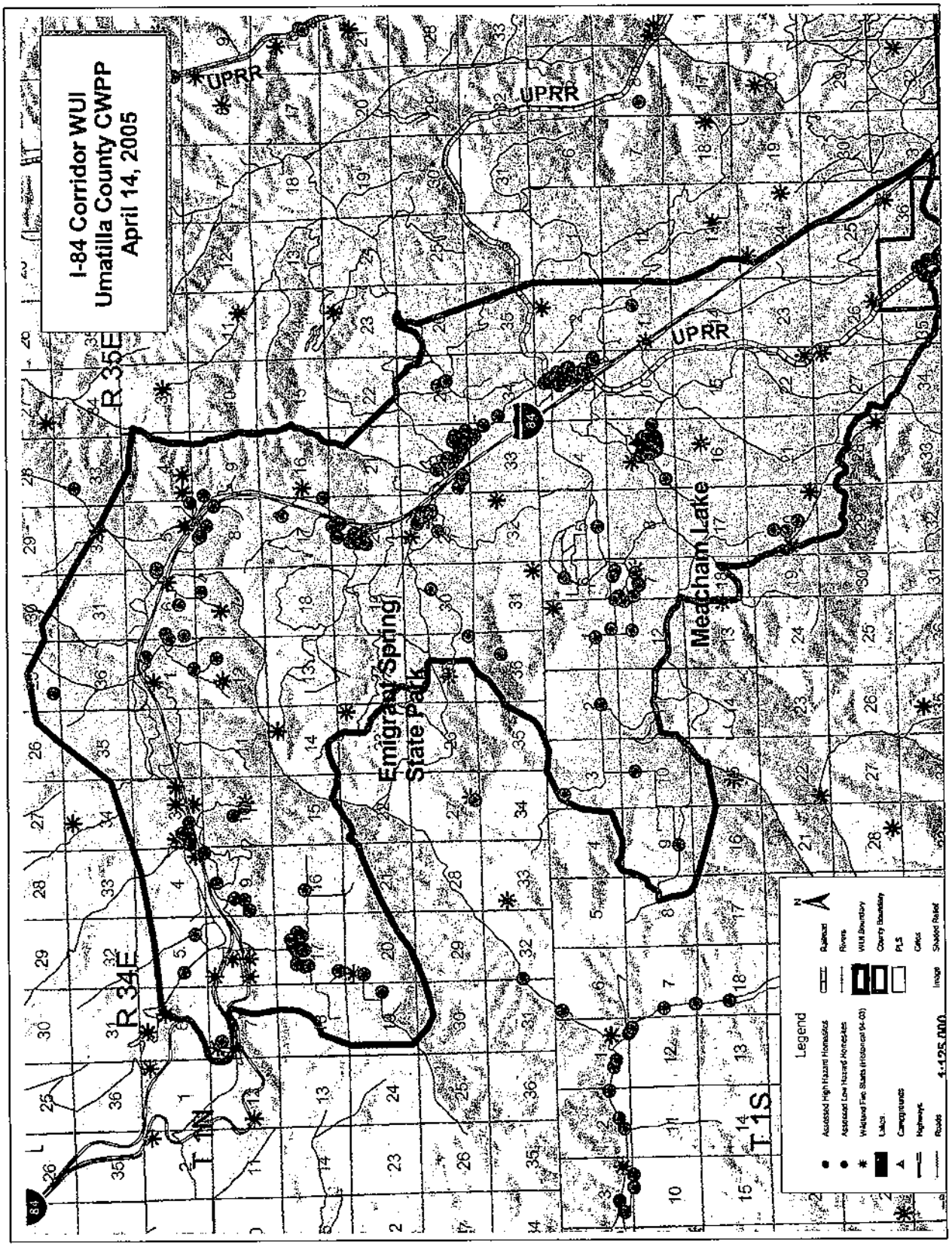


Figure 16. I-84 WUI Boundary with Density and Historical Wildland Fire Starts

Table 8. Battle Mountain WUI Planning Sheet

WUI Name: Battle Mountain **Priority Category:** HIGH

Description: Dry, ponderosa pine site with main state north-south highway passing through; two major clusters of homesites with additional scattered acreages throughout the area;

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Structural Vulnerability	Weather	Values At-Risk	Aggregate Score
2.5	3	4	4	3	1	17.5

Education Projects	Timeframe	Lead Agency/Cooperators
• Complete house-to-house visits and promote defensible space to homeowners	• Ongoing	• ODF
• Evaluate area for SB 360 program & implement as appropriate	• 1-3 years	• ODF & County
• Implement Public Use Restrictions to address human-caused ignitions (signs)	• Summer mos.	• USFS & ODF
•	•	•
Limitations: Funding for personnel in summer months;		

Treatment Projects	Timeframe	Lead Agency/Cooperators
• Review & evaluate fuels treatment projects to strategically locate near road systems, structures, & across WUI boundary lines with USFS & private landowners	• Ongoing	• USFS, ODF & landowners
• Monitor & complete USFS fuels treatment (Owens project)	• In process	• USFS
• Maintain travel corridor right-of-ways (weeds and brush)	• Ongoing	• ODOT & County
• Create defensible space around structures	• Ongoing	• ODF
• Maintain areas near utility transmission lines (weeds and brush)	• Ongoing	• Utility providers
• Encourage State Parks ladder fuels reduction treatment & other fuels reduction projects	• In process; west portion completed 2002	• Oregon State Parks
•	•	•
Limitations: Funding shortages for fuels treatment programs; biomass transportation costs;		

Emergency Response Projects	Timeframe	Lead Agency/Cooperators
• Implement Partners in Protection program	• Ongoing	• ODF & landowners
• Encourage development of phone trees	• Ongoing	• Landowners, ODF, USFS & County
• Work to enhance the Ukiah Volunteer Fire Department capacity and response	• By 2007	• Ukiah Fire Dept., ODF, County & USFS
•	•	•
Limitations: Finding an interested landowner in strategic location for pumper program;		

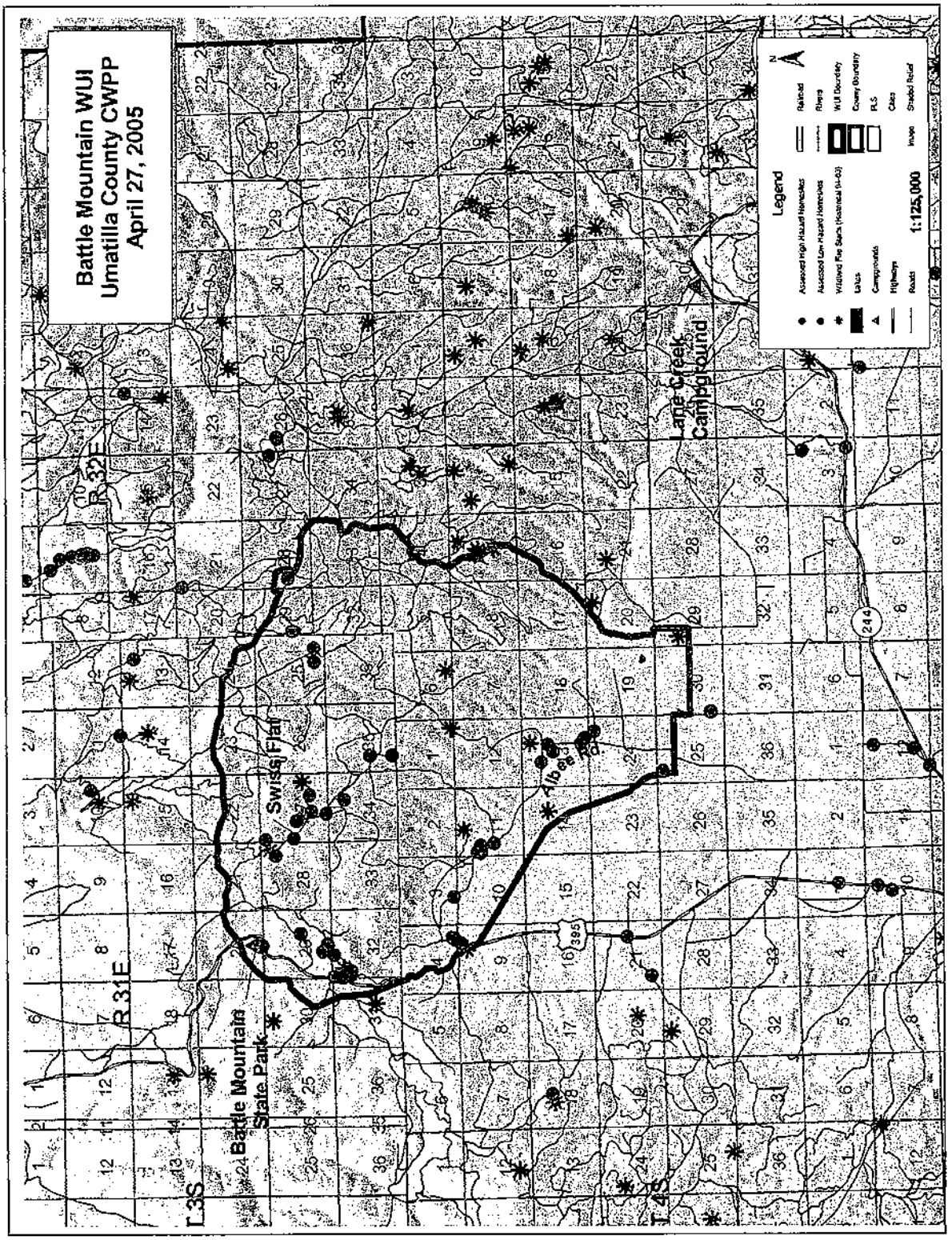


Figure 17. Battle Mountain WUI Boundary with Density and Historical Wildland Fire Starts

Table 9. Lehman / Hidaway WUI Planning Sheet

WUI Name: Lehman / Hidaway **Priority Category:** HIGH

Description: Destination resort area with three groupings of homesite concentrations; mixed conifer surrounded by federal forest service land;

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Structural Vulnerability	Weather	Values At-Risk	Aggregate Score
2	3	4	4	3	1	17

Education Projects	Timeframe	Lead Agency/Cooperators
• Target & provide prevention patrols around areas of high fire concern	• Summer mos.	• USFS & ODF
• Coordinate with resort operator regarding public use restrictions & fire prevention	• Ongoing	• USFS & ODF
• Promote ATV and motorcycle education & awareness with club members & the public	• Summer & fall	• ODF, USFS & local motorcycle clubs
• Implement Public Use Restrictions to address human-caused ignitions (signs)	• Summer - fall	• USFS & ODF
• Educate landowners on defensible space	• Ongoing	• ODF
Limitations: Funding for personnel in summer months; lots of non-residents traveling through area that aren't aware of local use restrictions;		

Treatment Projects	Timeframe	Lead Agency/Cooperators
• Review & evaluate strategic fuels treatment projects along WUI boundaries in conjunction with USFS projects	• Ongoing	• USFS, ODF & landowners
• Maintain travel corridor right-of-ways (weeds and brush)	• Ongoing	• ODOT & USFS
• Monitor & complete mechanical fuels reduction projects including Weasel and Owens	• 1-3 years; Owens started as 2002 Demo	• USFS
• Complete underburning projects including Elk and Camas	• Started 2002	• USFS
• Create defensible space around structures	• Ongoing	• ODF
• Work with BLM on fuels treatment projects in Cable Creek area	• In progress	• BLM, USFS & ODF
Limitations: Funding issues for fuels treatment work including Owens and Weasel projects – ready for implementation, but no funds available for those two projects;		

Emergency Response Projects	Timeframe	Lead Agency/Cooperators
• Work to enhance structural protection by annexing (or make agreement with) Ukiah Volunteer Fire Dept	• By 2007	• Ukiah Fire Dept., ODF & landowners
• Work on development of a community emergency plan	• 1-4 years	• Landowners
• Implement Partners in Protection program (Lehman)	• Ongoing	• ODF & landowners
Limitations: Increases in levels of public use; increasing number of human-caused fire starts;		

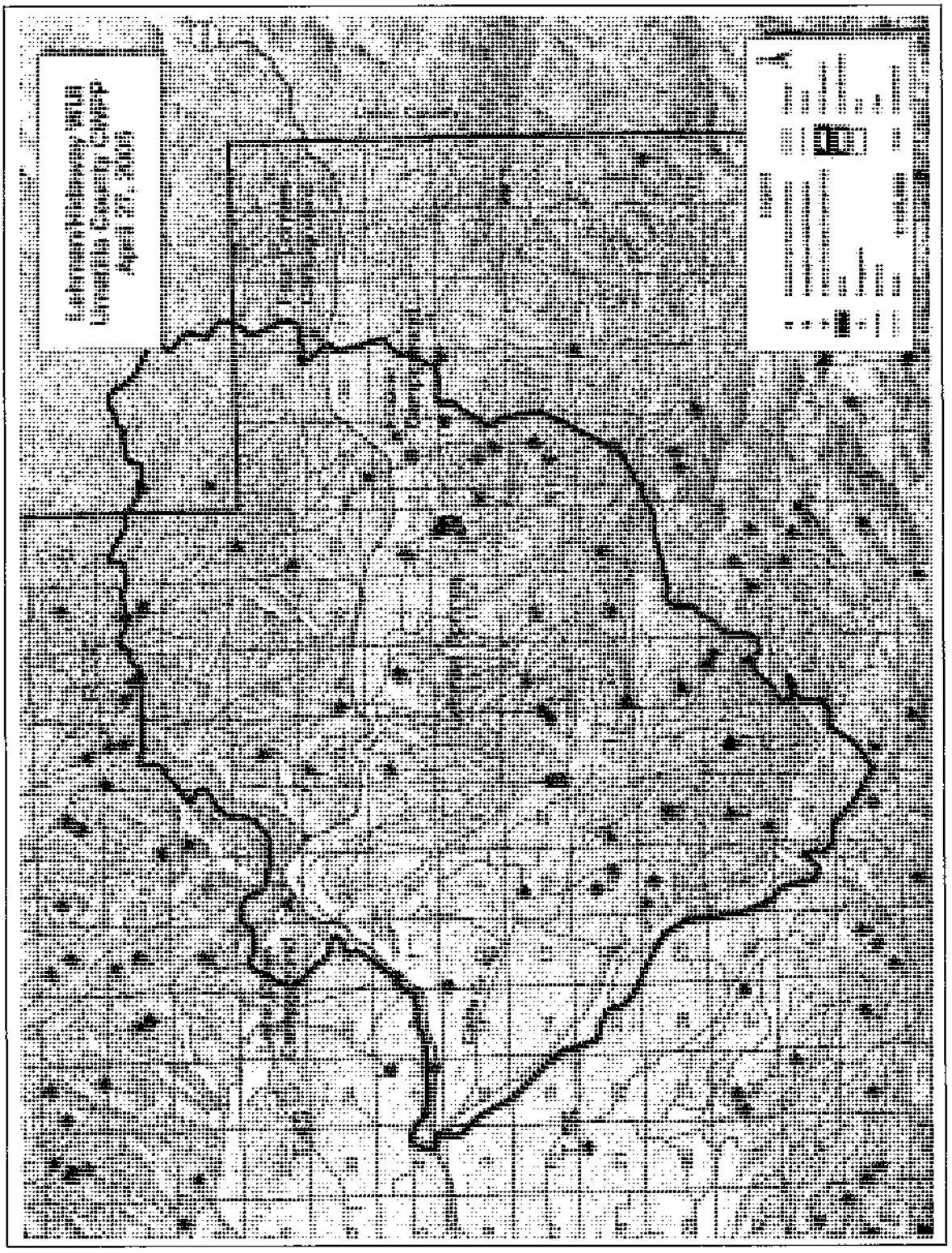


Figure 18. Lehman/Hidaway WUI Boundary with Density and Historical Wildland Fire Starts

Table 10. Weston Mountain / Umatilla River WUI Planning Sheet
WUI Name: Weston Mountain / Umatilla River **Priority Category:** HIGH

Description: Heavily rural homesite areas with numerous home and cabin sites scattered across area; fuel types include steep, grassy slopes and heavy timbered canyons with large areas of reverted CRP lands covered with heavy pine reprod; heavy recreation area with limited ingress/egress;

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Structural Vulnerability	Weather	Values At-Risk	Aggregate Score
2	3	4	4	2	1	16

Education Projects	Timeframe	Lead Agency/Cooperators
• Implement Public Use Restrictions to address human-caused ignitions	• Summer – fall	• USFS, ODF, EUCRFD & CTUIR
• Develop cost-share options to create firebreaks on CRP acres (Weston Mtn)	• Ongoing	• NRCS, ODF & landowners
• Promote safe debris burning activities	• Ongoing & year-round	• ODF, USFS, EUCRFD & CTUIR
• Target & provide prevention patrols in areas of high fire concern	• Summer mos.	• USFS, ODF & EUCRFD
• Evaluate area for SB 360 program & implement as appropriate	• 1-3 years	• ODF & County
• Install & maintain information kiosk and more signing across area	• 1-2 years	• ODF, USFS & EUCRFD
• Participate in Fire Wise presentation or day-long community workshop	• By 2007	• ODF, EUCRFD & County
Limitations: Funding for personnel in summer months;		

Treatment Projects	Timeframe	Lead Agency/Cooperators
• Review & evaluate possible fuels treatment projects in conjunction with USFS, CTUIR, BIA & private landowners	• Ongoing	• ODF, USFS, EUCRFD & landowners
• Complete pre-commercial thinning	• Ongoing	• ODF & USFS
• Create defensible space around structures	• Ongoing	• ODF & EUCRFD
• Complete & monitor fuels reduction projects – Plenty Bob	• NEPA done; 3 yrs implement	• USFS
Limitations: issues with slope and access; ESA issues including Lynx analysis unit and bull trout in lower part; landowner interest in fuels treatment; funding for fuels reduction projects;		

Emergency Response Projects	Timeframe	Lead Agency/Cooperators
• Work to improve fire fighting capacity (roads/access issues, more water sources, more equipment & fire fighters, etc)	• Ongoing	• ODF, EURFD & CTUIR
• Develop & strengthen communication & response plan among protection agencies	• Ongoing	• All
• Implement Partners in Protection program	• Ongoing	• ODF & landowners
• Look for & obtain funds to reopen High Ridge Lookout Tower in future (used as needed this year after 2-3 yrs of staffing)	• Ongoing	• USFS, ODF & CTUIR
Limitations: issues with slope and access to areas; funding to maintain full staff levels in strategically placed lookout towers that benefit all; funding for enhancing rural fire department capacities;		

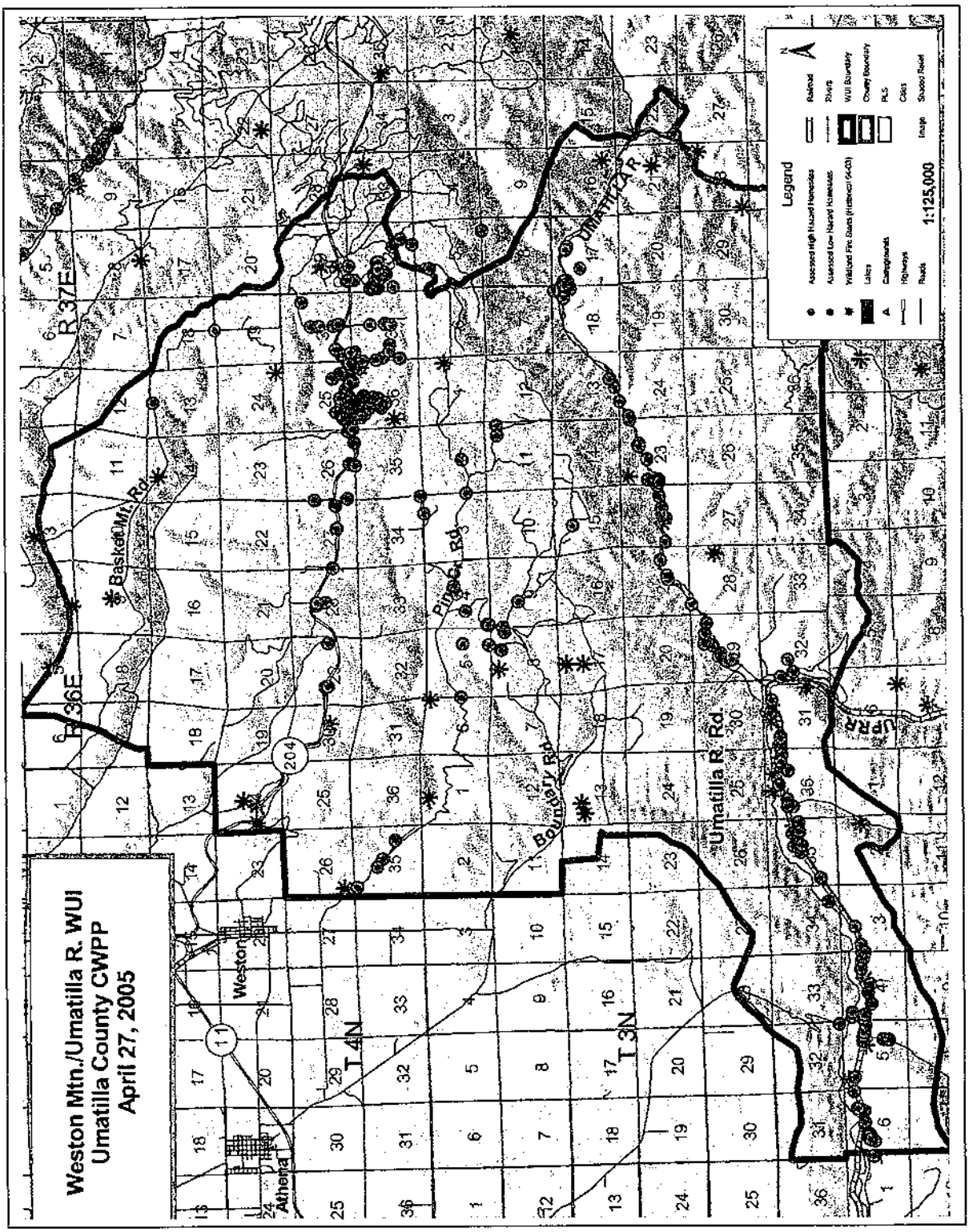


Figure 19. Weston Mtn/Umatilla River WUI Boundary with Density and Historical Wildland Fire Starts

Table 11. Mill Creek / Government Mountain WUI Planning Sheet

WUI Name: Mill Creek / Government Mountain **Priority Category:** HIGH

Description: North portion of WUI has north slopes heavily timbered with fir and spruce and south slopes with timbered stringers and open grass and brush ridges; steep slopes and dense, brushy vegetation; numerous year round and weekend homesites in canyon bottom; contains the municipal watershed for City of Walla Walla

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Structural Vulnerability	Weather	Values At-Risk	Aggregate Score
2	3.5	3	4.5	2	1	16

Education Projects	Timeframe	Lead Agency/Cooperators
• Participate in Firewise presentation or day-long community workshop	• April 14, 2005	• WA-DNR, ODF, USFS & Walla Walla County Fire District #4
• Complete house-to-house prevention visits and promote defensible space	• Summer 2004 90% complete	• ODF
• Implement Public Use Restrictions to address human-caused ignitions (more signs)	•	•
• Promote safe debris burning activities	•	•
• Evaluate area for SB 360 program & implement as appropriate	• 1-3 years	• ODF & County
• Install & maintain information kiosk	• Summer – fall annually	• WA-DNR, ODF, USFS & WWCFD #4
Limitations: Funding for personnel in summer months;		

Treatment Projects	Timeframe	Lead Agency/Cooperators
• Review & evaluate fuels reduction projects in conjunction with USFS & WA-DNR	• Coordinate w/ key landowners	• ODF, USFS & landowners
• Evaluate & maintain shaded fuel break: Tiger Saddle to Skyline	• 2004 completed	• USFS
• Complete fuels reduction (shaded fuel break) on WA-OR state line	• Coordinate w/ WA-DNR	• ODF
• Maintain travel corridors and cutbanks to minimize available fuels (weeds and brush)	• Coordinate w/ WA-DNR	• WA-DNR & Umatilla County
•	•	•
Limitations: Wilderness adjacent to closed, municipal watershed; extreme topography; ESA including Bull Trout & Lynx; outcome of USFS Wilderness Boundary Survey; landowner interest in fuels treatment; part-time residents; available funding for fuels treatment projects and staffing levels		

Emergency Response Projects	Timeframe	Lead Agency/Cooperators
• Maintain Skyline Rd for fire access	• Ongoing	• USFS
• Evaluate & maintain ingress/egress access on Yellow Jacket Ridge and Skyline Road	• Ongoing	• USFS
• Create and strengthen written agreements with Walla Walla Fire District #4 and WA-DNR	• Ongoing	• ODF
• Maintain funds for Table Rock Lookout staff	• Ongoing	• USFS & City of Walla Walla
• Maintain funds for patrol rider in Mill Ck WS	• Ongoing	• USFS & City of Walla Walla
• Develop other water sources for helicopter dip sites, portable heli-wells, other equipment	• Ongoing	• ODF & USFS
• Develop agreements with landowners to use available ponds as water sources	• Ongoing	• ODF & USFS
Limitations: Increases in levels of public use near wilderness areas; increasing human-caused fire starts; secure funding for alternative water sources;		

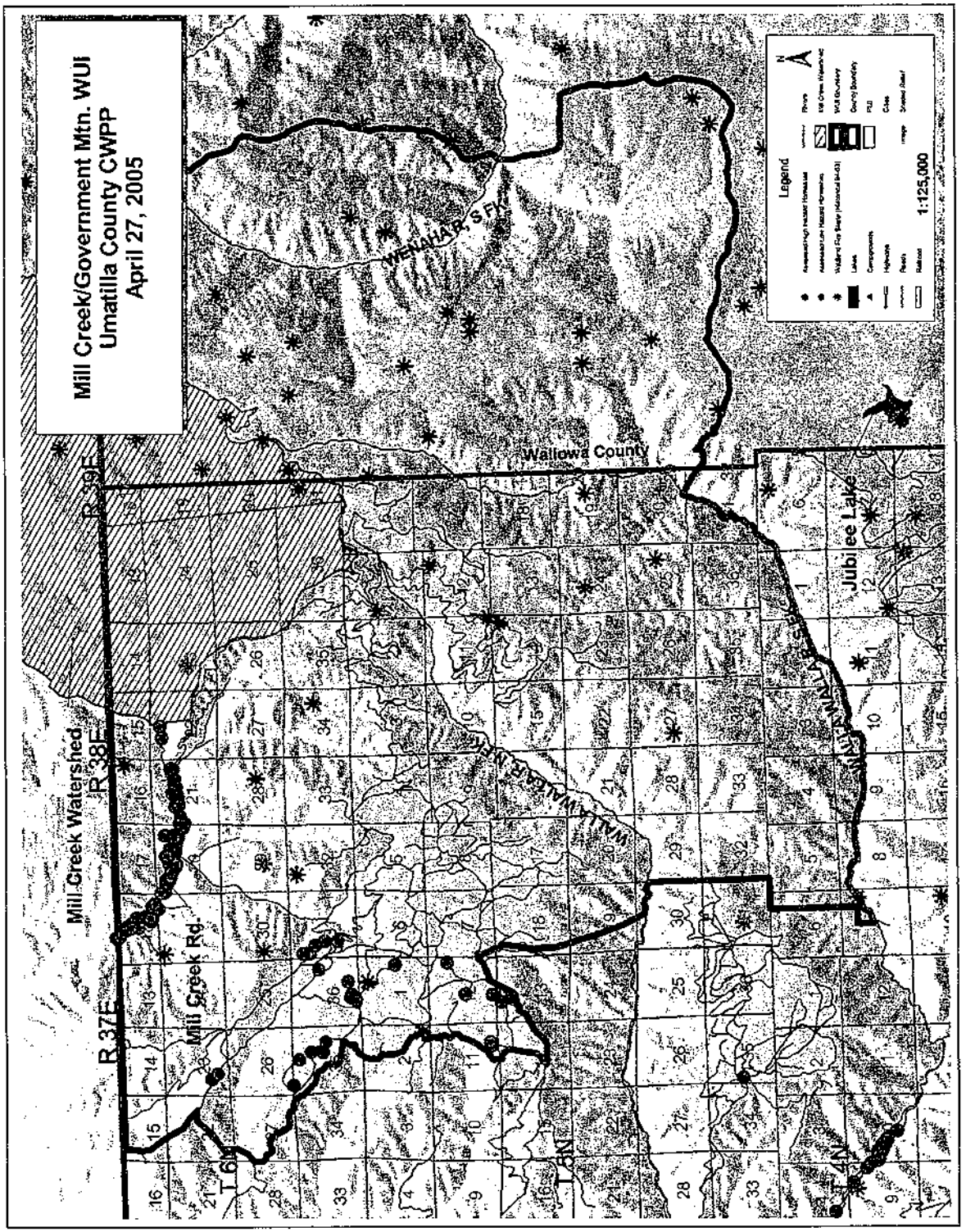


Figure 20. Mill Creek/Government Mtn WUI Boundary with Density and Historical Wildland Fire Starts

Table 12. Pine Grove WUI Planning Sheet
WUI Name: Pine Grove **Priority Category:** MODERATE

Description: Small year-round community of homes with residents along the canyon bottom; steep, grassy slopes with timbered stringers; one main road in and out of area;

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Structural Vulnerability	Weather	Values At-Risk	Aggregate Score
1	3	4	4	2	1	15

Education Projects	Timeframe	Lead Agency/Cooperators
• Implement Public Use Restrictions to address human-caused ignitions	• Summer – fall	• ODF, Pilot Rock RFD
• Target & provide prevention patrols in areas of high fire concern	• Summer - fall	• USFS & ODF
• Evaluate area for SB 360 program & implement as appropriate	• 1-3 years	• ODF & County
•	•	•
•	•	•
Limitations: Funding for personnel in summer months;		

Treatment Projects	Timeframe	Lead Agency/Cooperators
• Evaluate & complete mechanical fuels treatment	• Ongoing	• USFS & ODF
• Evaluate & coordinate for joint project areas that could extend across boundaries such as "Gulch"	• Ongoing	• USFS, ODF & landowners
• Maintain road right-of-ways (weeds/brush)	• Ongoing	• County
• Create defensible space around structures	• Ongoing	• ODF & Pilot Rock RFD
•	•	•
Limitations: Funding for fuels reduction projects;		

Emergency Response Projects	Timeframe	Lead Agency/Cooperators
• Implement Partners in Protection program	• Ongoing	• ODF & landowners
• Review ingress/egress issues & address changes as appropriate	• Ongoing	• ODF, landowners & County
• Work to enhance rural fire protection capacity	• Ongoing	• ODF & Pilot Rock RFD
•	•	•
Limitations: finding an interested landowner located in strategic location for pumper program;		

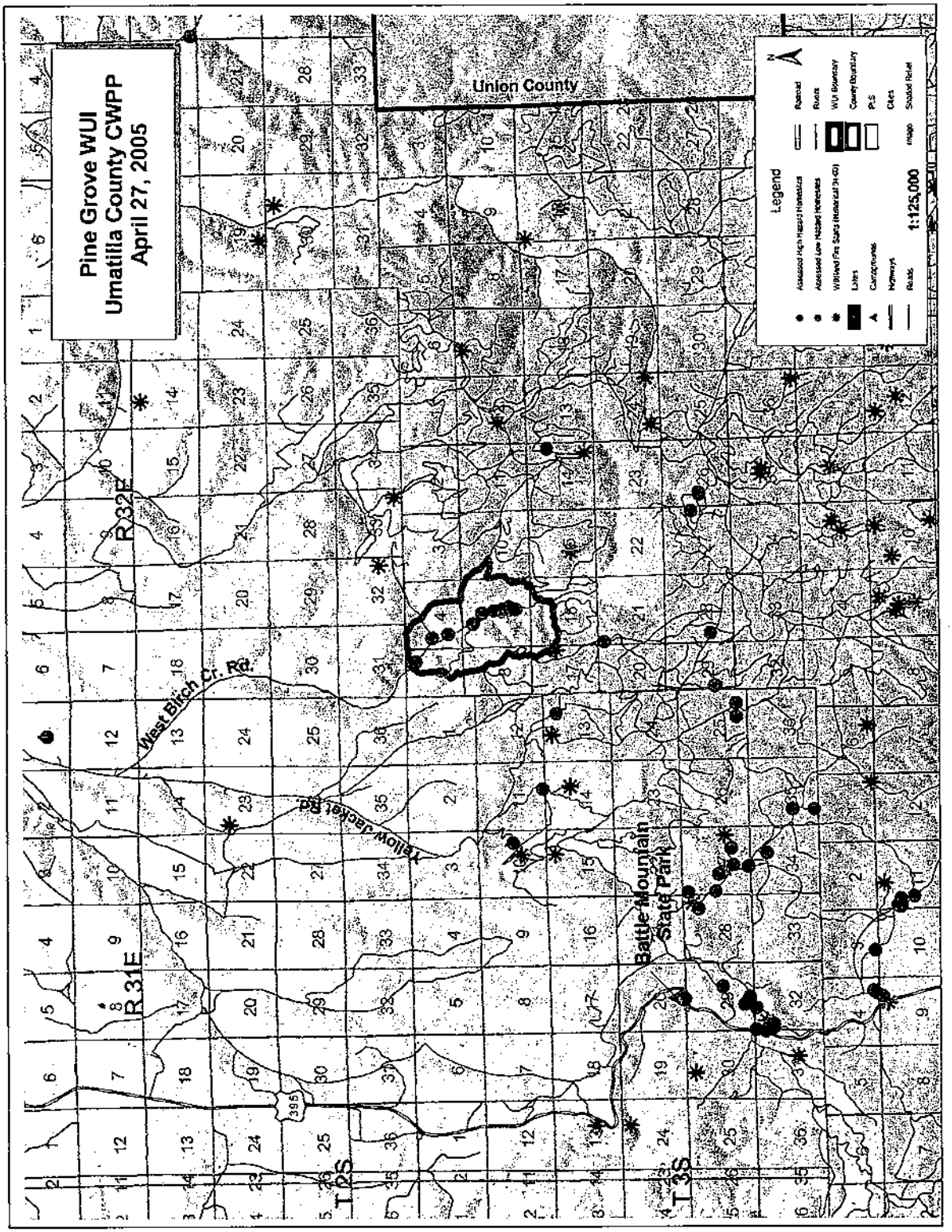


Figure 21. Pine Grove WUI Boundary with Density and Historical Wildland Fire Starts

Table 13. Camas WUI Planning Sheet

WUI Name: Camas **Priority Category:** MODERATE

Description: Small group of homes at junction of NFJD River and Camas Ck surrounded by dry, pine site; major north-south state highway corridor along canyon bottom; minimally-managed wildlife area nearby with no access poses heavy fuel threat to area;

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Structural Vulnerability	Weather	Values At-Risk	Aggregate Score
2	5	3	4	3	1	15

Education Projects	Timeframe	Lead Agency/Cooperators
• Complete house-to-house prevention visits and promote defensible space	• Summer 2004 90% complete	• ODF
•	•	•
•	•	•
•	•	•
•	•	•
Limitations: Funding for personnel in summer months;		

Treatment Projects	Timeframe	Lead Agency/Cooperators
• Create defensible space around structures	• Ongoing	• ODF & landowners
• Maintain travel corridor right-of-ways (weeds and brush)	• Ongoing	• ODOT
• Complete the Fall Meadowbrook HFR (timber sale/fuels treatment project) - Environmental Analysis to be completed by FY06;	• In progress; 1-4 years	• USFS
•	•	•
•	•	•
Limitations: Funding for fuels reduction treatment to implement Falls Meadowbrook and other future potential projects for Camas area;		

Emergency Response Projects	Timeframe	Lead Agency/Cooperators
• Work to enhance Ukiah Volunteer Fire Department capacity and response area	• Ongoing	• Ukiah Fire Dept. & ODF
•	•	•
•	•	•
•	•	•
Limitations:		

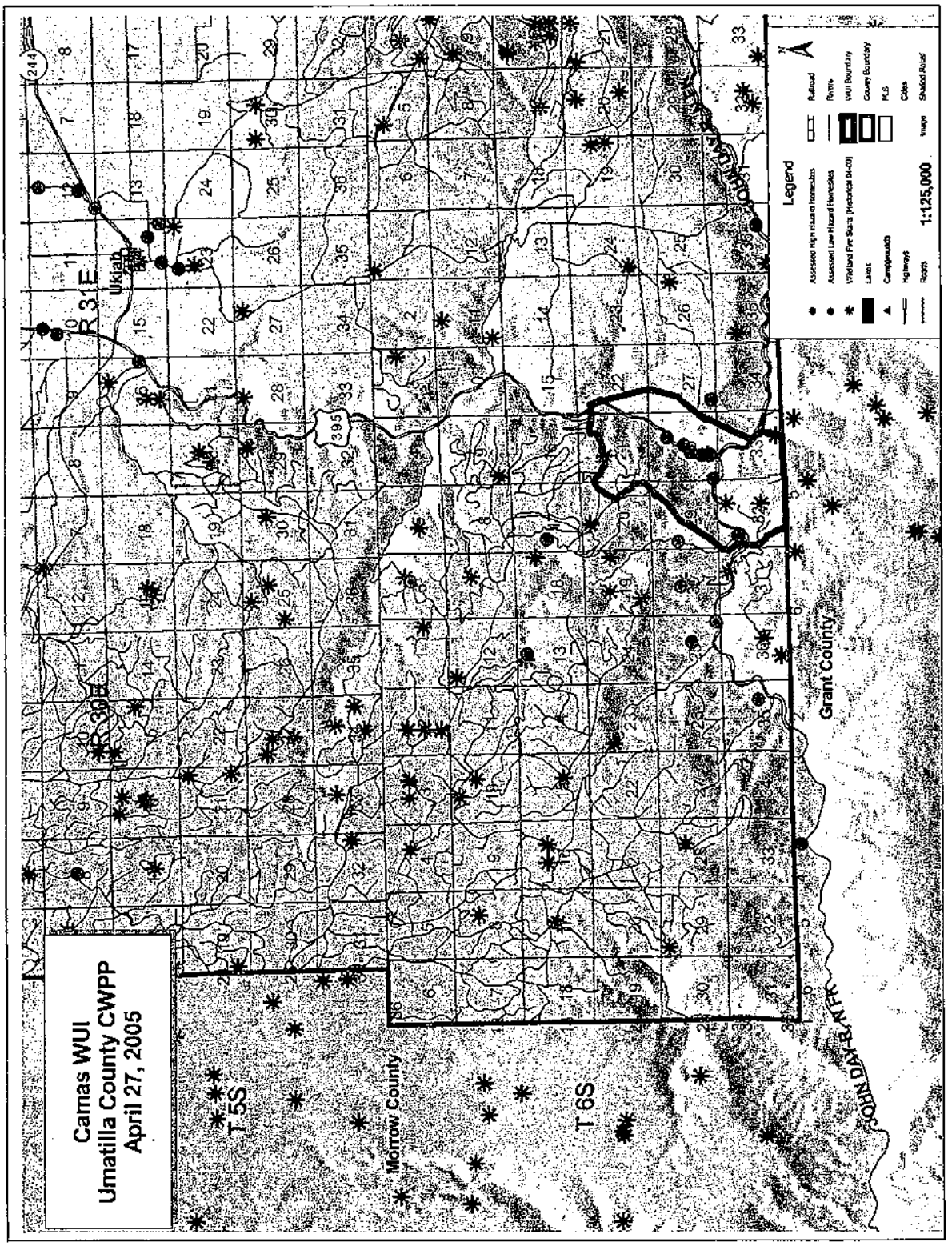


Figure 22. Camas WUI Boundary with Density and Historical Wildland Fire Starts

Table 14. Upper 204 / Tollgate WUI Planning Sheet
WUI Name: Upper 204 / Tollgate **Priority Category:** MODERATE

Description: Starting about milepost 10.5 at Weston Pond; upper elevation; heavy subalpine fuel types, moist, long-term fire interval; stand decay becoming evident; concentration of year-round and weekend residential area with many out-of-state property owners;

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Structural Vulnerability	Weather	Values At-Risk	Aggregate Score
1	3	4	5	1	1	15

Education Projects	Timeframe	Lead Agency/Cooperators
• Implement Public Use Restrictions to address human-caused ignitions	• Summer mos.	• USFS, ODF & EUCRFD
• Develop cost-share options to create firebreaks on CRP acres	• Ongoing	• NRCS & ODF
• Target & provide prevention patrols in areas of high fire concern	• Summer mos.	• USFS, ODF & EUCRFD
• Evaluate area for SB 360 program & implement as appropriate	• 1-3 years	• ODF
• Promote safe debris burning activities	• Year-round	• ODF & EUCRFD
• Complete homesite assessment and promote defensible space	• Ongoing	• ODF & EUCRFD
Limitations: Funding for personnel in summer months;		

Treatment Projects	Timeframe	Lead Agency/Cooperators
• Review & evaluate fuels projects in conjunction with USFS	• Ongoing	• USFS & ODF
• Maintain travel corridor right-of-ways (weeds and brush)	• Ongoing	• ODOT
• Complete prescribed burning – NF Umatilla wilderness and Walla Walla WS	• NEPA (approx. two years)	• USFS
• Create defensible space around structures	• Ongoing & year-round	• ODF, EUCRFD & landowners
• Review ingress/egress issues & complete improvements as appropriate	• Ongoing & year-round	• ODF, EUCRFD & landowners
Limitations: landowner interest in fuels treatment; funding for fuels treatment projects; out-of-state landowners; topography of area; restrictions associated with wilderness areas; ESA including Lynx;		

Emergency Response Projects	Timeframe	Lead Agency/Cooperators
• Implement Partners in Protection program	• Summer mos.	• ODF and landowners
• Work to enhance rural fire protection capacity through grants	• Ongoing	• EURFD & ODF
• Locate and GPS water source sites and put into Spotfires database	• Ongoing	• ODF, USFS & EUCRFD
• Explore locating substation in Langdon Lake area (structural protection) to help with homeowners' fire insurance coverage	• Ongoing	• EUCRFD
Limitations: finding interested landowners in strategic areas of county for pumper program to help improve citizen response and initial attack; look into feasibility of additional substation to help with ISO rates for unprotected structures;		

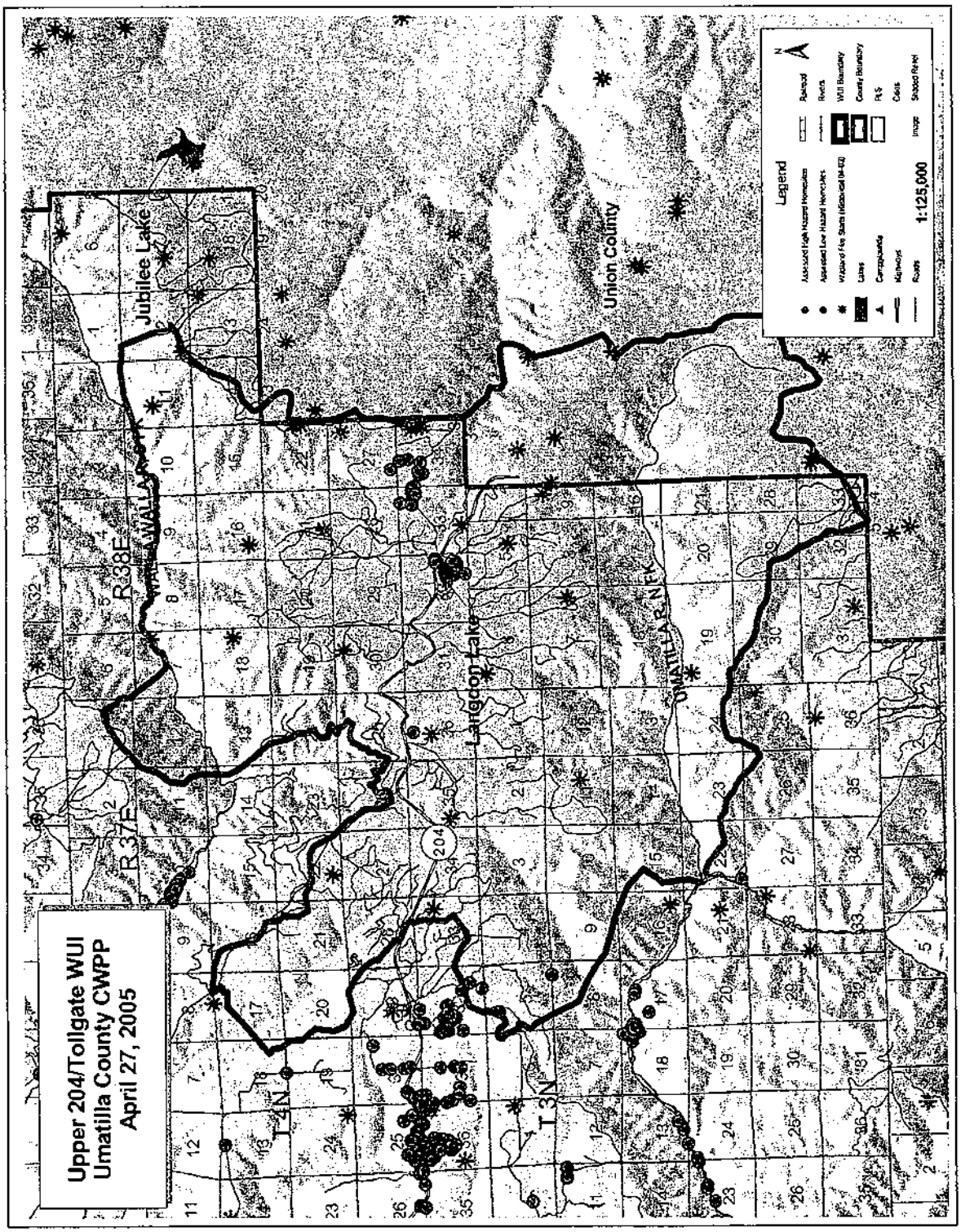


Figure 23. Upper 204/Tollgate WUI Boundary with Density and Historical Wildland Fire Starts

Table 15. Ukiah WUI Planning Sheet

WUI Name: Ukiah **Priority Category:** MODERATE

Description: Largest community in south portion of county at junction of major travel corridors; surrounded by predominately-mixed pine and grass fuel types;

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Structural Vulnerability	Weather	Values At-Risk	Aggregate Score
2	1	3	3	3	1	13

Education Projects	Timeframe	Lead Agency/Cooperators
• Evaluate area for SB 360 program & implement as appropriate	• 1-3 years	• ODF
• Implement Public Use Restrictions to address human-caused ignitions (tourists/hunters/etc.)	• Summer – fall	• USFS& ODF
• Target & provide prevention patrols in areas of high fire concern	• Summer – fall	• USFS & ODF
•	•	•
•	•	•
Limitations: Funding for personnel in summer months;		

Treatment Projects	Timeframe	Lead Agency/Cooperators
• Create defensible space around structures	• Ongoing	• ODF & Ukiah Fire Dept.
• Complete Western Route fuels treatment project area near WUI	• Close to signature; implementation 2-4 yrs	• USFS
• Evaluate and promote private land fuels reduction projects as warranted	• Ongoing	• ODF & landowners
•	•	•
•	•	•
Limitations: Past timber treatment and grazing activities have helped reduce fuels loading around town – however, both activities are done less and less each year; no USFS projects currently proposed within five air miles of Ukiah due to property ownership;		

Emergency Response Projects	Timeframe	Lead Agency/Cooperators
• Work to enhance capacity of City of Ukiah Fire Department	• Ongoing	• City of Ukiah & ODF
•	•	•
•	•	•
•	•	•
Limitations:		

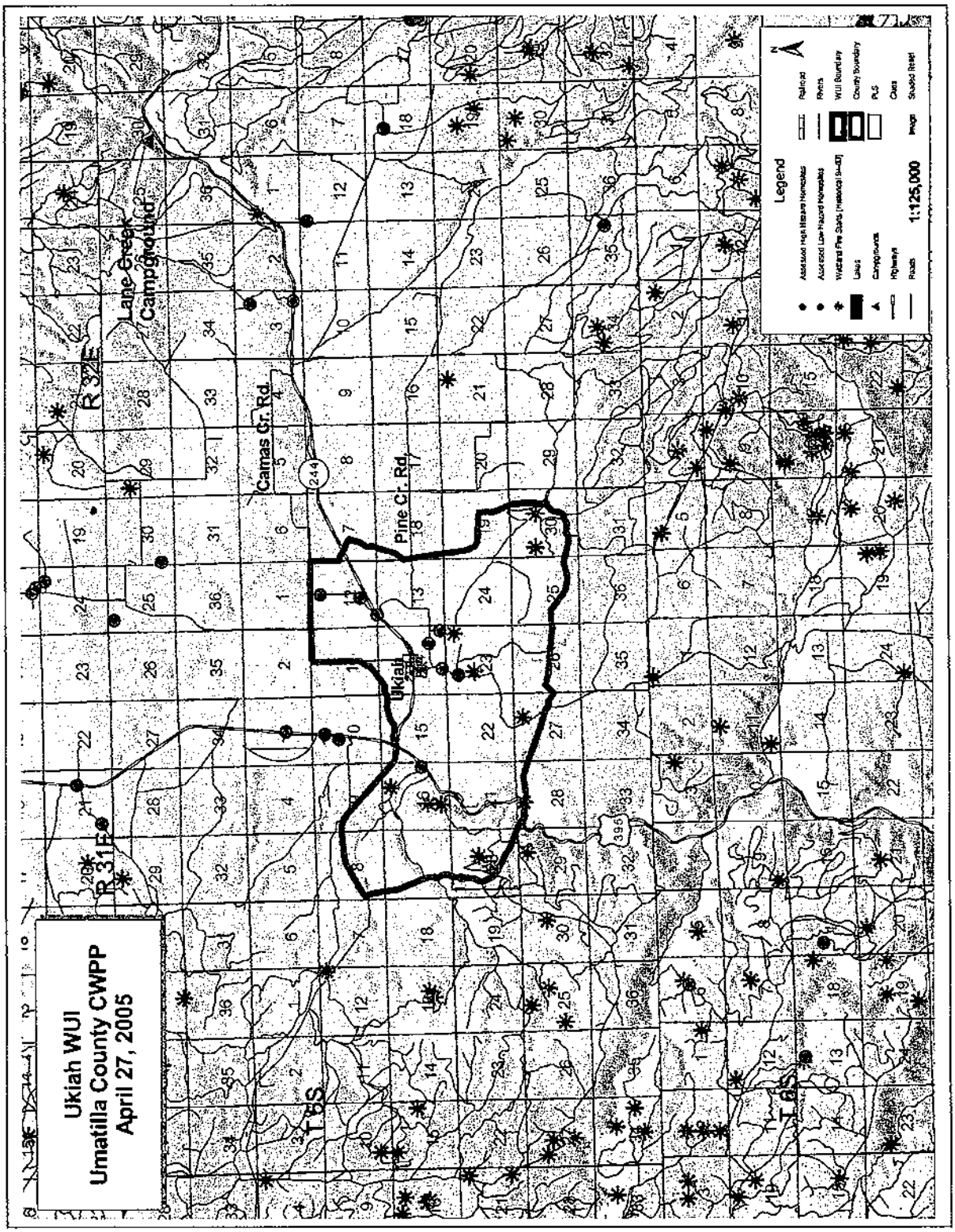


Figure 24. Ukiah WUI Boundary with Density and Historical Wildland Fire Starts

Table 16. Birch WUI Planning Sheet

WUI Name: Birch **Priority Category:** MODERATE

Description: Populated stream corridor with primarily riparian brush and deciduous tree species leading to steep, grassy slopes; numerous year-round homesites scattered through area;

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Structural Vulnerability	Weather	Values At-Risk	Aggregate Score
2	1	3	3	2	1	12

Education Projects	Timeframe	Lead Agency/Cooperators
• Target & provide prevention patrols in areas of high fire concern	• Summer – fall	• ODF
• Implement Public Use Restrictions to address human-caused ignitions	• Summer – fall	• ODF & CTUIR
• Evaluate prevention efforts around Hum-Te-Pin Lake & implement as appropriate	• Summer – fall	• ODF & CTUIR
•	•	•
•	•	•
Limitations: Funding for personnel in summer months;		

Treatment Projects	Timeframe	Lead Agency/Cooperators
• Create defensible space around structures	• Ongoing	• ODF, Pilot Rock RFD & CTUIR
• Complete debris clean up of ice storm damage around Hum-Te-Pin Lake	• 1-2 years	• CTUIR
•	•	•
•	•	•
•	•	•
Limitations:		

Emergency Response Projects	Timeframe	Lead Agency/Cooperators
• Implement Partners in Protection program	• Ongoing	• ODF & landowners
• Work to enhance rural fire protection capability through grants	• Ongoing	• Pilot Rock RFD
•	•	•
•	•	•
Limitations:		

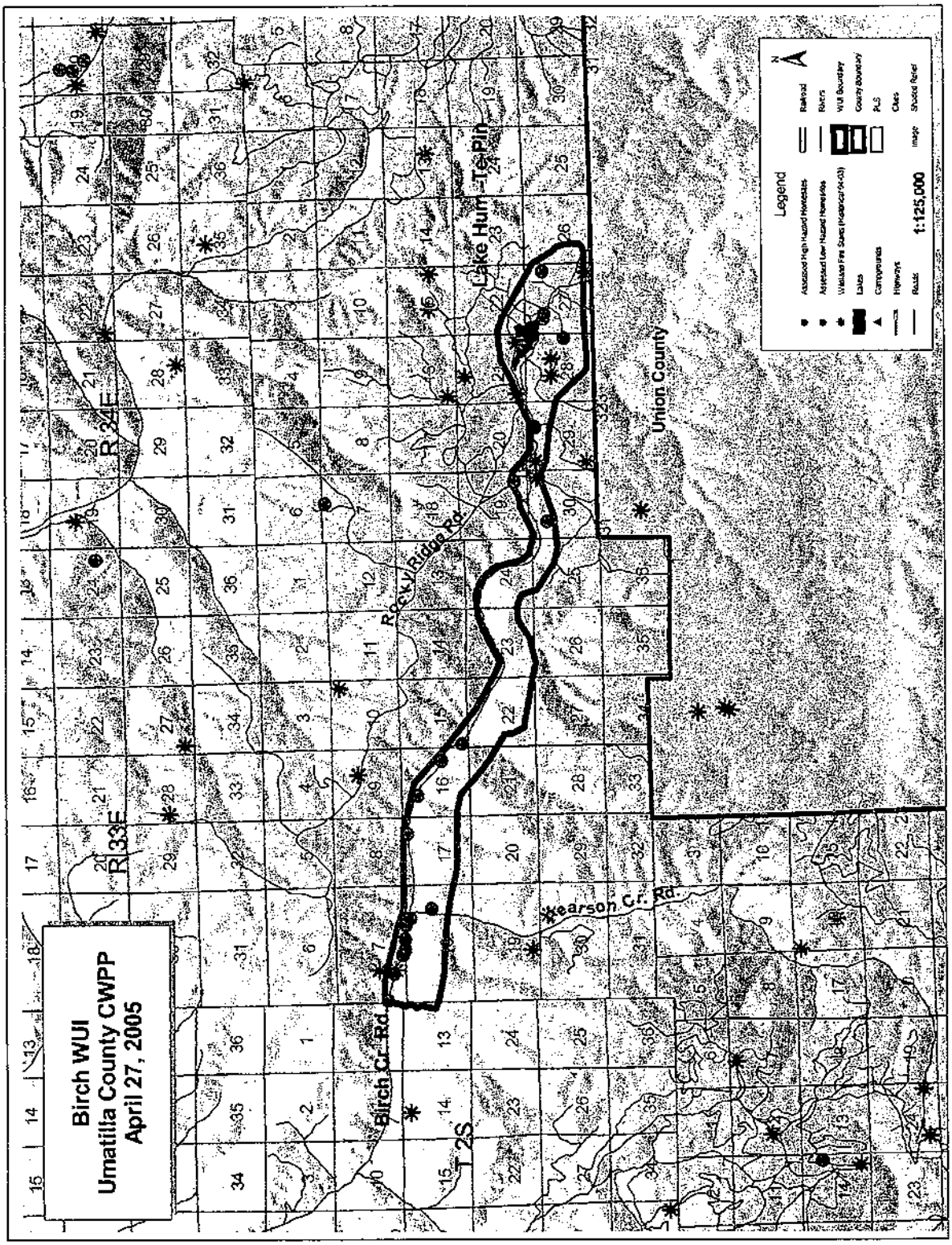


Figure 25. Birch WUI Boundary with Density and Historical Wildland Fire Starts

Table 17. Pearson Guard Station WUI Planning Sheet

WUI Name: Pearson Guard Station **Priority Category:** MODERATE

Description: Very small cluster of leased forest service cabin sites all within the federal forest lands; USFS has obligation to the permitees to manage the vegetation and fire fuels; USFS buildings are on the historical list;

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Structural Vulnerability	Weather	Values At-Risk	Aggregate Score
3	1	1	4	2	0	11

Education Projects	Timeframe	Lead Agency/Cooperators
• Target & provide prevention patrols in areas of high fire concern	• Summer – fall	• USFS
•	•	•
•	•	•
•	•	•
•	•	•
Limitations:		

Treatment Projects	Timeframe	Lead Agency/Cooperators
• Create defensible space around structures	• Ongoing	• USFS & permitees
• Review & evaluate the need of an Environmental Analysis for future treatment work around buildings and complete the EA as appropriate	• By 2010	• USFS
• Maintain vegetation and fire fuels levels near the WUI	• Ongoing	• USFS
•	•	•
•	•	•
Limitations: Funding for fuels reduction treatment;		

Emergency Response Projects	Timeframe	Lead Agency/Cooperators
•	•	•
•	•	•
•	•	•
•	•	•
Limitations:		

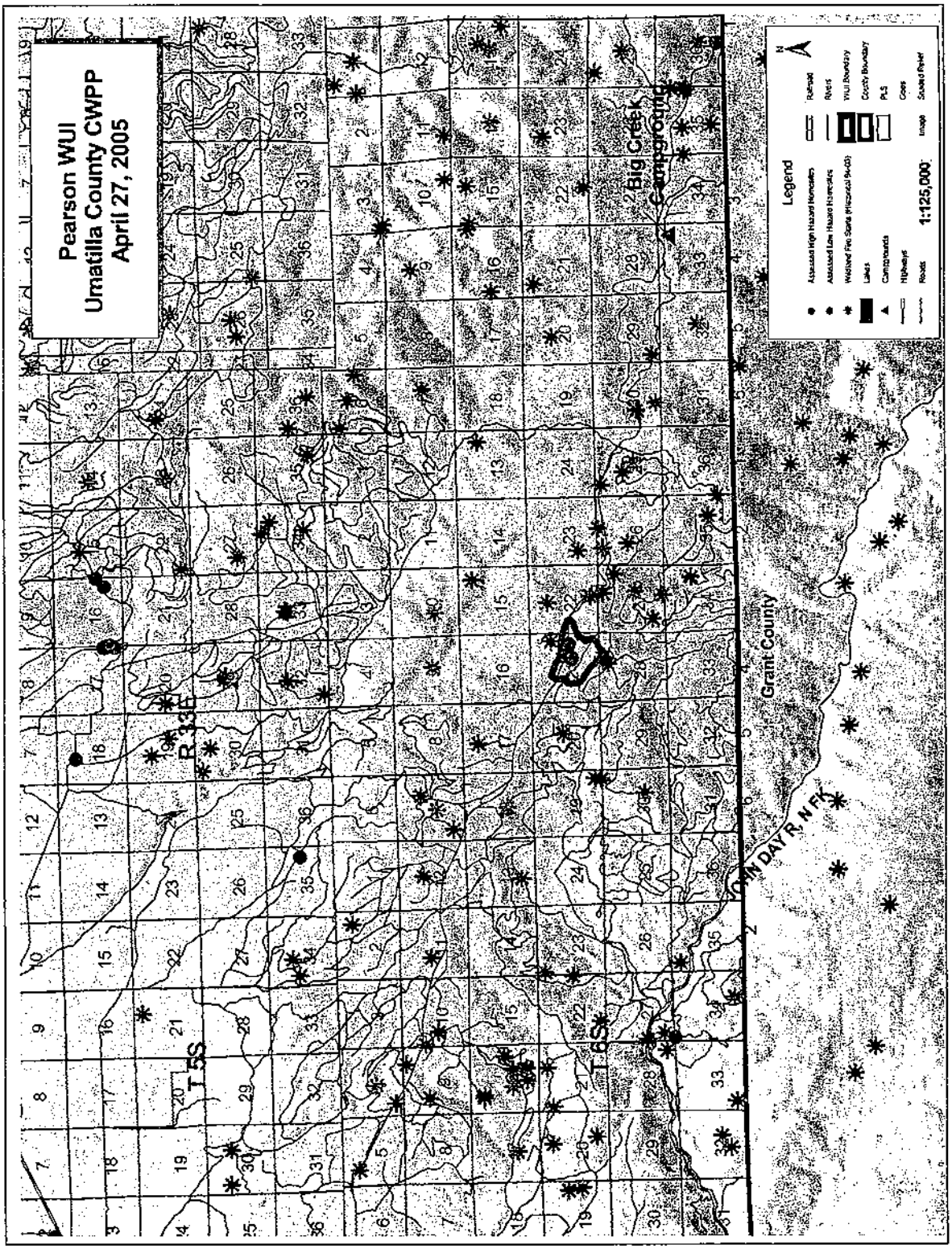


Figure 26. Pearson Guard Station WUI Boundary with Density and Historical Wildland Fire Starts

Table 18. McKay WUI Planning Sheet

WUI Name: McKay **Priority Category:** MODERATE

Description: Populated stream corridor with primarily riparian brush and deciduous trees that lead to steep, grassy slopes; numerous year-round homesites scattered through area;

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Structural Vulnerability	Weather	Values At-Risk	Aggregate Score
2	1	2	3	2	1	11

Education Projects	Timeframe	Lead Agency/Cooperators
• Target & provide prevention patrols in areas of high fire concern	• Summer – fall	• ODF & CTUIR
• Implement Public Use Restrictions to address human-caused ignitions	• Summer – fall	• ODF & CTUIR
• Promote fire prevention awareness	• Summer – fall	• ODF & CTUIR
•	•	•
•	•	•
Limitations: Funding for personnel in summer months;		

Treatment Projects	Timeframe	Lead Agency/Cooperators
• Create defensible space around structures	• Ongoing	• CTUIR, ODF, Pilot Rock RFD & landowners
•	•	•
•	•	•
•	•	•
•	•	•
Limitations:		

Emergency Response Projects	Timeframe	Lead Agency/Cooperators
• Implement Partners in Protection program	• Ongoing	• ODF & landowners
•	•	•
•	•	•
•	•	•
Limitations:		

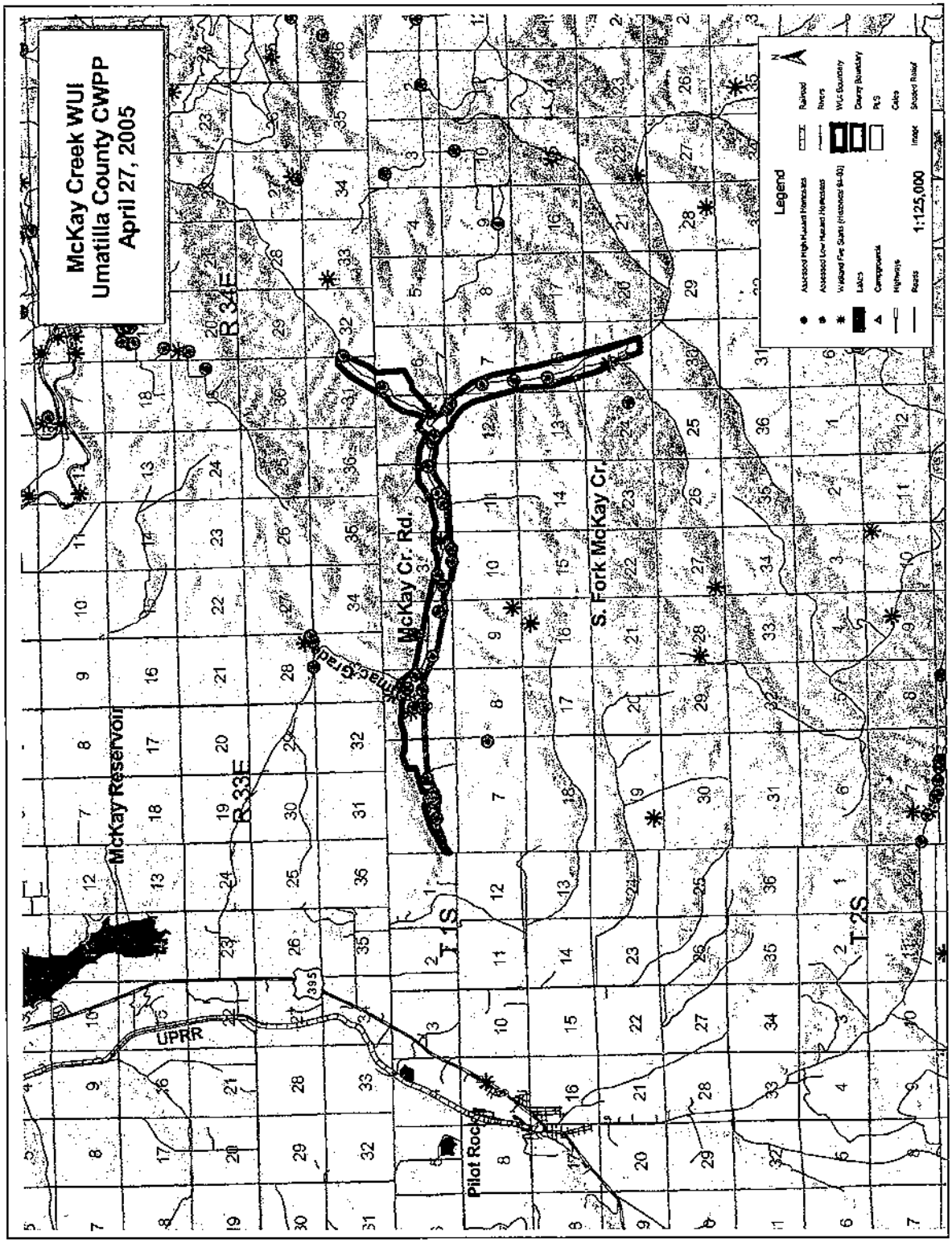


Figure 27. McKay WUI Boundary with Density and Historical Wildland Fire Starts

Table 19. Walla Walla River WUI Planning Sheet

WUI Name: Walla Walla River **Priority Category:** LOW

Description: River corridor with heavy deciduous fruit crops and steep, heavily-brush covered slopes with timbered stringers; numerous small acreages and homesites as well as a county park;

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Structural Vulnerability	Weather	Values At-Risk	Aggregate Score
1	1	1	3	2	1	9

Education Projects	Timeframe	Lead Agency/Cooperators
• Target & provide prevention patrols in areas of high fire concern	• Summer – fall	• ODF
• Implement Public Use Restrictions to address human-caused ignition	• Summer – fall	• ODF
• Evaluate area for SB 360 program & implement as appropriate	• 1-3 years	• ODF
•	•	•
•	•	•
Limitations: Funding for personnel in summer months;		

Treatment Projects	Timeframe	Lead Agency/Cooperators
• Create defensible space around structures	• Ongoing	• ODF & landowners
•	•	•
•	•	•
•	•	•
•	•	•
Limitations:		

Emergency Response Projects	Timeframe	Lead Agency/Cooperators
• Work with Milton-Freewater RFPD for coordinated mutual aid response	• Ongoing	• ODF & Milton-Freewater RFPD
• Maintain relationship with Harris Park caretaker re: ATV/motorcycle use and other public use restrictions education	• Ongoing	• ODF
•	•	•
•	•	•
Limitations:		

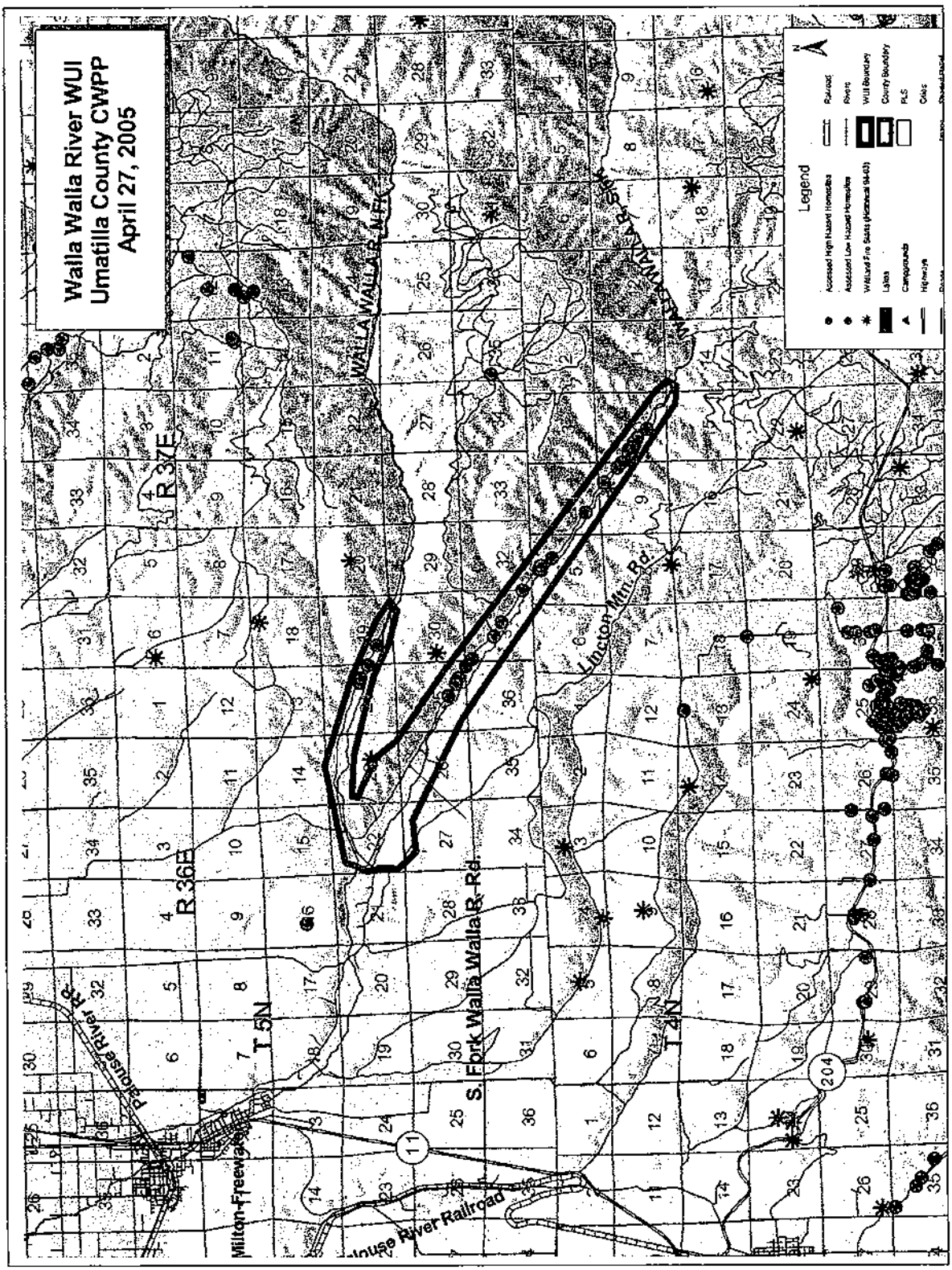


Figure 28. Walla Walla River WUI Boundary with Density and Historical Wildland Fire Starts

Development of a Fuels Maintenance Program[11]

Developing a fuels maintenance program requires knowing the plant association and defining acceptable fire behavior parameters. Projections can then be made to determine when a particular site will move beyond acceptable fire behavior criteria and require some level of re-treatment.

Once treated, stands undergo the process of ecological succession in which understory and overstory vegetation changes over time, resulting in incremental changes (often increases) in herbs, grasses, shrubs, and regeneration of trees because more growing space has been created by the removal of trees and other vegetation. Overstory structure changes too as residual trees expand their crowns and increase in diameter, continually adding more biomass to the site in the form of needles, branches, or downed logs. Subsequent disturbances caused by insects and disease can kill trees and add more biomass to the forest floor. Although some of this biomass decays over time, in the dry forests of southwest, central and eastern Oregon, dead biomass tends to accumulate on the forest floor faster than it decays, adding more fuel to the landscape.

The amount of time before treated areas will require re-treatment is dependent on several factors including:

- Past treatment level (e.g., how much biomass (fuel) was removed initially in the understory and overstory)
- Plant association groups
- Site productivity
- Rate of fuel accumulation
- Fuel structure (i.e., condition class)
- Historic fire regime
- Desired fire behavior (for effective control)
- Climatic regime

While condition class and fire regime are the two primary factors in prioritizing areas initially for treatment, this method may have less of a bearing in deciding which areas should be prioritized for *re-treatment* in the future. For example, it's unlikely that managers would allow sites that began as condition class 2 or 3 prior to treatment and treated to condition class 1, to revert to condition class 2 or 3 before conducting the re-treatment, particularly in WUI areas. It seems more likely they would allow a site that was originally in a condition class 2 or 3 and treated to condition class 1 to re-accumulate fuels only to a point or phase that resembles a condition class 1 *transitioning* into class 2 conditions. Allowing fuels to accumulate any further would entail more expensive re-treatment and increase the risk of loosing the initial investment made in fuel reduction.

Biomass Utilization and Economic Development[12]

> ***Biomass*** is the renewable organic matter such as agricultural crops and residue, wood and wood waste, animal waste, aquatic plants, and organic components of municipal and industrial wastes.

Living plant material is the source of all biomass fuel. Some biomass fuel resources are waste products left over after plant materials have been used for other purposes or consumed by animals. Other biomass resources are plant materials directly harvested for their energy value. Biomass fuels are readily available throughout the world. Oregon's biomass resources include wood, agricultural crop residue and organic waste.

Firewood harvested from Oregon's forests has long been a bioenergy resource for home heating. Private individuals and commercial companies cut firewood from public and private forestlands in the state. Scrap and salvaged wood are other sources of wood fuel for home heating use. Twenty-two percent of Oregon households use wood heating as either their main method of space heating or as a back-up heating resource. The Oregon Department of Energy estimates that about 480,000 cords of firewood were consumed in 2003.

Forest biomass is generated from commercial timber harvest, non-commercial thinning, and timber stand improvement activities. Non-commercial thinning (pruning and tree removal) is designed to help shape and guide development of forest stands to meet a variety of goals. It generally does not result in removal of trees that can be used to manufacture products, but it could be used in renewable energy production (heat, steam, electricity, and fuel). Timber stand improvements (TSI) can accomplish similar goals but often results in the removal of some commercially valuable trees. Wood manufacturing residues (bark, sawdust, chips, and veneer cores) are additional sources of raw material for renewable energy production. Thinning and prescribed burning in strategic locations is often used to reduce forest fuels and wildfire risks, but most of the material generated from these types of fuels reduction activities is not suitable for wood products manufacturing. In many cases, biomass material from these activities is left on-site or piled and burned at an additional cost.

Local Biomass Utilization Opportunities

Biomass has the opportunity to become a market-driven solution for overstocked forest stands in Umatilla County. Partnerships are being developed among the Oregon Department of Energy, ODF, and other interested agencies across the NEO District to assess a variety of local biomass utilization opportunities. Energy credits and some type of subsidy incentive are critical to making this a viable enterprise. In Umatilla County, the outlook for utilizing biomass (in particular wood products) is still under assessment. There are several wind power generation facilities currently in operation and additional "wind farms" planned for other sites in the county. While there are a few facilities that use wood products in neighboring counties, the cost of

transporting biomass material from forest operations in Umatilla County to those facilities are not economically feasible at this time.

---

[11] *A Conceptual Approach for a Maintenance Strategy for Fuel Treatments in Oregon: Maintaining the Investment*, Fitzgerald, Stephen and Martin, Charlie, Oregon State FFHM Committee Report, July 5, 2004.
[12] http://egov.oregon.gov/ENERGY/RENEW/Biomass/use.shtml

9. Emergency Management

Protection Capabilities & Infrastructure Protection

Inventory of fire protection resources

An inventory of various local fire resources can be found in Appendix C.

There are several agencies involved in wildland fire suppression that work together to provide protection across the interface areas of Umatilla County. Resources range from a strictly volunteer department with little training, to a department with some paid staff along with several trained volunteers, to federal and state agencies that hire paid, full-time seasonal firefighters. Fire vehicles range from 200-gallon engines to 5,000-gallon tenders.

Most of the local resources have at least some radios that are programmable to wildland fire frequencies. All of the emergency fire agencies (with the exception of WA-DNR and Walla Walla Fire District #4) participate and coordinate as members of the Umatilla/Morrow County Fire Defense Board, to work together for mutual aid activities. These agencies have the ability to utilize a common radio communication frequency as needed: the Oregon State Fire Marshall frequency for command and tactical operations. Agencies have also agreed through mutual aid agreements in place, to allow other fire agencies to use their frequency as appropriate.

Each district or department faces unique challenges in dealing with wildland fires. Having to rely on volunteers for firefighting needs is a common struggle for several rural fire districts. Quick initial response can be impacted by limited resources, especially when firefighters have to be pulled off their "regular" jobs. Wildland fires can occur in terrain that is rural, remote, and difficult to reach quickly. Roads may be in poor condition, private gates locked, and private bridges may be unable to accommodate heavier, firefighting vehicles. Ingress and egress issues are a constant problem in certain areas of the county. Appropriate wildland training is an ongoing challenge for districts that rely on volunteer forces; it demands a high level of commitment from those citizens to maintain current training standards. Having water sources available is also a concern. Pilot Rock RFD has added water tanks at strategic locations across their protection district to improve available water supply. Others are working on improving access to water sources.

Home Site Access

The first consideration for suppression forces fighting a wildfire in any situation is safety. They must be able to quickly and effectively attack the fire but only in as safe a manner as possible. Firefighters use a variety of structural fire fighting equipment such as engines, brush rigs, or tenders to protect homes from wildfire. These specialized vehicles require more space to turn around in and higher clearances than the typical cars and pickups.

Suppression forces will first consider if accessing a home will put them at risk while attacking the fire. Criteria they might consider include:

- Does the access road have proper clearance overhead;
- Is there turn around space once inside?
- Is there more than one way out?
- Are there multiple structures down this road?
- Have suppression forces reviewed the area prior to the emergency?

Clearly marked rural address numbers at the start of your access road greatly aids fire suppression efforts. Firefighters may be working during darkness to protect your home. Having to search for the address takes time away from protection efforts. Having an adequate and safe area for firefighters to work around your home is a key factor of access. Defensible space not only provides a safety area for the home, but for firefighting resources as well. Issues such as the road gradient, surface material, length, available turnouts, or turn-a-rounds are essential considerations during the initial assessment of the incident. Overgrown roadside vegetation could become a flame front, trapping firefighters. Aboveground utility lines running along your access may also become a hazard for vehicles with higher clearance requirements. Umatilla County Road Standards require a 60-foot right of way, with a 22-foot driving surface and a 50-foot radius turning circle with a 40-foot radius turning circle driving surface. This is a "C" cul-de-sac.

Telephone trees, emergency contacts, community information database

According to residents who attended the public meetings, telephone trees are not in place in any of the communities that hosted meetings. The idea of some type of formalized phone tree was suggested by a few community members, but without the lead of a community member or local agency, this is unlikely to occur.

Emergency Alerting

The county will utilize NOAA Weather radio system when activating the Emergency Alert System to notify residents of an emergency evacuation. Residents of fire prone areas are encouraged to utilize the NOAA weather radio system. NOAA receivers are available for a nominal fee wherever radios are sold. The radio will activate when it receives an alert signal and then provide the emergency information. NOAA radio signals are heard throughout the Umatilla County's Blue Mountains/Foothills region.

Another useful tool for wildfire notification to the public could be the Tone Alert Radio (TAR) system currently being used by the Chemical Stockpile Emergency Preparedness Program (CSEPP) as part of the notification program for the weapons destruction activities at the Umatilla Army Depot in the far western edge of the county. The primary CSEPP office is located at the Umatilla County Emergency Services complex in Pendleton, right off I-84. While radios have been provided to residents in the western portion of the county, more directly affected by the Depot's program, a transmitter was installed at the Pendleton NWS office in January 2005; the purpose of this system is to alert first responders in the Pendleton, Athena, Pilot Rock areas, and the Tribes. Radios have now been provided to the ODF and PICC

offices in Pendleton. The county's Emergency Management program has the ability to send out EAS messages (emergency alert system). Along with the Weather Bureau, they can break in on area radio stations and television stations and provide emergency information to county residents (in the event of a wildfire).

Notification

Umatilla County would utilize the following methods to notify residents in a fire area of an impending wildfire hazard or other emergency:

- Emergency Alert System
- Radio news broadcasts or announcements
- Door-to-door
- Emergency Vehicle sirens/public address announcements
- Local Phone Trees
- Person notification

Umatilla County would implement a Joint Information System to provide the latest information to the public and media. Resources of the County Public Information Officer and Joint Information Center, and other appropriate agencies (US Forest Service, Oregon Department of Forestry, tribal and other agencies) would be combined to respond to the public's need to know. All releases would be coordinated with the Incident Commander or appropriate authority.

During a wildfire incident, agencies need to provide accurate and timely information about the incident, especially to affected communities in wildland-urban interface areas. While the primary purpose of *notification* is to alert people to a wildfire hazard, the purpose of providing *updated information* is to share ongoing suppression actions, evacuation trigger points, evacuation area status, and projected future size/impacts from the wildfire.

Two factors that might affect the timely delivery of information beyond the initial emergency notifications are: 1) the overwhelming nature of a fast moving event, and 2) limited personnel resources immediately available.

Web sites, information hot lines, public meetings within communities, and press releases have been successfully used in the past to help provide updated information to local communities.

Evacuation

Evacuation may become necessary to protect the lives of residents of a community during a hazardous and unpredictable event like a wildfire. By removing the threat to life from an area, firefighters can avoid the split focus of

Critical Home Documents
- ✓ *Insurance Papers*
- ✓ *Financial Account #s*
- ✓ *Will / Estate planning*

worrying about people in the hazard area as they work to suppress the fire and protect property.

The Incident Commander may order evacuation when evacuation is determined to be the best method of protecting the public from the fire. Evacuation will be directed by the Umatilla County Sheriff or his Deputy. Public shelters may be opened during evacuations, and evacuees will be advised of shelter locations. Shelters may provide food, housing, and information to those displaced by a wildfire. The American Red Cross (ARC) is the lead agency in establishing public shelters, and is integrated into Umatilla County's emergency plan. It is the responsibility of all residents and visitors to fire prone areas to have a 72-hour kit and be able to maintain their selves and families with needed medications, clothing, snack foods, and other necessities if they are advised to evacuate. The American Red Cross will attempt to support evacuees in obtaining emergency prescription medications and serve as a conduit for health or welfare messages between evacuees and their friends and family.

The County Sheriff or other law enforcement agency will be the lead agency in protecting property within evacuated areas and in establishing traffic control points related to wildfire. Traffic control is one of the key elements of any evacuation plan. Evacuations seek to remove the threat to life by moving people out of the hazard area. Traffic control points around the perimeter of an incident are necessary to prevent people from getting back into the hazard area until it is determined safe to do so.

Where to Report a Wildland Fire Emergency

There are two primary ways to report a wildfire in Umatilla County. The easiest and most commonly used phone number is to dial 9-1-1. However, in those cases where the person reporting the wildfire knows that it is located on forestlands protected by either the Umatilla National Forest or Oregon Department of Forestry, contact the PICC dispatch center and report the fire directly to them. Keep these numbers by your telephone for reference:

For areas within the Northeast Oregon forestlands (ODF and USFS)

Dial: 541-278-3732 (PICC dispatch)

(After hours calls will be transferred to answering service and dispatch duty officer)

For all other wildland fire emergencies:

Dial 9-1-1

10. Monitoring and Evaluation

Schedule

The maintenance for this plan will be directed by the Umatilla County Commissioners but coordinated and completed through the CWPP Steering Committee. The committee will reconvene annually to review and reevaluate:

- The plan, goals, and objectives
- Designated WUI boundaries and Communities-at-risk
- Strategy recommendations as various tasks/projects are accomplished and areas at-risk decline in hazard level
- Priorities for action items and progress
- Infrastructure changes in County including:
    - population changes in WUI areas
    - land use changes, in particular as related to implementation of SB360
    - emergency services capacity levels
    - computer software and data updates, such as tax lot project

A complete revision of the CWPP will be completed every five years by the Steering Committee and submitted to the County Commissioners for their approval. If during annual reviews or following some unforeseen condition that warrants a modification in this schedule, the committee may use their discretion to complete the review and revision as warranted.

Continued Public Involvement

The participation of the public in future reviews of the Umatilla County CWPP will be necessary to accomplish many of the recommendations. Public meetings will be scheduled and advertised to generate participation of interface residents.

Color copies of the plan will be available for review at the Umatilla County Courthouse, local public libraries, and on the web at:

http://www.odf.state.or.us/AREAS/eastern/northeast/umatco_cwpp.htm

The website will provide citizens with an ongoing opportunity to provide comments or send questions to the Steering Committee in the future.

This page was intentionally left blank.

11. Appendices

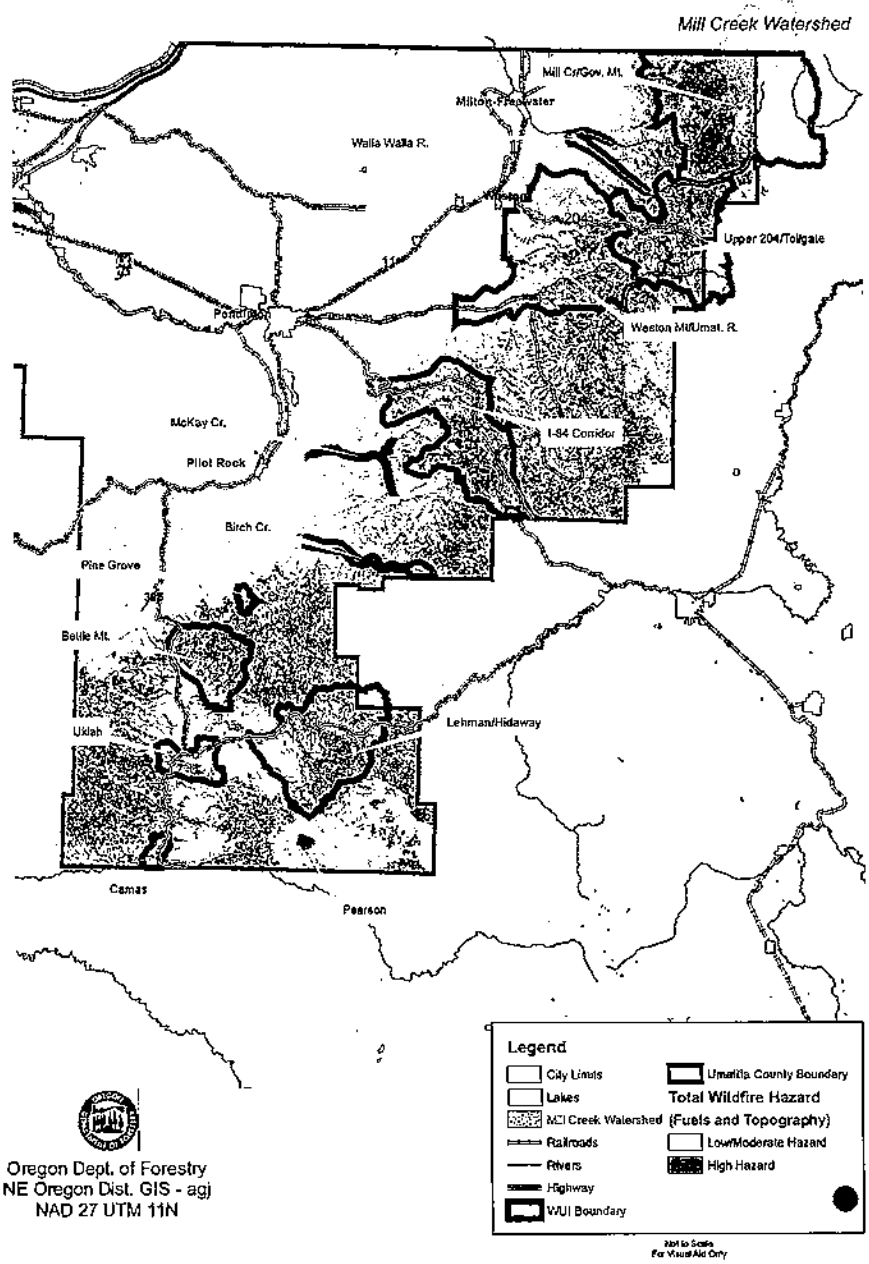
Appendix A: City of Walla Walla CWPP (includes Mill Creek Watershed)

Note: The City of Walla Walla CWPP Steering Committee is currently working on this planning document. When completed and approved by committee members, the document will be included in the Umatilla County CWPP.

This page was intentionally left blank.

Appendix B: Total Wildfire Hazards for Umatilla County CWPP

Total Wildfire Hazard Map
Fuels and Topography
Umatilla County CWPP
June 16, 2005



This page was intentionally left blank.

Appendix C: Inventory of Local Suppression Resources

Agency	Protection Area	Suppression Services	Employees	Engines Available	Programmable Radios
BIA	Trust Lands	Wildland	4 BIA and 2 CTUIR (in BIA office)	2 - Type 6 engines (250 gal) 1 - Type 4 engine (750 gal)	Yes
City of MF		Both			
City of Pendleton		Both			
City of Ukiah	city of Ukiah	Structural			
CTUIR		Structural			
East Umatilla RFPD	Highway 204 corridor & Umatilla Rv Rd	Both	? Volunteers & 1.5 paid staff	3 - Type 1 engines 4 - brush Type 6 engines 3 - Types 1, 2, and 3 tenders 1 - brush Type 4 engine	Yes - with ODF
Meacham RFD		Both	volunteer only		
Milton-Freewater RFD (subscription service)	foothills of Blue Mtns on east and southeast side	Both	20 volunteers & paid staff	4 - heavy brush Type 4 engines (1,000 gal water & ≥ 90 GPM) 3 - light brush Type 6 engines (200 gal & ≥ 80GPM) 2 - Tenders (2,250 gal & 300 GPM; 5,000 gal & 750 GPM)	Yes - 80% of radios
Oregon Dept. of Forestry - Pendleton	Pendleton Unit - NEO Forest Protection	Wildland	4 permanent 12 seasonal	5 – Type 6X engines (300-400 gal) 1 – Type 4X Tactical Tender (1600 gal)	Yes

Agency	Protection Area	Suppression Services	Employees	Engines Available	Programmable Radios
Pilot Rock RFD	City of PR and surrounding 342 sq. miles	Both	20 volunteers	1 - Type 1 engine/tender (3,000 gal) Class A Foam 1 - Type 1 engine (1,000 gal) CAFS 1 - Type 2 engine (900 gal) CAFS 1 - Type 3 engine (350 gal) Class A Foam 1 - 3,000 gal Tender 1 - Type 4 engine (200 gal)	Yes - Red Net; White Net; Fire Net
USFS Walla Walla RD	federal forest	Wildland	summer ~ 50 winter ~ 15	1 - Type 4 engine 3 - Type 6 engines 1 - Type 7 engines (patrols)	Yes - radios are ready to be 'cloned'
USFS North Fork John Day RD	federal forest	Wildland			
Walla Walla Fire District #4	residents in Mill Ck area thru individual contract up to 2 miles into Oregon	Structural	none	6 - Type 6 engines 3 - 2,000 gal tenders	Command vehicles can talk with WA-DNR & USFS, but not ODF

Appendix D: Umatilla County CWPP WUI Scoring Explanation Sheet

This page was prepared by Angie Johnson, Oregon Department of Forestry, to provide additional detail on the various categories used to rank the various WUI areas by the Steering Committee.

Category 1:
Likelihood of Fire Occurring

Based on Fire Occurrence Rate (FOR) per 1,000 acres.
Used fire history data from ODF, USFS, and BLM for last ten years (1994 - 2003).

Category 2:
Topographic Hazard

Slope and Aspect working together on landscape. For example, 0-25% slope on north aspect would be considered low hazard whereas, 50% slope on south/southwest aspect would be considered high hazard. GIS was used to calculate the raster files and reclassify the combination of slope hazard and aspect hazard to come up with topographic hazard.

Category 3:
Total Fuel Hazard Rating

Surface and Ladder Fuels working together on the landscape. For example, Fuel Group 3 with Crown Fuel 3 would be considered high hazard, whereas Fuel Group 1 with Crown Fuel 1 would be considered low hazard. GIS was used to calculate the raster files and reclassify the combination of surface fuel hazard and ladder fuel hazard and arrive at total fuel hazard.

Category 4:
Overall Fire Protection Capability Rating

Homesite Density (homes per 10 acres)		Check Appropriate Box Under Category
Low	0 - .9	☐
Moderate	1 - 5.0	☐
High	5.1+	☐

Other Risk Factors Present		
Low	< 1/3 present	☐
Moderate	1/3 - 2/3 present	☐
High	> 2/3 present	☐

Other risk factors: Transmission power lines, above ground distribution lines, power substations, active logging, construction, debris burning, slash burning, mining, dispersed camping, developed camping, off-road vehicle use, railroad, federal/state highway, county road, public access roads, camps/resorts/cabins/stables, schools, business, ranch/farm, lightning prone, dump, mowing dry grass, woodcutting, equipment use, flammables present….

Organized Response

Low	Both Structural and Wildland	
Moderate	Wildland response only	
High	No organized response	

Fire Response

Using outermost group of structures to determine response time. Response time also includes time it takes to bring in volunteers.

Low	< 10 minutes	
Moderate	> 10 minutes	
High	< 20 minutes	
Extreme	> 20 minutes	

Community Preparedness

Low	Organized group, CWPP, phone tree, mitigation efforts	
Moderate	Primarily agency efforts (mailings, campaigns, etc.	
High	No effort	

Structural Vulnerability

Ingress/Egress, All-Season Road Condition, Fire Service access, adequate water supply for structural firefighters, comfort level of structural fire district regarding defendability of structures in wildfire event.

Low	< 1/2 adequate	
High	> 1/2 inadequate	

Category 5:
Weather Hazard

Weather Factor of High has been applied by the State of Oregon for all of eastern, southern, and southwestern Oregon. The high hazard rating was offset by using annual precipitation. The layer used to determine annual rainfall came from the Oregon Dept. of Forestry GIS library.

Category 6:
Values at-risk

Values Protected

Community values like wildlife, recreation, viewshed, hunting/fishing, municipal watersheds, power substations and corridors, communication sites and facilities, transportation corridors, homes, life, etc.

High	Yes	
Low	No	

Appendix E: References

http://www.fireplan.gov/eports/351-358-en.pdf

http://www.nwfireplan.gov

http://www.fireplan.gov

http://www.fireplan.gov/reports/7-19-en.pdf

http://www.whitehouse.gov/infocus/healthyforests/toc.html

http://www.fema.gov/fima/planning10.shtm

http://www.odf.state.or.us/DIVISIONS/protection/fire_protection/prev/sb360/docs/overview.pdf

---

[1] State of Oregon Emergency Management Plan, *Natural Hazards Mitigation Plan, Fire Chapter*, November 2003.

[2] http://www.communitiescommittee.org/pdfs/cwpphandbook.pdf

[3] Josephine County Integrated Fire Plan, August 2004.

[4] http://www.umatilla.nsn.us/geninfo.html

[5] http://www.wrh.noaa.gov/mfr/climo/AvgAnnPcpnOR.gif

[6] State of Oregon Emergency Management Plan, *Natural Hazards Mitigation Plan, Fire Chapter*, November 2003.

[7] This section is based upon *Methodology for Hazard Assessment (2005authored by Angie Jahnson, Oregon Department af Forestry Northeast Oregon District, and edited by Trish Wallace, USDA Wallowa-Whitman National Forest.*

[8] Protecting People and Sustaining Resources in Fire-Adapted Ecosystems – A Cohesive Strategy, October 13, 2000.

[9] Fire Regime Condition Class Definition. 06/20/2003. Obtained from Umatilla National Forest Fire Planning.

[10] Expanded Fire Condition Class Definition Table. Available at http://www.frcc.gov.

11 *A Conceptual Approach for a Maintenance Strategy far Fuel Treatments in Oregon: Maintaining the Investment*, Fitzgerald, Stephen and Martin, Charlie, Oregon State FFHM Committee Report, July 5, 2004.

[12] http://egov.oregon.gov/ENERGY/RENEW/Biomass/use.shtml

This page was intentionally left blank.

Appendix F: Acronyms and Glossary of Terms

BLM – Bureau of Land Management
CAR – communities at risk
CE – Category Exclusion
CSEPP – Chemical Stockpile Emergency Preparedness Program
CTUIR – Confederated Tribes of the Umatilla Indian Reservation
CWPP – Community Wildfire Protection Plan
EA – Environmental Assessment
EIS – Environmental Impact Statement
FEMA – Federal Emergency Management Agency
HFRA – Healthy Forests Restoration Act
NEPA – National Environment Protection Act
NEO – Northeast Oregon district (of Oregon Dept. of Forestry)
NFP – National Fire Plan
ODF – Oregon Department of Forestry
ORS – Oregon Revised Statute
OSFM – Office of State Fire Marshall
RFPD – Rural Fire Protection District
SB – Senate Bill (Oregon Legislature)
SFM – State Fire Marshall (more commonly Office of State Fire Marshall)
UNF – Umatilla National Forest
USFS – US Forest Service
WUI – Wildland-Urban Interface
WHZ – Wildfire Hazard Zone

Conflagration – in the context of this document, this means Governor-declared fires with an imminent threat to life or structures that have exhausted local and mutual aid resources.

Conflagration Act – state legal authority established as a civil defense measure to mobilize structural fire suppression resources for massive urban fires. It was first used in 1951 to coordinate aid to an explosion and fire in downtown Roseburg. The Act was not invoked again until 1972, when a wildland fire in Yamhill County threatened homes in what is now known as the wildland-urban interface. It must be authorized by the Governor. The Act includes authorization for OSFM to assign firefighting forces and equipment beyond mutual aid agreements. It also designates reimbursement for aid to those departments participating.

Driveway - the primary, privately owned vehicle access road that serves a dwelling, which is controlled by the owner of the dwelling, and which is longer than 150 feet.

Dwelling – a structure, or a part of the structure, that is used as a home, as a residence, or as a sleeping place by one or more people who maintain household in the structure.

Fire-resistant roofing – roofing material that has been installed and is maintained to the specifications of the manufacturer, and which is rated by Underwriter's Laboratory as Class A, Class B, Class C, or is equivalent thereto; or is metal.

Forestland – any woodland, brushland, timberland, grazing land or clearing that, during any time of the year, contains enough forest growth, slashing or vegetation to constitute, in judgment of the state forester, a fire hazard, regardless of how the land is zoned or taxed.

Fuel break – a natural or human-made area immediately adjacent to a structure or to a driveway, where material capacity of allowing a wildfire to spread does not exist or has been cleared, modified, or treated to significantly reduce the rate of spread and the intensity of an advancing wildfire; to create an area in which fire suppression operations may more safely occur.

Homeowner's association – a legal nonprofit corporation that manages a community of homes or residential properties.

Included rural lands – lands that meet the definition "rural" but which have been classified as "suburban".

Ladder fuel – branches, leaves, needles, and other combustible vegetation that may allow a wildfire to spread from lower growing vegetation to higher growing vegetation.

National Fire Plan – a federal program that helps manage the impact of wildfire on communities. It has five main components: firefighting, rehabilitation and restoration, hazardous fuel reduction, community assistance, and accountability. The state foresters have agreed upon a process for completing an assessment in 2003-04 for evaluating communities at risk to better prioritize funding of National Fire Plan projects.

NEO District – ODF district in Northeast Oregon comprised of four units: Union, Wallowa, Baker, and Pendleton. NEO District headquarters are located in La Grande.

Non-fire-resistant roofing – roofing material that is not resistant including, but not limited to, cedar shakes.

Non-statistical Fires – ODF fires, commonly referred to as 'non-stat' fires that ignited on non-State protected land but threatened ODF protected property.

Oregon Senate Bill 360 – this 1997 legislation established the policy and framework for meeting the fire protection needs of the wildland-urban interface. One of the goals of the bill is to define the Interface in Oregon and establish a process and system for the classification of the Interface. Formal classification committees in each county will accomplish the classification. Work has begun in Jackson and Deschutes counties, with the remainder of the state planned for classification over the next ten years. The

Northeast Oregon district of ODF has hired an employee to manage the SB360 work in the district.

Road – a road over which the public has a right of use.
Rural – a geographic area that has not been classified by a committee as suburban or urban and shall include:

- Lands zoned primarily for farm or forestry uses;
- Lands which have an average tax lot size of 10 acres or larger;
- Lands not zoned to allow a concentration of structures;
- Lands that do not contain a concentration of structures.

Safety zone – an area that is substantially free of flammable materials, and which can be used as a refuge to protect people from an advancing wildfire.

Standards – the actions, efforts, or measures which owners of suburban and urban lands shall take on their property, pr... to a wildfire occurrence which originates on the property.

Statistical Fires – ODF fires typically referred to as 'stat' fires. They are fires that ignited on State protected land.

Structure – a permanently sited building, a manufactured home, or a mobile home that is either a dwelling or an access building, which occupies at least 500 square feet of ground space, and which has at least one side that is fully covered.

Structural fire protection – the protection of structures by established municipal fire departments and rural fire protection districts with specific equipment and training.

Structural Ignitability – a term that relates to the cause of a home igniting during a wildfire. Examples are ratings given to the building materials used for the home and amount of combustible materials around the home.

Structural Vulnerability – a term that relates factors contributing to how and why a home is vulnerable to wildfire, including but not limited to, access to the home, ladder fuels and vegetation within the landscape of a home, and whether or not fire protection is available.

Suburban – a geographic area which includes one or more of the following:

- Lands where a concentration of structures exists;
- Lands on which current zoning allows a concentration of structures; or
- Included rural lands.

Urban – a geographic area that includes one or more of the following:

- Lands within a city limit; or
- Lands within an urban growth boundary.

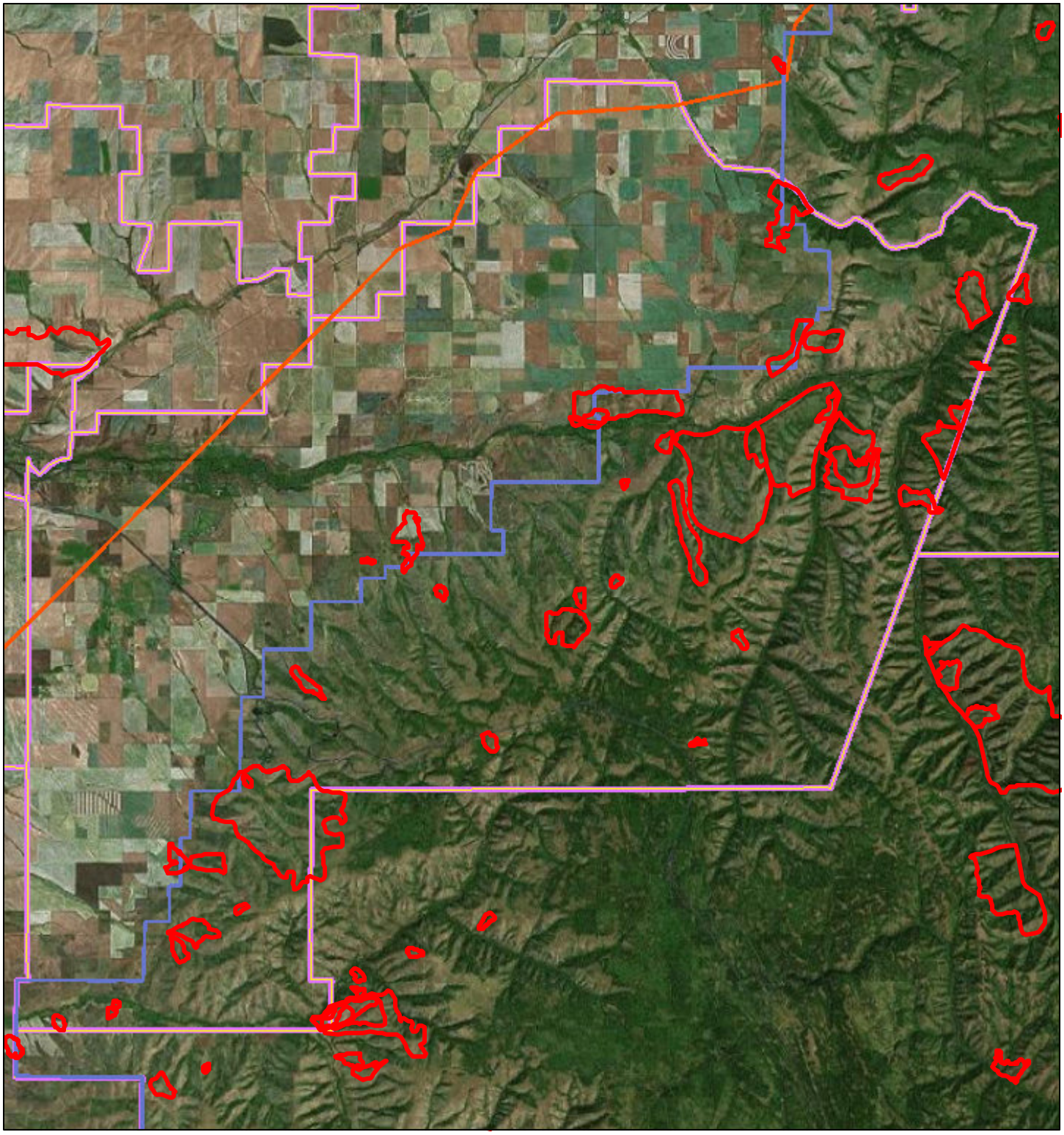
Wildfire – an uncontrolled fire that is burning on forest and which is damaging, or is threatening to damage, forest resources or structures.

Wildfire Hazard Zone – the portion of a local government jurisdiction that has been determined to be at risk of a catastrophic wildfire. The purpose of such a designation is to define those areas where buildings need to be made more survivable from fires spreading from adjacent wildlands. The WHZ process was established by the 1993 Oregon Legislature. Participation by local governments is voluntary.

Wildland-Urban Interface (a.k.a. Wildland Interface, Forestland-Urban Interface, Interface) – an area where structures are adjacent to or are intermingled with natural vegetative fuels which is prone to the occurrence of wildland fires.

BIA/CTUIR Fires

10 Acres & Larger, 1967 to Present



October 14, 2014 09:05 Author : Matt Hoehna

1:270,000

0 2.25 4.5 9 mi

0 3.5 7 14 km

Coordinate System: Web Mercator Datum: WGS 84

Legend

- Fire Polygons
- Regulated Use Areas
- Fire Weather Zones
- Structural FPD
- Lookouts Names
- Lookouts

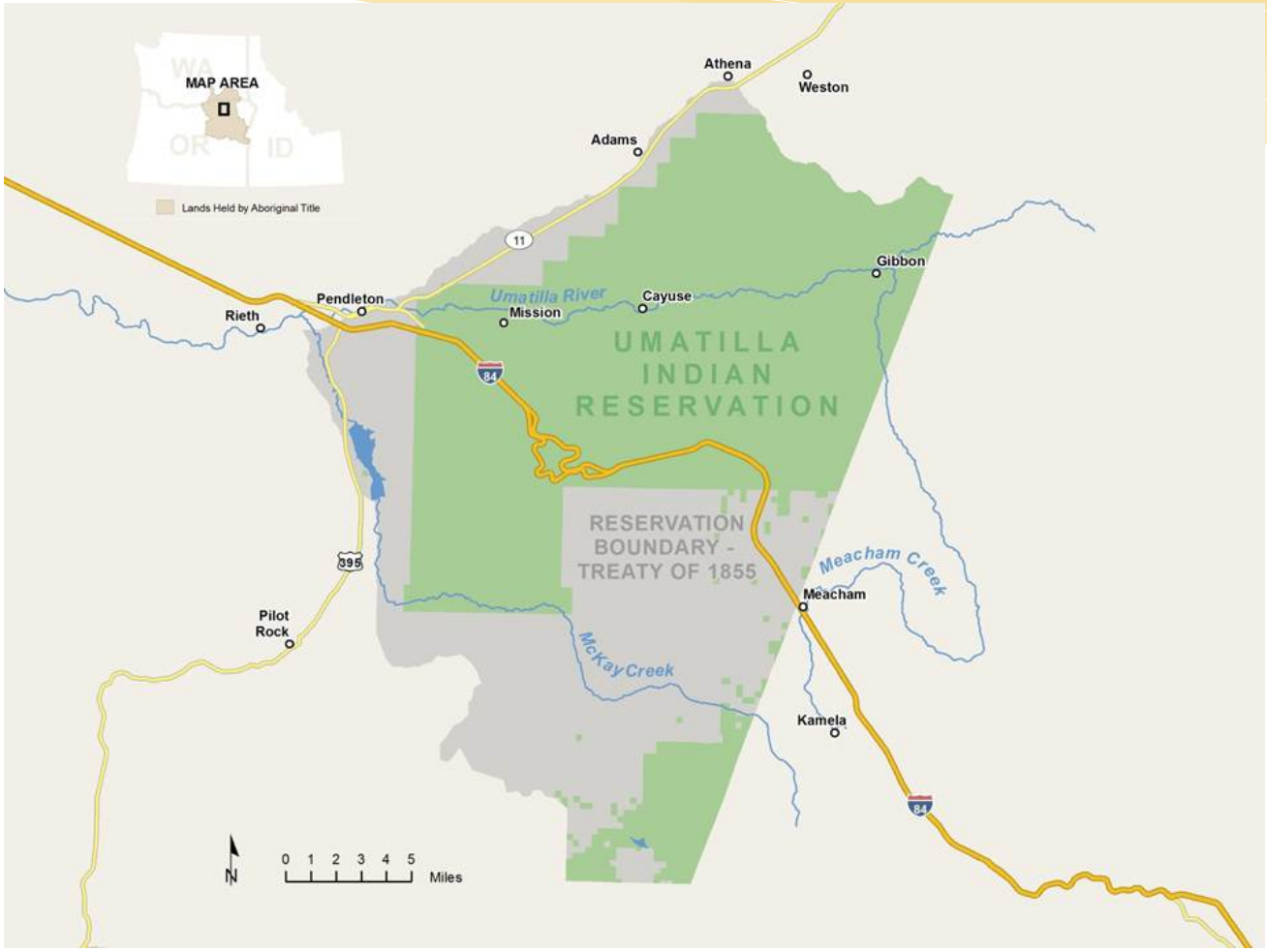
Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

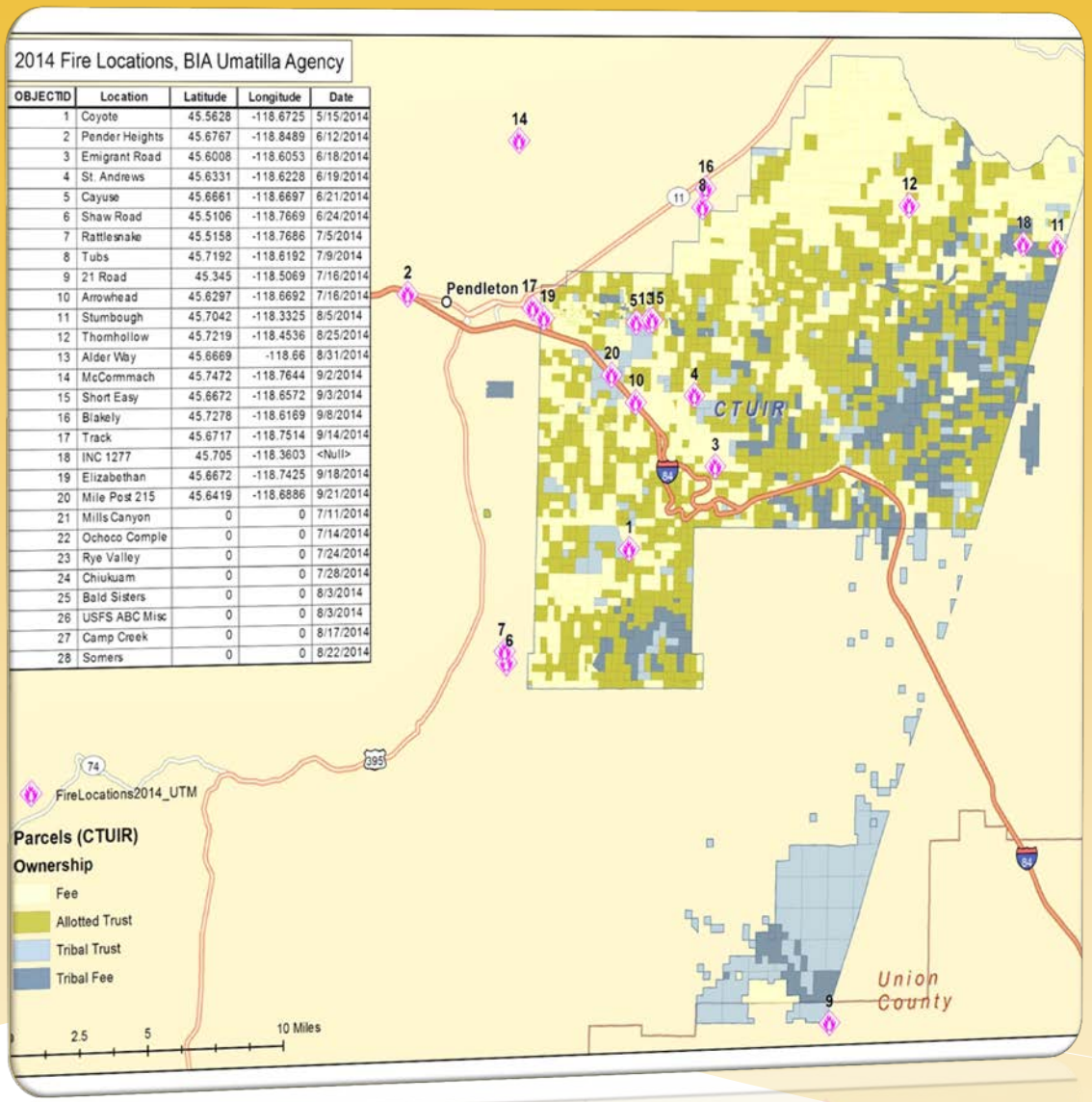
This product is for informational purposes, and may not be suitable for legal, engineering or surveying purposes.This information or data is provided with the understanding that conclusions drawn from such information are the responsibility of the user.

BIA Umatilla Agency Fire Program

2014 Review

Confederated Tribes of the Umatilla Indian Reservation (CTUIR)





OBJECTID	Location	Latitude	Longitude	Date
1	Coyote	45.5628	-118.6725	5/15/2014
2	Pender Heights	45.6767	-118.8489	6/12/2014
3	Emigrant Road	45.6008	-118.6053	6/18/2014
4	St. Andrews	45.6331	-118.6228	6/19/2014
5	Cayuse	45.6661	-118.6697	6/21/2014
6	Shaw Road	45.5106	-118.7669	6/24/2014
7	Rattlesnake	45.5158	-118.7686	7/5/2014
8	Tubs	45.7192	-118.6192	7/9/2014
9	21 Road	45.345	-118.5069	7/16/2014
10	Arrowhead	45.6297	-118.6692	7/16/2014
11	Stumbough	45.7042	-118.3325	8/5/2014
12	Thornhollow	45.7219	-118.4536	8/25/2014
13	Alder Way	45.6669	-118.66	8/31/2014
14	McCommach	45.7472	-118.7644	9/2/2014
15	Short Easy	45.6672	-118.6572	9/3/2014
16	Blakely	45.7278	-118.6169	9/8/2014
17	Track	45.6717	-118.7514	9/14/2014
18	INC 1277	45.705	-118.3603	<Null>
19	Elizabethan	45.6672	-118.7425	9/18/2014
20	Mile Post 215	45.6419	-118.6886	9/21/2014
21	Mills Canyon	0	0	7/11/2014
22	Ochoco Comple	0	0	7/14/2014
23	Rye Valley	0	0	7/24/2014
24	Chiukuam	0	0	7/28/2014
25	Bald Sisters	0	0	8/3/2014
26	USFS ABC Misc	0	0	8/3/2014
27	Camp Creek	0	0	8/17/2014
28	Somers	0	0	8/22/2014

Blue Mountain Interagency Dispatch Center

La Grande, OR

- CTUIR Tribal Fire
- Oregon Department of Forestry
- Umatilla NF
- Wallowa Whitman NF
- USFWS
- Pendleton Fire Dept.
- Pilot Rock Fire Dept.

Apparatus & Staffing

Type 4 Engine: 2341

Type 6 Engine: 0761

No safety related incidents

1: BIA 13/13 Engine Module Leader

2: CTUIR Seasonal Firefighters

Militia: Various CTUIR Forestry Staff

Fuels

CTUIR Forestry Department

Wanaket Rx

Jennings Creek Rx

Skatrak Timber Rx

Prevention

Previous 3 year fire average:

17

Cause: Equipment & Incendiary

84% Human Cause

Nixyaawii Youth Fire Prevention Program

KCUW/CUJ Newspaper

WFPP Update due 2015

Cooperative Wildland Fire Agreement

DD May 2015

Cohesive Wildfire Strategy

Risk Based Wildland Fire Management

Questions you have?

Glossary of Wildland Fire Terminology

PMS 205 October 2014

Glossary of Wildland Fire Terminology

PMS 205

October 2014

The National Wildfire Coordinating Group (NWCG) has approved this information for the guidance of its groups and member agencies and is not responsible for the interpretation or use of this information by anyone except its groups and member agencies.

Sponsored for NWCG publication by the Data Standards and Terminology Subcommittee.

Previous editions: 2012, 2011, 2008, 2007, 2006, 2005.

This publication is published electronically by NWCG on the NWCG Web site at
http://www.nwcg.gov/pms/pms.htm

Comments regarding the content of this document should be directed to
BLM_FA_NWCG_Webmaster@blm.gov

NWCG information is in the public domain. Use of the information, including copying, is permitted. Use of NWCG information within another document is permitted, if NWCG information is accurately cited to the NWCG. The NWCG logo may not be used except on NWCG authorized information. "National Wildfire Coordinating Group", "NWCG", and the NWCG logo are trademarks of the National Wildfire Coordinating Group.

The use of trade, firm, or corporation names in this publication is for the information and convenience of the reader and does not constitute an endorsement by the National Wildfire Coordinating Group of any product or service to the exclusion of others that may be suitable.

Preface

The Glossary of Wildland Fire Terminology provides an extensive listing of terms and definitions used by the National Wildfire Coordinating Group (NWCG) community. This document contains terms commonly used by NWCG in the areas of wildland fire and incident management and is not intended to list all terms used by NWCG members and users.

The NWCG has approved this glossary for use by the NWCG and its subgroups. The NWCG has directed that all NWCG glossaries will be based upon the Glossary of Wildland Fire Terminology for the purpose of maintaining definition consistency and clarity among documents.

Contents

Introduction

Scope of the Glossary

This glossary provides the wildland fire and incident management communities a single source document that covers wildland fire, prescribed fire, fire use and incident management terminology commonly used by the National Wildfire Coordinating Group (NWCG) and its subgroups.

Objective of the Glossary

This glossary will help to improve communication and provide consistency in terminology usage throughout those organizations with a mission of wildland fire or fire use management. It will also facilitate consistent use of glossary terms in publications, course development, and incident management activities.

Maintenance of the Glossary

This glossary is intended to be a dynamic document, updated on a regular cycle. Those wishing to submit terminology for glossary inclusion or to recommend updating or removing existing glossary definitions may do so by sending a glossary entry change request to:

NWCG Program Management Unit
National Interagency Fire Center
3833 S. Development Avenue
Boise, ID 83705

or by e-mailing the request to: *BLM_FA_NWCG_Webmaster@blm.gov*

When submitting a glossary change request, it is requested that the NWCG Entry Change Request format be used. An electronic copy of this format can be found with the glossary on the NWCG Web site at http://www.nwcg.gov.

Publication of the Glossary

For those who wish to access the most up-to-date, interactive version of this glossary, it is available via the Internet at the NWCG Web site (http://www.nwcg.gov). An electronic version (in PDF format) of the glossary document is also available for download or on CD. Instructions for downloading or requesting the CD can be found on the Web site.

Reference Definitions

Some of the terms within this glossary will be followed by initials or will have references or comments at the end of the definition to help broaden the recognition and understanding of the term. An explanation of those references is as follows:

Also called: means there is another term that may sometimes be in use, but is not defined in this glossary.

Acronym: A name made up of the initial letters of a multi-word term or official title. An acronym appears in parentheses following the term.

See: means there is another, preferred term that should be used instead. In such a case only the preferred term is defined in this glossary.

See Also: means there are one or more related terms that may also be of interest to the glossary user. The related terms are also defined in this glossary.

Synonym: means the term is synonymous with another. The terms have the same, or essentially the same, definition and the terms are interchangeable in their use.

Acronyms

1,000-h TL FM	see:	One-thousand Hour Timelag Fuel Moisture
100-h TL FM	see:	One-hundred Hour Timelag Fuel Moisture
10-h TL FM	see:	Ten-hour Timelag Fuel Moisture
1-h TL FM	see:	One-hour Timelag Fuel Moisture
AAR	see:	After Action Review
ABRO	see:	Aircraft Base Radio Operator
ACAC	see:	Area Command Aviation Coordinator
ACDR	see:	Area Commander
ACLC	see:	Assistant Area Commander, Logistics
ACPC	see:	Assistant Area Commander, Plans
AD	see:	Administratively Determined
ADF	see:	Automatic Direction Finder
ADO	see:	Assistant Disbursing Officer
AGL	see:	Above Ground Level
AID	see:	Aerial Ignition Device
AirNet	see:	Aircraft Network
ALS	see:	Advanced Life Support
AMR	see:	Appropriate Management Response
AMRS	see:	All Hazards Meteorological Response System
AOBD	see:	Air Operations Branch Director
AOP	see:	Annual Operating Plan (for Fire Weather)
APT	see:	Administrative Payment Team
AREP	see:	Agency Representative
ASA	see:	Air Stagnation Advisory
ASGS	see:	Air Support Group Supervisor
ATA	see:	Actual Time of Arrival
ATCO	see:	Air Tanker/Fixed-Wing Coordinator
ATD	see:	Actual Time of Departure
ATE	see:	Actual Time En Route
ATGS	see:	Air Tactical Group Supervisor
ATIM	see:	Aircraft Timekeeper
ATV	see:	All Terrain Vehicle
AWS	see:	Automatic Weather Station
BACM	see:	Best Available Control Measures
BCMG	see:	Base Manager
	see:	Camp Manager
BLEVE	see:	Boiling Liquid Expanding Vapor Explosion
BLS	see:	Basic Life Support
Btu	see:	British Thermal Unit
BUI	see:	Buildup Index
CAFS	see:	Compressed Air Foam Systems

CFP see: Cooperative Fire Protection
CISD see: Critical Incident Stress Debriefing
CLMS see: Claims Specialist
CMSY see: Commissary Manager
CO see: Carbon Monoxide
CO2 see: Carbon Dioxide
COML see: Communications Unit Leader
COMP see: Compensation/Claims Unit Leader
COMT see: Incident Communications Technician
COST see: Cost Unit Leader
CRWB see: Crew Boss
CWPP see: Community Wildfire Protection Plan
DA see: Departure from Average Greenness
DAID see: Delayed Aerial Ignition Devices
DDP see: Designated Dispatch Point
DE see: Dry Episode
DECK see: Deck Coordinator
DISE see: Distributed Incident Simulation Exercise
DIVS see: Division/Group Supervisor
DL see: Distance Learning
see: Fuel Dryness Level
DME see: Distance Measuring Equipment
DMOB see: Demobilization Unit Leader
DOB see: Depth of Burn
DOCL see: Documentation Unit Leader
DOZB see: Dozer Boss
DPRO see: Display Processor
DZ see: Drop Zone
EFF see: Emergency Firefighter
EFp see: Emission Factor
EFSA see: Escaped Fire Situation Analysis
ELT see: Emergency Locator Transmitter
EMC see: Equilibrium Moisture Content
EMTB see: Emergency Medical Technician - Basic
EMTI see: Emergency Medical Technician - Intermediate
EMTP see: Emergency Medical Technician - Paramedic
EOC see: Emergency Operations Center
ERC see: Energy Release Component
ETA see: Estimated Time of Arrival
ETD see: Estimated Time of Departure
ETE see: Estimated Time En Route
FAC see: Fire Adapted Community
FACL see: Facilities Unit Leader
FAR see: Federal Aviation Regulation
FDUL see: Food Unit Leader

FIRES	see:	Fire Information Retrieval and Evaluation System
FIRETIP	see:	Firefighting Technology Implementation Program
FLE	see:	Fireline Explosives
FLI	see:	Fire Load Index
FLIR	see:	Forward Looking Infrared
FLPMA	see:	Federal Land Policy and Management Act
FMP	see:	Fire Management Plan
FMU	see:	Fire Management Unit
FOBS	see:	Field Observer
FOFE	see:	First Order Fire Effects
FORPLAN	see:	Forest Planning Language and Simulator
FPU	see:	Fire Planning Unit
FRA	see:	Friction Reducing Agent
FSC1 or FSC2	see:	Finance/Administration Section Chief
FWI	see:	Fire Weather Index
FWIS	see:	Forestry Weather Information System
GACC	see:	Geographic Area Coordination Center
GACG	see:	Geographic Area Coordinating Group
GAWR	see:	Gross Axle Weight Rating
GISS	see:	Geographic Information System Specialist
GOES	see:	Geostationary Operational Environmental Satellite
GPM	see:	Gallons per Minute
GPS	see:	Global Positioning System
GSA	see:	General Services Administration
GSUL	see:	Ground Support Unit Leader
GTS	see:	Gum Thickened Sulphate
GVW	see:	Gross Vehicle Weight
GVWR	see:	Gross Vehicle Weight Rating
HCWN	see:	Helicopter Manager
HEB1 or HEB2	see:	Helibase Manager
HECM	see:	Helicopter Crewmember
HELB	see:	Helicopter Boss
HERO	see:	Helibase Radio Operator
HESM	see:	Helispot Manager
HIGE	see:	Hovering in Ground Effect
HLCO	see:	Helicopter Coordinator
HRSP	see:	Human Resource Specialist
IA	see:	Initial Attack
IAF	see:	Initial Attack Fire
IAIC	see:	Initial Attack Incident Commander
IAP	see:	Incident Action Plan
IARR	see:	Interagency Resources Representative
IAS	see:	Indicated Airspeed
IBA	see:	Incident Business Advisor

ICP	see:	Incident Command Post
ICS	see:	Incident Command System
ICT1, ICT2, ICT3, ICT4, or ICT5	see:	Incident Commander
ID	see:	Inside Diameter
IFPL	see:	Industrial Fire Precaution Level
IFR	see:	Instrument Flight Rules Conditions
ILS	see:	Instrument Landing System
IMET	see:	Incident Meteorologist
IMI	see:	Interactive Multimedia Instruction
IMSA	see:	Incident Medical Specialist Assistant
IMSM	see:	Incident Medical Specialist Manager
IMST	see:	Incident Medical Specialist Technician
INCM	see:	Incident Communications Manager
INVF	see:	Wildland Fire Investigator
IPT	see:	Iron Pipe Thread
IR	see:	Infrared
	see:	Infrared Groundlink
JIC	see:	Joint Information Center
JIS	see:	Joint Information System
KBDI	see:	Keetch-Byram Drought Index
L/RMP	see:	Land/Resource Management Plan
LAL	see:	Lightning Activity Level
LC	see:	Liquid Concentrate
LCES	see:	Lookout(s), Communication(s), Escape Route(s), and Safety Zone(s)
LCMS	see:	Learning Content Management System
LOFR	see:	Liaison Officer
LR	see:	Lightning Risk
LSC1 or LSC2	see:	Logistics Section Chief
MAC	see:	Multi-Agency Coordination
MAC Group	see:	Multi-Agency Coordinating Group
MACS	see:	Multi-Agency Coordination System
MAFFS	see:	Modular Airborne Firefighting System
MEDL	see:	Medical Unit Leader
MEL	see:	Most Efficient Level
Micro-REMS	see:	Micro-Remote Environmental Monitoring System
MIST	see:	Minimum Impact Suppression Techniques
MMA	see:	Maximum Manageable Area
	see:	Maximum Management Area
MOA	see:	Military Operations Area
MSL	see:	Mean Sea Level
NAAQS	see:	National Ambient Air Quality Standards
NARTC	see:	National Advanced Resources Technology Center

NASF	see:	National Association of State Foresters
NDVI	see:	Normalized Difference Vegetation Index
NESDIS	see:	National Environmental Satellite, Data and Information Service
NFC	see:	National Fire Codes
NFDRS	see:	National Fire Danger Rating System
NFPA	see:	National Fire Protection Association
	see:	National Fire Protection Association Standards
NH	see:	National Standard Thread
NICC	see:	National Interagency Coordination Center
NIFC	see:	National Interagency Fire Center
NIFMID	see:	National Interagency Fire Management Integrated Database
NIIMS	see:	National Interagency Incident Management System
NO	see:	Nitrogen Oxide
NO2	see:	Nitrogen Dioxide
NOTAM	see:	Notice to Airmen
NPSH	see:	National Pipe Straight Hose Thread
NRL	see:	National Resource Lands
NVC	see:	Net Value Change
NWCG	see:	National Wildfire Coordinating Group
OCC	see:	Operations Coordination Center
OD	see:	Outside Diameter
OI	see:	Occurrence Index
OPBD	see:	Operations Branch Director
ORDM	see:	Ordering Manager
ORV	see:	Off-road Vehicle
OSC1 or OSC2	see:	Operations Section Chief
PAL	see:	Project Activity Level
PAR	see:	Precision Approach Radar
PIBAL	see:	Pilot Balloon Operation
PIO1, PIO2, PIOF	see:	Public Information Officer
PM10	see:	PM10
PM2.5	see:	PM2.5
PPE	see:	Personal Protective Equipment
PROC	see:	Procurement Unit Leader
PSC1 or PSC2	see:	Planning Section Chief
PSD	see:	Plastic Sphere Dispenser
	see:	Prevention of Significant Deterioration
PSI	see:	Pounds per Square Inch
PTB	see:	Position Task Book
RACM	see:	Reasonably Available Control Measures
RAWS	see:	Remote Automatic Weather Station
RCDM	see:	Receiving and Distribution Manager
RECON	see:	Reconnaissance

RESL	see:	Resources Unit Leader
RFD	see:	Rural Fire District
RG	see:	Relative Greenness
RH	see:	Relative Humidity
RM	see:	Risk Management
ROSS	see:	Resource Ordering and Status System
SA	see:	Situation Awareness
	see:	Situational Awareness
SAFENET	see:	SAFENET
SAIT	see:	Serious Accident Investigation Team
SCBA	see:	Self-Contained Breathing Apparatus
SCKN	see:	Status/Check-In Recorder
SCO	see:	Shareable Content Object
SCORM	see:	Shareable Content Object Re-usable Model
SECM	see:	Security Manager
SHEF	see:	Standard Hydrologic Exchange Format code
SIG	see:	Special Interest Group
SIMWYE	see:	Reversible Siamese
SIP	see:	State Implementation Plan
SITL	see:	Situation Unit Leader
SOFE	see:	Second Order Fire Effects
SOP	see:	Standard Operating Procedure
	see:	Standard Operational Procedure
SPUL	see:	Supply Unit Leader
SSA	see:	Smoke-Sensitive Area
STAM	see:	Staging Area Manager
STCR	see:	Strike Team leader Crew
STCR, STDZ, STEN or STPL	see:	Strike Team Leader
STDZ	see:	Strike Team Leader Dozer
STEN	see:	Strike Team Leader Engine
STEX	see:	Sand Table Exercise
STPL	see:	Strike Team Leader Tractor/Plow
STPS	see:	Structure Protection Specialist
SUBD	see:	Support Branch Director
SVBD	see:	Service Branch Director
TDGS	see:	Tactical Decision Game
TFLD	see:	Task Force Leader
TFR	see:	Temporary Flight Restriction
THSP	see:	Technical Specialist
TIME	see:	Time Unit Leader
TL	see:	Timelag
TNSP	see:	Training Specialist
TOLC	see:	Take-off and Landing Coordinator

TSP see: Total Suspended Particulate Matter
UHF-FM see: Ultra High Frequency
VFD see: Volunteer Fire Department
VFR see: Visual Flight Rules Conditions
VG see: Visual Greenness
VHF-AM see: Very High Frequency
VOR see: VHF Omnidirectional Radio Range
VRM see: Visual Resource Management
WCT see: Work Capacity Test
WEPS see: Water Expansion Pumping System
WES see: Water Expansion System
WFAS see: Wildland Fire Assessment System
WFIP see: Wildland Fire Implementation Plan
WFMI see: Wildland Fire Management Information
WFSA see: Wildland Fire Situation Analysis
WIMS see: Weather Information Management System
WRCC see: Western Regional Climate Center
WUI see: Wildland Urban Interface

- 6 -

6 Minutes for Safety

1 A daily safety briefing for wildland fire that focuses on high risk events found within a firefighter's scope of work that are performed on an infrequent basis.

- A -

Abort

1 To jettison a load of water or retardant from an aircraft, or terminate a preplanned aircraft maneuver.

Abort Area

1 A designated area where unused quantities of water or fire retardant may be jettisoned, usually to permit an air tanker to land with less than a full load.

Above Ground Level (AGL)

1 Term frequently used in aviation operations, usually in connection with a stated altitude.

Absolute Humidity

1 Total amount of water vapor in the air.

Absorption

1 Act of soaking up and retaining a gas in liquid or in a solid; also retention of radiant energy.

Accelerant

1 Material (usually a flammable liquid) used to initiate or increase the spread of a fire.

Acceptable Fire Risk

1 The potential fire loss a community is willing to accept rather than provide resources to reduce such losses.

Accessibility Burn

1 The burning of understory prior to the sale of forest products to improve the efficiency of timber marking and harvesting.

Action Plan

1 Any tactical plan developed by any element of ICS in support of the incident action plan.

see also: Incident Action Plan

Active Crown Fire

1 A fire in which a solid flame develops in the crowns of trees, but the surface and crown phases advance as a linked unit dependent on each other.

Active Resources

1 Resources checked in and assigned work tasks on an incident.

synonym: Assigned Resources
see also: Allocated Resources
Available Resources

Activity Fuels

1 Fuels resulting from, or altered by, forestry practices such as timber harvest or thinning, as opposed to naturally created fuels.

see also: Logging Debris
Natural Fuels

Actual Time En Route (ATE)

1 Term used in flight planning/following to document actual time spent flying between points.

Actual Time of Arrival (ATA)

1 Term used in flight planning/following to document time of arrival at a point.

Actual Time of Departure (ATD)

1 Term used in flight planning/following to document time of departure from a point.

Adapter

1 A device for connecting hoses of the same size with non-matching hose threads, or connecting a threaded coupling to a quick-connect coupling.

see also: Coupling

Adiabatic Process

1 Thermodynamic change of state in which no heat is added or subtracted from a system; compression always results in warming, expansion in cooling.

Adjective Rating

1 A public information description of the relative severity of the current fire danger situation.

Administrative Payment Team (APT)

1 A team that supports incident agencies by processing payments for resources. Resources may include emergency equipment, casuals, local vendors for supplies, etc.

Administratively Determined (AD)

1 A person hired and compensated under the Pay Plan for Emergency Workers.

synonym: Casual
see also: Emergency Firefighter

Admission

1 Oral or written statement tending to link its maker to involvement in a particular crime.

Advanced Life Support (ALS)

1 Advanced life support skills performed by an EMS practitioner or service, e.g. intravenous fluids and drug administration.

Advancing a Line

1 Moving a hose lay toward a specified area from the point where the hose-carrying apparatus has stopped.

Advancing Fire

1 That portion of the fire with rapid fire spread with higher intensity which is normally burning with the wind and/or up slope. Also called: forward fire, or a run.

synonym: Head Fire

Advancing Front Combustion Stage

1 The period of combustion when a fire is spreading, usually accompanied by flaming combustion that releases heat to sustain the convection column.

Advection

1 The transfer of atmospheric properties by the horizontal movement of air, usually in reference to the transfer of warmer or cooler air, but may also refer to moisture.

Adze Hoe

1 A fire-trenching or digging tool having a sharp, tempered blade, which is useful for heavy grubbing, trenching, and light cutting.

Aerial Detection

1 A system for, or the act of discovering, locating, and reporting fires from aircraft.

Aerial Fuels

1 Standing and supported live and dead combustibles not in direct contact with the ground and consisting mainly of foliage, twigs, branches, stems, cones, bark, and vines.

see also: Draped Fuels

Aerial Ignition

1 Ignition of fuels by dropping incendiary devices or materials from aircraft.

Aerial Ignition Device (AID)

1 Inclusive term applied to equipment designed to ignite wildland fuels from an aircraft.

see also: Delayed Aerial Ignition Devices
Helitorch
Ping-Pong Ball System
Plastic Sphere Dispenser

Aerial Observer

1 A person specifically assigned to discover, locate, and report wildland fires from an aircraft and to observe and describe conditions at the fire scene.

Aerial Photo Interpreter

1 A person skilled in identification and measurements of natural and cultural features on aerial photographs.

Aerial Reconnaissance

1 Use of aircraft for detecting and observing fire behavior, values-at-risk, suppression activity, and other critical factors to facilitate command decisions on strategy and tactics needed for fire suppression.

Aerial Torch

1 An ignition device suspended under a helicopter, capable of dispensing ignited fuel to the ground for assistance in burning out or backfiring.

Affidavit

1 A statement of declaration in writing and affirmed before an official with authority to administer an oath; a statement of declaration alleging fact to support the issuance of a search or arrest warrant.

After Action Review (AAR)

1 A structured review or de-brief process of an event, focused on performance standards, that enables participants to discover for themselves what happened, why it happened, and how to sustain strengths and improve on weaknesses. After action reviews, informal or formal, follow the same general format, involve the exchange of ideas and observations, and focus on improving performance.

Agency

1 An administrative division of a government with a specific function, or a non-governmental organization (e.g., private contractor, business, etc.) that offers a particular kind of assistance. A federal, tribal, state or local agency that has direct fire management or land management responsibilities or that has programs and activies that support fire management activities.

see also: Assisting Agency
Cooperating Agency
Supporting Agency

Agency Administrator

1 The official responsible for the management of a geographic unit or functional area. The managing officer of an agency, division thereof, or jurisdiction having statutory responsibility for incident mitigation and management. Examples: NPS Park Superintendent, BIA Agency Superintendent, USFS Forest Supervisor, BLM District Manager, FWS Refuge Manager, State Forest Officer, Tribal Chairperson, Fire Chief, Police Chief.

see also: Line Officer

Agency Certification

1 The process whereby the employing agency or contractor documents that the individual is fully qualified to perform duties and responsibilities for a specified position.

Agency Dispatch

1 The agency or jurisdictional facility from which resources are allocated to incidents.

Agency Dispatcher

1 A person working within an agency organization who processes resources to and from incidents.

see also: Dispatcher

Agency Representative (AREP)

1 This ICS position serves as the point of contact for an assisting or cooperating agency which has been delegated authority to make decisions on matters affecting that agency's participation at the incident and reports to the Liaison Officer.

see also: Assisting Agency
Cooperating Agency

Agency/Area Coordination Center

1 A facility which serves as a central point for one or more agencies to use in processing information and resource requests. It may also serve as a dispatch center for one of the agencies.

Air Ambulance

1 A rotary wing aircraft configured, staffed and equipped to respond, care for and transport a patient(s) and approved/licensed by a state to do so. An air ambulance is sometimes referred to as a medevac.

Air Attack

1 The deployment of fixed-wing or rotary aircraft on a wildland fire, to drop retardant or extinguishing agents, shuttle and deploy crews and supplies, or perform aerial reconnaissance of the overall fire situation.

Air Attack Base

1 Permanent facility at which aircraft are stationed for use in air attack operations.

see also: Reload Base

Air Cargo

1 All items for transport and delivery by aircraft.

Air Contaminant

1 An airborne dust, fume, gas, mist, odor, smoke, vapor, soot, pollen, carbon, acid or particulate matter or any combination thereof.

see also: Air Pollution

Air Guard

1 A common VHF-FM frequency used by natural resource agency aircraft for emergency radio transmissions. Also called national air safety guard frequency.

Air Mass

1 An extensive body of air having the same properties of temperature and moisture in a horizontal plane.

Air Operations Branch Director (AOBD)

1 This ICS position is responsible for management of an incident's air operations and reports to the Operations Section Chief.

Air Pack

1 Portable air (not oxygen) tanks with regulators which allow firefighters to breathe while in toxic smoke conditions. Usually rated for 30 minutes of service. Used primarily on fires involving structures or hazardous materials.

synonym: Self-Contained Breathing Apparatus
see also: Respirator

Air Pollution

1 The general term referring to the undesirable addition of substances (gases, liquids, or solid particles) to the atmosphere that are foreign to the natural atmosphere or are present in quantities exceeding natural concentrations.

see also: Air Contaminant

Air Pollution Alert

1 A statement issued by an Air Quality Regulatory Agency due to high measured concentrations of pollutants. The alert remains in effect until monitoring shows a decrease in pollutant levels. Should conditions worsen, air pollution warnings and emergencies may be issued. At each stage (alert, warning and emergency) additional emission restrictions are put into effect so as to not intensify the situation. Essentially, at the emergency level all industrial activities and auto usage stop.

Air Quality

1 The composition of air with respect to quantities of pollution therein; used most frequently in connection with "standards" of maximum acceptable pollutant concentrations. Used instead of "air pollution" when referring to programs.

Air Quality Model

1 Mathematical or quantitative representation or simulation of air quality processes; e.g., emission models, receptor models, or air quality dispersion models.

Air Stagnation Advisory (ASA)

1 A statement issued by a National Weather Service forecast office when atmospheric conditions are stable enough such that the potential exists for air pollutants to accumulate in a given area. The statement is initially issued when conditions are expected to last for at least 36 hours.

Air Support Group Supervisor (ASGS)

1 This ICS position is responsible for overseeing logistical support and management of helibase and helispot operations and temporary fixed-wing base(s) and reports to the Air Operations Branch Director. This position also maintains liaison with air tanker and fixed-wing bases supporting incident operations.

Air Tactical Group Supervisor (ATGS)

1 This ICS position is responsible for directing and coordinating airborne aircraft operations and management of an incident's airspace and reports to the Air Operations Branch Director.

Air Tanker

1 Fixed-wing aircraft certified by FAA as being capable of transport and delivery of fire retardant solutions.

Air Tanker/Fixed-Wing Coordinator (ATCO)

1 This ICS position is responsible for coordinating air tanker and fixed-wing operations over an incident and reports to the Air Tactical Group Supervisor.

Aircraft Accident

1 An unplanned event that does substantial damage or causes serious injuries when associated with the operation of applicable aircraft. Event occurs between the time engine(s) is (are) started or rotors turning for the purpose of commencing flight, until the aircraft comes to rest with engines and propellers or rotors stopped, the brakes set or wheel chocks in place, and all persons have disembarked.

Aircraft Base Radio Operator (ABRO)

1 This ICS position is responsible for maintaining base communications with assigned helicopters, helibases, helispots, air operations personnel, and project aviation manager, and reports to the Helibase Manager.

Aircraft Data Card

1 Card or documentation required to be on board the aircraft which approves use and indicates specific types of use.

Aircraft Footprint

1 That area on the surface of the earth, runway, or ramp that is covered by the tread of the aircraft tire while the aircraft is motionless. Also called wheel loading.

Aircraft Ground Mishap

1 An aircraft mishap in which there is no intent to fly. However, the power plants and/or rotors are in operation and damage is incurred requiring replacement or repair of rotors, propellers, wheels, tires, wing tips, flaps, etc., or injury is incurred requiring first-aid or medical attention.

Aircraft Incident

1 An unplanned event that results in damage which is less than serious aircraft incident criteria, or injuries not requiring medical attention.

see also: Serious Aircraft Incident

Aircraft Network (AirNet)

1 Applies to radio frequencies primarily used for air operations.

Aircraft Timekeeper (ATIM)

1 This ICS position is responsible for keeping time and other information concerning helicopters assigned to a helibase and reports to the Helibase Manager.

Alidade

1 A sighting device used by lookouts to determine the horizontal bearing and sometimes the vertical angle of a fire from a lookout.

synonym: Osborne Firefinder

see also: Firefinder Map

All Hazard Incident

1 An incident, natural or human-caused, that requires an organized response by a public, private, and/or governmental entity to protect life, public health and safety, values to be protected, and to minimize any disruption of governmental, social, and economic services. One or more kinds of incident (fire, flood, mass casualty, search, rescue, evacuation, etc.) may occur simultaneously as part of an all hazard incident response.

see also: Incident
Values To Be Protected

All Hazards Meteorological Response System (AMRS)

1 A mobile weather data collection and forecasting system consisting of two-way satellite communications and a laptop computer. Used by incident meteorologists on an incident.

see also: Incident Meteorologist
Micro-Remote Environmental Monitoring System

All Terrain Vehicle (ATV)

1 Any motorized vehicle designed for or capable of cross-country travel on or immediately over land, water, sand, snow, ice, marsh, swampland, or other terrain.

synonym: Off-road Vehicle

Alligatoring

1 Char patterns formed on paint or burned wood remains, usually in the shape of blisters.

see also: Depth of Char Indicators

Allocated Resources

1 Resources dispatched to an incident, that have not yet checked in.

see also: Active Resources
Assigned Resources
Available Resources

Allowable Payload

1 The amount of weight that is available for passengers and/or cargo. On the load calculation form it is the operating weight subtracted from the selected weight.

see also: Operating Weight

Altimeter Setting

1 The barometric pressure reading used to adjust a pressure altimeter for variations in existing atmospheric pressure or to the standard altimeter setting (29.92) inches.

Ambient Air

1 Air of the surrounding environment.

Ambulance

1 A ground transport vehicle configured, equipped and staffed to respond, care for and transport a patient(s) and approved by a state to do.

see also: Air Ambulance

Anchor Point

1 An advantageous location, usually a barrier to fire spread, from which to start constructing a fireline. The anchor point is used to minimize the chance of being flanked by the fire while the line is being constructed.

Anemometer

1 An instrument designed to measure wind speed.

Angle of Char Indicators

1 Standing fuels that are burned at an angle that indicates the direction of fire spread. Also called vertical char.

Annual Certification

1 Annual review by an employing agency of an individual's position qualifications and documentation certifying that the individual is fully qualified to perform duties and responsibilities for a specified position. Annual certification is based on established performance standards and agency specific requirements.

Annual Operating Plan (for Fire Weather) (AOP)

1 A procedural guide which describes fire meteorological services provided within the Geographic Area of responsibility, including the National Interagency Fire Center. The guide is based on the National Interagency Agreement and applicable Geographic Area Memorandum of Agreement.

Annual Plant

1 A plant that lives for one growing season, starting from a seed each year.

Anticyclone

1 An area of high atmospheric pressure with closed clockwise circulation.

see also: Surface High

Apparatus

1 A motor-driven vehicle, or group of vehicles, designed and constructed for the purpose of fighting fires. May be of different types such as engines, water tenders, ladder trucks, etc.

Appropriate Management Response (AMR)

1 Any specific action suitable to meet fire management objectives. Typically, the AMR ranges across a spectrum of tactical options (from monitoring to intensive management actions). The response action is based on an evaluation of risks to firefighter and public safety, the circumstances under which the fire occurs, including weather and fuel conditions, natural and cultural resource management objectives, protection priorities, and values to be protected. The evaluation must also include an analysis of the context of the specific fire within the overall local, geographic area, or national wildland fire situation.

see also: Fire Management Objective
Fire Management Plan

Approved

1 In fire service terminology, that which is inspected and listed by recognized fire-testing agencies. The term as used in National Fire Protection Association standards means approval by the authority having jurisdiction, such as the fire chief, insurance inspection department, or other agency that enforces standards or regulations.

Aramid

1 The generic name for a high-strength, flame-resistant, synthetic fabric used in the shirts and jeans of firefighters. Nomex ®, a brand name for aramid fabric, is the term commonly used by firefighters.

see also: Nomex ®

Area Command

1 An organization established to: 1) oversee the management of multiple incidents that are each being handled by an incident management team (IMT) organization; or 2) to oversee the management of a very large incident that has multiple IMTs assigned to it. Area Command has the responsibility to set overall strategy and priorities, allocate critical resources based on priorities, ensure that incidents are properly managed, and that objectives are met and strategies followed.

Area Command Aviation Coordinator (ACAC)

1 The ICS position responsible for ensuring effective use of air resources and supplies among those incidents under Area Command management. Reports to the Area Commander.

see also: Area Command

Area Commander (ACDR)

1 The ICS position responsible for the overall direction of incident management teams assigned to the same incident or incidents in close proximity managed under Area Command. Position responsibilities include ensuring that conflicts are resolved, compatible incident objectives are established, and strategies are selected for the use of critical resources among assigned incident management teams.

see also: Area Command

Area Ignition

1 Ignition of several individual fires throughout an area, either simultaneously or in rapid succession, and so spaced that they add to and influence the main body of the fire to produce a hot, fast-spreading fire condition. Also called simultaneous ignition.

Area of Influence

1 Delineated area surrounding a base which can be reached first by the ground or air attack units assigned to the base. Also called zone of influence.

Area Source

1 A source category of air pollution that generally extends over a large area. Prescribed burning, field burning, home heating, and open burning are examples of area sources.

Armed

1 A term used to indicate that the air tanker dropping mechanism is set to allow a programmed release of part or all of the load of fire retardant.

Arrest

1 The taking or keeping of a person in custody by legal authority, especially in response to a criminal charge.

Arson

1 At common law, the malicious and willful burning of another’s dwelling, outhouse or parcel; by most modern statutes, the intentional and wrongful burning of someone else's, or one's own, property. Frequently requires proof of malicious or wrongful intent.

Arson Fire

1 A fire that is intentional and wrongfully set to burn one's own or someone else's property.

Arson Task Force

1 Group of individuals convened to analyze, investigate and solve arson problems in a particular region.

Arsonist

1 One who commits arson.

Ash Indicators

1 White ash deposited on the origin side of objects.

Aspect

1 Cardinal direction toward which a slope faces.

see also: Exposure

Aspirate (Foam)

1 To draw in gases (or other substances); nozzle aspirating systems draw air into the nozzle to mix with the foam solution.

Assessment

1 A fire weather fire danger product based on a thorough evaluation of all pertinent sources of meteorological, fire danger and resource information.

2 The evaluation and interpretation of measurements, intelligence, and other information to provide a basis for decision-making.

Assigned Resources

1 Resources checked in and assigned work tasks on an incident.

synonym: Active Resources
see also: Allocated Resources
Available Resources

Assignments

1 Tasks given to resources to perform within a given operational period, based upon tactical objectives in the incident action plan.

Assistant

1 Term used as a title for subordinates of the command staff positions. In some cases, assistants are also assigned to unit leader positions in the planning, logistics, and finance/administration sections. Qualifications, technical capability, and responsibility of assistants are normally less than those of the person holding the primary position.

Assistant Area Commander, Logistics (ACLC)

1 The ICS position responsible for providing facilities, services and materials at the Area Command level, and for ensuring effective use of critical resources and supplies among those incidents under Area Command management. Reports to the Area Commander.

see also: Area Command

Assistant Area Commander, Plans (ACPC)

1 The ICS position responsible for collecting information from those incidents under Area Command management in order to assess, evaluate potential conflicts in establishing incident objectives, strategies, and prioritizing use of critical resources. Reports to the Area Commander.

see also: Area Command

Assistant Disbursing Officer (ADO)

1 Person with authority to pay wildland fire suppression crews, transient labor, local residents, and vendors with US Treasury checks.

Assisting Agency

1 An agency directly contributing tactical or service resources to another agency.

see also: Agency
Agency Representative
Cooperating Agency
Supporting Agency

Assumption

1 Acceptance of information as true without proof or demonstration.

see also: False Assumption

Atmometer

1 An instrument that provides an approximate measure of evapotranspiration by measuring the water loss from an artificial evaporating surface.

Atmospheric Inversion

1 Departure from the usual increase or decrease with altitude of the value of an atmospheric property (in fire management usage, nearly always refers to an increase in temperature with increasing height).

2 The layer through which this departure occurs (also called inversion layer). The lowest altitude at which the departure is found is called the base of the inversion.

see also: Atmospheric Stability
Inversion
Stable Layer of Air

Atmospheric Pressure

1 The force exerted by the weight of the atmosphere, per unit area.

see also: Barometric Pressure

Atmospheric Stability

1 The degree to which vertical motion in the atmosphere is enhanced or suppressed. Vertical motions and pollution dispersion are enhanced in an unstable atmosphere. Thunderstorms and active fire conditions are common in unstable atmospheric conditions. Stability suppresses vertical motion and limits pollution dispersion.

see also: Atmospheric Inversion
Inversion
Stable Layer of Air

Attack a Fire

1 Limit the spread of fire by any appropriate means.

Attack Line

1 A line of hose, preconnected to the pump of a fire apparatus and ready for immediate use in attacking a fire. Contrasted to supply lines connecting a water supply with a pump or to feeder lines extended from a pump to various points around the perimeter of a fire.

Attack Time

1 The starting date, hour, and minute of the first suppression work on a fire.

Attack Unit

1 Single vehicle or aircraft and its associated personnel and material provided for the purpose of responding to and abating a fire or other emergency.

Attack Unit Response

1 The response of one attack unit to a fire or other emergency with no regard for the number of return trips to that same fire or emergency.

Attainment Area

1 An area considered to have air quality as good as, or better than, the National Ambient Air Quality Standards (NAAQS) as defined in the Clean Air Act. An area may be in attainment for one or more pollutants but be in nonattainment for one or more other pollutants.

Automatic Direction Finder (ADF)

1 An aircraft radio navigational receiver operating in the low frequency bands.

Automatic Weather Station (AWS)

1 A non-GOES telemetered weather station that provides hourly observations to a local database.

see also: Manual Weather Station

Automatically Regulated

1 A proportioning method or device that readily adjusts to changes in water flow and or pressure to maintain a desired mix ratio.

Autorotation

1 A helicopter flight condition in which the lifting rotor is driven entirely by action of air when the helicopter is in motion.

Auxiliary Pump

1 A secondary pump on an engine in addition to the main pump. Usually of small capacity.

Available Fuel

1 That portion of the total fuel that would actually burn under various environmental conditions.

2 Fuel available for use in a motor vehicle, aircraft, or other motorized equipment.

Available Resources

1 Resources assigned to an incident and available for assignment.

see also: Active Resources
Allocated Resources
Assigned Resources

Average Annual Precipitation

1 The expected amount of annual rainfall. Average annual precipitation is an important component to determining the Keech-Bryam Drought Index (KBDI).

Average Relative Humidity

1 Part of the National Fire Danger Rating System (NFDRS). The mathematical average of the maximum and minimum relative humidities measured at a fire weather station from one basic observation time to the next.

Average Temperature

1 The mathematical average of the maximum and minimum dry-bulb temperatures measured at a fire weather station from one basic observation time to the next.

Avoidance

1 A smoke emission control strategy that considers meteorological conditions when scheduling prescribed fires in order to avoid incursions into smoke sensitive areas.

Awareness

1 The continual process of collecting, analyzing, and disseminating intelligence, information, and knowledge to allow organizations and individuals to anticipate requirements and to react effectively and safely.

Azimuth

1 Horizontal angle or bearing of a point measured clockwise from true (astronomic) north.

Azimuth Circle

1 A circle graduated in 360 degrees in a clockwise direction from true (astronomic) north.

- *B* -

Back Azimuth

1 Angle or bearing 180 degrees opposite of azimuth.

Backburn

1 Used in some localities to specify fire set to spread against the wind in prescribed burning.

Backdraft

1 Instantaneous explosion or rapid burning of superheated gases that occurs when oxygen is introduced into an oxygen-depleted confined space. It may occur because of inadequate or improper ventilation procedures.

Backfire

1 A fire set along the inner edge of a fireline to consume the fuel in the path of a wildfire or change the direction of force of the fire's convection column.

see also: Burn Out

Backfire Torch

1 A flame generating device (e.g., a fount containing diesel oil or kerosene and a wick, or a backpack pump serving a flame-jet).

synonym: Burning Torch
see also: Drip Torch
Flame Thrower

Backfiring

1 A tactic associated with indirect attack, intentionally setting fire to fuels inside the control line to slow, knock down, or contain a rapidly spreading fire. Backfiring provides a wide defense perimeter and may be further employed to change the force of the convection column. Backfiring makes possible a strategy of locating control lines at places where the fire can be fought on the firefighter's terms. Except for rare circumstance meeting specified criteria, backfiring is executed on a command decision made through line channels of authority.

Background Level

1 In air pollution control, the concentration of air pollutants in a definite area during a fixed period of time prior to the starting up, or the stoppage, of a source of emission under control. In toxic substances monitoring, the average presence in the environment, originally referring to naturally-occurring phenomena.

Backing Fire

1 Fire spreading, or ignited to spread, into (against) the wind or downslope. A fire spreading on level ground in the absence of wind is a backing fire.

2 That portion of the fire with slower rates of fire spread and lower intensity normally moving into the wind and/or down slope. Also called: heel fire.

Backing Wind

1 Wind that changes direction in a counter clockwise motion.

Backpack Pump

1 A portable sprayer with hand-pump, fed from a liquid filled container fitted with straps, used mainly in fire and pest control.

see also: Bladder Bag

Baffle

1 A partitioned wall placed in vehicular or aircraft water tanks to reduce shifting of the water load when starting, stopping or turning.

Ball Valve

1 A valve in which fluid flow is controlled by a ball with a hole drilled through it. In one position, fluid flows through the hole. When the valve is turned 90 degrees (1/4 turn) the hole is perpendicular to the flow and the ball stops the flow. Intermediate valve positions can be used to adjust the flow.

Bambi Bucket ®

1 A collapsible bucket slung below a helicopter. Used to dip water from a variety of sources for fire suppression.

Banking Snags

1 The act of throwing mineral soil about the base of an unlighted snag to prevent its being ignited by a surface fire.

Barometer

1 An instrument for measuring the pressure of the atmosphere. The two principal types are the mercurial and the aneroid.

Barometric Pressure

1 Atmospheric pressure corrected for elevation.

see also: Atmospheric Pressure

Barrier

1 Any obstruction to the spread of fire. Typically an area or strip devoid of combustible fuel.

Base

1 The location at which primary logistics functions for an incident are coordinated and administered. There is only one base per incident. (Incident name or other designator will be added to the term "base.") The incident command post may be collocated with the base.

2 The location of initial attack forces.

see also: Camp

Base Area

1 Part of the National Fire Danger Rating System (NFDRS). An area representative of the major fire problems on a protection unit. Base fuel model and slope class are chosen from the base area.

Base Fuel Model

1 Part of the National Fire Danger Rating System (NFDRS). A representation of the vegetative cover and fuel in a base area. Used in the calculation of fire danger rating.

Base Manager (BCMG)

1 This ICS position is responsible for ensuring that appropriate sanitation, security, and facilities management services are provided at the Incident Base and reports to the Facilities Unit Leader.

see also: Camp Manager
Facilities Unit

Base Observation Time

1 Part of the National Fire Danger Rating System (NFDRS). The time established to take the fire danger observations. It should be at the time of day when the fire danger is normally the highest. The usually agreed upon time is 1:00 pm standard time. This allows time to transmit observations and prepare forecasts.

Base Station

1 A fixed central radio dispatching station controlling movements of one or more mobile units.

Baseline

1 In prescribed burning, the initial line of fire, usually set as a backing fire along a barrier or control line, which serves to contain subsequent burning operations.

Basic Life Support (BLS)

1 Basic life support skills performed by an EMS practitioner or service, e.g. splinting, bandaging, oxygen administration, use of the AED.

Batch Mix

1 Manually adding and mixing a concentrated chemical, such as liquid foam, or powdered or liquid retardant with water, or gelling agents with fuel, into solution in a tank or container.

Bearing

1 The horizontal direction to or from any point, usually measured clockwise from true north, or some other reference point through 360 degrees.

Beaufort Wind Scale

1 A system of estimating and reporting wind speeds. In its present form for international meteorological use it equates (a) Beaufort force (or Beaufort number), (b) wind speed, (c) descriptive term, and (d) visible effects upon land objects or sea surf.

BEHAVE

1 A system of interactive computer programs for modeling fuel and fire behavior, comprised of two systems: BURN and FUEL.

Behavior

1 An observable activity or action demonstrated by an individual in a particular context.

see also: Competency

Belt Weather Kit

1 Belt-mounted case with pockets fitted for anemometer, compass, sling psychrometer, slide rule, water bottle, pencils, and book of weather report forms. Used to take weather observations to provide on-site conditions to the fire weather forecaster or fire behavior analyst. Observations include air temperature, wind speed and direction, and relative humidity.

Benefits

1 Something that represents, promotes or enhances a desired outcome, being of positive value and contributing to the attainment of organizational goals. Benefits represent one end of the spectrum of outcomes from fire, with the opposite end being harm, loss or damage.

see also: Fire Benefits

Berm

1 A ridge of soil and debris along the outside edge of a fireline, resulting from line construction.

see also: Throw Out

Best Available Control Measures (BACM)

1 An emission limitation action based on the maximum degree of emission reduction (considering energy, environmental, and economic impacts) achievable through application of production processes and available methods, systems, and techniques.

see also: Reasonably Available Control Measures

Blackline

1 Preburning of fuels adjacent to a control line before igniting a prescribed burn. Blacklining is usually done in heavy fuels adjacent to a control line during periods of low fire danger to reduce heat on holding crews and lessen chances for spotting across control line. In fire suppression, a blackline denotes a condition where there is no unburned material between the fireline and the fire edge.

Bladder Bag

1 A collapsible backpack portable sprayer made of neoprene or high-strength nylon fabric fitted with a pump.

see also: Backpack Pump

Blind Area

1 An area in which neither the ground nor its vegetation can be seen from a given observation point.

Block Plan

1 A detailed prescription for treating a specified burning block with fire.

Blow Down

1 An area of previously standing timber which has been blown over by strong winds or storms.

Blowup

1 Sudden increase in fireline intensity or rate of spread of a fire sufficient to preclude direct control or to upset existing suppression plans. Often accompanied by violent convection and may have other characteristics of a fire storm.

see also: Extreme Fire Behavior
Fire Storm
Flare-up

Board of Review

1 A board or committee selected to review results of fire suppression action on a given unit or the specific action taken on a given fire. The board reviews the results in order to identify reasons for both good and poor action and to recommend or prescribe ways and means of doing an effective and efficient job. Reviews the results of a safety/accident investigation.

Boiling Liquid Expanding Vapor Explosion (BLEVE)

1 The failure of a closed container as a result of overpressurization caused by an external heat source.

2 A major failure of a closed liquid container into two or more pieces when the temperature of the liquid is well above its boiling point at normal atmospheric pressure.

Bole

1 The trunk of a tree.

Bone Yard

1 A mop up term. To "bone yard" a fire means to systematically work the entire area, scraping embers off remaining fuel, feeling for heat with the hands, and piling unburned materials in areas cleared to mineral soil.

2 An area cleared to mineral soil for piling unburned fuels.

Booster Hose

1 The most common type of hose attached and stored on wildland engine booster reels. The hose is made of neoprene and does not appreciably collapse when stored empty.

Booster Pump

1 An intermediary pump for supplying additional lift in pumping water uphill past the capacity of the first pump.

Booster Reel

1 A reel for the booster hose mounted on a fire engine, often supplied by the auxiliary pump. This reel usually carries a 1-inch (25 mm) or 3/4 inch (19 mm) hose and frequently contains an electric rewind mechanism.

see also: Hose Reel

Boundary Conditions

1 The temperature and relative humidity of the boundary layer.

Boundary Layer

1 The air in immediate contact with a fuel particle.

2 That part of the lower atmosphere that is directly influenced by the presence of the earth's surface and responds to surface forcings with a time scale of about an hour or less.

Boundary Value

1 The equilibrium moisture content (EMC) commensurate with the boundary conditions and precipitation events of the preceding 24 hours.

Bowles Bag

1 A neoprene tank designed for attachment to the landing skid frame of a helicopter. It has a capacity of 80 to 100 gallons (303 to 378 liters) of water or retardant.

Box Canyon

1 A steep-sided, dead end canyon.

Branch

1 The organizational level having functional or geographical responsibility for major parts of incident operations. The branch level is organizationally between section and division/group in the operations section, and between section and unit in the logistics section. Branches are identified by roman numerals or by functional name (e.g. service, support).

Break a Line

1 To insert a gate valve or some other device into a hose line.

Break Coupling

1 To detach two pieces of hose by backing the swivel thread off the nipple thread.

Break Left or Right

1 Means "turn" left or right. Applies to aircraft in flight, usually on the drop run, and when given as a command to the pilot, implies expectation of prompt compliance.

Breakover

1 A fire edge that crosses a control line or natural barrier intended to confine the fire.

synonym: Slopover

British Thermal Unit (Btu)

1 Amount of heat required to raise 1 pound of water 1 degree Fahrenheit (from 59.50 to 60.50 F), measured at standard atmospheric pressure.

Broadcast Burning

1 Prescribed burning activity where fire is applied generally to most or all of an area within well defined boundaries for reduction of fuel hazard, as a resource management treatment, or both.

Brown and Burn

1 Application of herbicide to desiccate living vegetation prior to burning.

Brownspot Control

1 Prescribed fire to control fungal infection (brown spot disease) of longleaf pine (Pinus palustris) in the "grass" (small seedling) stage.

Brush

1 A collective term that refers to stands of vegetation dominated by shrubby, woody plants, or low growing trees, usually of a type undesirable for livestock or timber management.

Brush Blade

1 Blade attachment with long teeth specially suited to ripping and piling brush with minimum inclusion of soil. Also called brush rake or root rake.

Brush Fire

1 A fire burning in vegetation that is predominantly shrubs, brush, and scrub growth.

Brush Hook

1 A heavy cutting tool designed primarily to cut brush at the base of the stem. Used in much the same way as an axe and having a wide blade, generally curved to protect the blade from being dulled by rocks.

Brush Management

1 Manipulation of stands of brush by manual, mechanical, chemical, or biological means or by prescribed burning for the purpose of achieving land management objectives.

Brush Patrol Unit

1 Any light, mobile vehicular unit with limited pumping and water capacity for off-road operations.

Bubble

1 The building block of foam; bubble characteristics of water content and durability influence foam performance.

Bucket Drops

1 The dropping of fire retardants or suppressants from specially designed buckets slung below a helicopter.

Bucking

1 Sawing through the bole of a tree after it has been felled.

Build-up

1 The cumulative effects of long-term drying on current fire danger.
2 The increase in strength of a fire management organization.
3 The accelerated spreading of a fire with time.
4 Towering cumulus clouds which may lead to thunderstorms later in the day.

Buildup Index (BUI)

1 A relative measure of the cumulative effect of daily drying factors and precipitation on fuels with a ten-day timelag.

Bulk Density

1 Weight per unit volume. For fuels, this is usually expressed as pounds per cubic foot; for soils, grams per cubic centimeter.

see also: Compactness

Bumpup Method

1 Progressive method of fireline construction on a wildfire without changing relative positions in the line. Work is begun with a suitable space between workers; whenever one worker overtakes another, all of those ahead move one space forward and resume work on the uncompleted part of the line. The last worker does not move ahead until work is completed in his/her space. Forward progress of the crew is coordinated by a crew boss.

synonym: Moveup Method

Burn

1 An area burned over by wildland fire.
2 A reference to a working fire.
3 An injury to flesh caused by a cauterizing agent, heat from a fire, or a heated object
a) First Degree Burn: A burn which causes only pain, redness, and swelling.
b) Second Degree Burn: A burn in which the skin is blistered.
c) Third Degree Burn: A flesh burn in which charring occurs.
4 To be on fire.
5 To consume fuel during rapid combustion.
6 A fire in progress or under investigation.

Burn Block

1 A discrete area within a larger prescribed or fire use project.

Burn Boss

1 Person responsible for supervising a prescribed fire from ignition through mopup.

Burn Out

1 Setting fire inside a control line to consume fuel between the edge of the fire and the control line.

see also: Backfire

Burn Out Time

1 The duration of flaming and smoldering combustion phases at a specified point within a burn or for the whole burn, expressed in convenient units of time.

Burn Patterns

1 The characteristic configuration of char left by a fire. In wildland fires burn patterns are influenced by topography, wind direction, length of exposure, and type of fuel. Definitions are scale-dependent: (1) They can be used to trace a fire's origin; (2) They are influenced by severity and intensity within a stand; (3) They describe the landscape mosaic.
2 Apparent and obvious design of burned material and the burning path from the area of origin.

Burn Severity

1 A qualitative assessment of the heat pulse directed toward the ground during a fire. Burn severity relates to soil heating, large fuel and duff consumption, consumption of the litter and organic layer beneath trees and isolated shrubs, and mortality of buried plant parts.

Burned Area Rehabilitation

1 The post-fire activities prescribed and implemented to rehabilitate and restore fire damaged lands.

see also: Rehabilitation

Burning

1 Decomposition of material by the application of heat and oxidation. Also applied to propellants and other pyrotechnic mixtures, though the proper term there is "reacting". Also often an element of the crime of arson.

Burning Ban

1 A declared ban on open air burning within a specified area, usually due to sustained high fire danger.

Burning Conditions

1 The state of the combined factors of the environment that affect fire behavior in a specified fuel type.

Burning Index

1 An estimate of the potential difficulty of fire containment as it relates to the flamelength at the head of the fire.

2 A relative number related to the contribution that fire behavior makes to the amount or effort needed to contain a fire in a specified fuel type. Doubling the burning index indicates that twice the effort will be required to contain a fire in that fuel type as was previously required, providing all other parameters are held constant.

Burning Index Meter

1 A device used to determine the burning index for different combinations of burning index factors.

Burning Out

1 Setting fire inside a control line to consume fuel located between the edge of the fire and the control line.

Burning Period

1 That part of each 24-hour period when fires spread most rapidly; typically from 10:00 AM to sundown.

Burning Priority Rating

1 System of rating slash to indicate the treatment objective, whether or not burning is required to meet that objective, the fuel treatment necessary to achieve successful burning, and the time of year burning should occur.

Burning Rate

1 Rate at which a propellant and other combustibles burn.

Burning Rotation

1 The planned number of years between prescribed fires on a specified area.

Burning Torch

1 A flame generating device (e.g., a fount containing diesel oil or kerosene and a wick, or a backpack pump serving a flame-jet).

synonym: Backfire Torch
see also: Drip Torch
Flame Thrower

Burnover

1 An event in which a fire moves through a location or overtakes personnel or equipment where there is no opportunity to utilize escape routes and safety zones, often resulting in personal injury or equipment damage.

Buying Team

1 A team that supports incident procurement through the local administrative staff and is authorized to procure a wide range of services, supplies, and land and equipmental rentals. In addition, the Buying Team Leader has the responsibility of coordinating property accountability with the supply unit leader.

Buys Ballot's Law

1 If a person stands with his back to the general wind, the high atmospheric pressure is found to his right in the Northern Hemisphere. The high pressure on the right moves clockwise and outward from the cell. The low pressure on the left moves counterclockwise and towards the center of the cell. This Law does not work in the presence of locally produced convective winds.

- C -

Cache

1 A pre-determined complement of tools, equipment and/or supplies stored in a designated location, available for incident use.

Calculation of Probabilities

1 Evaluation of all factors pertinent to probable future behavior of a going fire and of the potential ability of available forces to perform fire suppression operations on a specified time schedule.

Calibrated Airspeed

1 Indicated airspeed of an aircraft, corrected for position and instrument error. Equal to true airspeed in standard atmosphere at sea level.

Camp

1 A geographical site(s), within the general incident area, separate from the incident base, equipped and staffed to provide sleeping, food, water, and sanitary services to incident personnel.

see also: Base

Camp Manager (BCMG)

1 This ICS position is responsible for ensuring that services, supplies, and non-technical coordination are provided within a camp and reports to the Facilities Unit Leader. There may be one or more camps per incident, each with a Camp Manager.

see also: Base Manager
Facilities Unit

Candling

1 The burning of the foliage of a single tree or a small group of trees, from the bottom up.

synonym: Torching

Canopy

1 The stratum containing the crowns of the tallest vegetation present (living or dead), usually above 20 feet.

Carbon Dioxide (CO2)

1 A colorless, odorless, nonpoisonous gas, which results from fuel combustion and is normally a part of the ambient air.

Carbon Monoxide (CO)

1 A colorless, odorless, poisonous gas produced by incomplete fuel combustion.

Carcinogen

1 Any substance that can cause or contribute to the production of cancer.

Cardinal Altitudes

1 Odd or "even" thousand-foot (305 m) altitudes or flight levels. E.g., 5,000, 6,000, 7,000; FL 250, FL 260, and FL 270.

Cardinal Directions

1 North, south, east, west; used for giving directions and information from the ground or air in describing the fire (e.g., the west flank or east flank, not right flank or left flank).

Cargo Chute

1 A parachute designed and rigged for dropping equipment and supplies from an aircraft.

Cargo Compartment

1 An internal area of an aircraft specifically designed to carry baggage or cargo.

Cargo Drop

1 Dropping of equipment or supplies, with or without a parachute, from an aircraft in flight.

Cargo Hook

1 Mechanically and electrically operated hook attached to the bottom of a helicopter to which a sling load is attached.

Cargo Net

1 Net attached to the cargo hook of a helicopter, used to carry cargo. Also called cargo sling.

Cargo Rack

1 Externally mounted rack for transporting supplies or cargo aboard a helicopter.

Carousel Hook

1 A remote hook attached to the end of a longline. It has four or more individual hooks which can be independently released, allowing the pilot to fly cargo loads to different locations without landing.

Carried Wet

1 Booster hose carried full of water during mild weather to speed discharge of water on fire without filling or priming from tank.

Carrier Fuels

1 The fuels that support the flaming front of the moving fire.

Casual

1 A person hired and compensated under the Pay Plan for Emergency Workers.

synonym: Administratively Determined
see also: Emergency Firefighter

Category Day

1 A numerical index related to the ability of the atmosphere to disperse smoke. Different agencies use different scales [e.g., in South Carolina, the current scale is based on ventilation factor and ranges from 1 (poor) to 5 (excellent)].

Catface

1 Defect on the surface of a tree resulting from a wound where healing has not re-established the normal cross-section.

Ceiling

1 Height above the earth's surface of the lowest layer of clouds or obscuring phenomena aloft that is not classified as a thin layer or partial obscuration, that together with all lower clouds or obscuring phenomena covers more than half the sky as detected from the point of observation.

2 Maximum height of a temporary flight restriction (TFR).

Celsius

1 A temperature scale with 0° as the freezing point of water and 100° as the boiling point of water at sea level.

Center Firing

1 Method of broadcast burning in which fire is ignited in the center of the area to create a strong draft; additional fires are then ignited progressively nearer the outer control lines (sometimes in one step) as indraft increases so as to draw the flames and smoke toward the center.

Centrifugal Pump

1 Pump which expels water by centrifugal force through the ports of a circular impeller rotating at high speed. With this type of pump, the discharge line may be shut off while the pump is running without damaging the pump or hose.

Certifying Official

1 The agency official at the home unit who is responsible for authorizing and granting position certification per agency policy. The agency official is responsible for completing the agency certification block located on the inside front cover of a Position Task Book.

see also: Agency Certification
Home Unit
Position Task Book

Chain

1 Unit of measure in land survey, equal to 66 feet (20 M) (80 chains equal 1 mile). Commonly used to report fire perimeters and other fireline distances, this unit is popular in fire management because of its convenience in calculating acreage (e.g., 10 square chains equal one acre).

Chain Lightning

1 Lightning in a long zigzag or apparently broken line.

Chain of Command

1 A series of management positions in order of authority.

Char

1 Carbonaceous material formed by incomplete combustion of an organic material, most commonly wood; remains of burned materials.

2 In fire simulation, a darkened area within the fire perimeter; usually indicates fire has already passed through; usually created by an opaque material blocking out a selected portion of basic scene illumination.

Char Height

1 The vertical distance above ground scorched or blackened on a tree bole.

Charged Line

1 Hose filled with water under pressure and ready to use.

synonym: Live Line
see also: Live Reel

Chase Truck

1 Vehicle that carries crew gear, supplies, and operational equipment for initial/extended attack.

Check Line

1 A temporary fireline constructed at right angles to the control line and used to hold a backfire in check as a means of regulating the heat or intensity of the backfire.

Check Valve

1 A valve that permits flow of liquid through a hose or pipe in one direction but prevents a return flow. Uses include the prevention of backflow on uphill hose lays, loss of prime with centrifugal pumps and chemical contamination in fire chemical mixing systems.

Check-in

1 The process whereby resources first report to an incident. Check-in locations include incident command post (ICP), base or camps, staging areas, helibases, or direct to a tactical assignment.

see also: Reporting Locations

Chevron Burn

1 Burning technique in which lines of fire are started simultaneously from the apex of a ridge point, and progress downhill, maintaining position along the contour; used in hilly areas to ignite ridge points or ridge ends.

Chief

1 The ICS title for individuals responsible for command of functional sections: Operations, Planning, Logistics, and Finance/Administration.

Chief of Party

1 The chief of party is responsible to the sending unit dispatcher until destination is reached. Chief of party is responsible for all traveling personnel assigned on the manifest list.

Circumstantial Evidence

1 Testimony or information not based on actual personal knowledge or observation, but dependent on inference of other facts or experience. For example, testimony that defendant's cigarette lighter was found in ashes of a fire.

Cirrus

1 A form of high cloud, composed of ice crystals, which seldom obscures the sun.

Claims Specialist (CLMS)

1 Person responsible for handling all claims, other than injury, against the incident.

Class A Foam

1 Foam intended for use on Class A or woody fuels; made from hydrocarbon-based surfactant, therefore lacking the strong filming properties of Class B foam, but possessing excellent wetting properties.

Class B Foam

1 Foam designed for use on Class B or flammable liquid fires; made from fluorocarbon-based surfactants, therefore capable of strong filming action, but incapable of efficient wetting of Class A fuels.

Class I Areas (Air Quality)

1 Geographic areas designed by the Clean Air Act subject to the most stringent restrictions on allowable increment of air quality deterioration. Class I areas include Forest Service wildernesses and nation memorial parks over 5,000 acres, National Parks exceeding 6,000 acres, international parks, as well as other designated lands.

Class II Areas (Air Quality)

1 All areas of the country not designated Class I, including everything from non-Class I areas to urban areas. A greater amount of air pollution can be added to these areas than Class I.

Class of Fire

1 As to kind of fire for purpose of using a proper extinguisher:
Class A - Fires involving ordinary combustible materials (such as wood, cloth, paper, rubber, and many plastics) requiring the heat absorbing (cooling) effects of water, water solutions, or the coating effects of certain dry chemicals, which retard combustion.
Class B - Fires involving flammable or combustible liquids, flammable gases, greases, and similar materials where extinguishment is most readily secured by excluding air (oxygen), inhibiting the release of combustible vapors, or interrupting the combustion chain reaction.
Class C - Fires involving live electrical equipment where safety to the operator requires the use of electrically nonconductive extinguishing agents.
Class D - Fires involving certain combustible metals (such as magnesium, titanium, zirconium, sodium, potassium, etc.) requiring a heat absorbing extinguishing medium not reactive with burning metals.

see also: Size Class of Fire

Clean Air Act

1 A federal law enacted to ensure that air quality standards are attained and maintained. Initially passed by Congress in 1963, it has been amended several times.

Clear Text

1 The use of plain English in radio communications transmissions. No Ten Codes or agency specific codes are used when using Clear Text.

Climate

1 The prevalent or characteristic meteorological conditions of any place or region, and their extremes.

Climate Class

1 In NFDRS, one of four classifications of general climate of an area.

Climatological Breakpoint

1 Points on the cumulative distribution of one fire weather/fire danger index without regard to associated fire occurrence/business.

Clock Method

1 Means of establishing a flight path to a target on a fire by referring to clock directions from the aircraft's present location, with the nose of the aircraft pointing at 12:00.

Closed Area

1 An area in which specified activities or entry are temporarily restricted to reduce risk of human-caused fires or to mitigate the risk to human health or safety by potential or on-going wildland fires.

Closure

1 An administrative action limiting or prohibiting access to a specific geographic or jurisdictional area for the purposes of reducing wildfire or the risk it poses to life, property, and/or resources. Example of use: "Pursuant to 36 C.F.R. 261.50 (a) and (b), it is hereby ordered that the prohibitions hereinafter set forth apply to the general forest area of the Ozark-St. Francis National Forests until further notice."

see also: Restrictions

Cloud

1 A visible cluster of minute water/ice particles in the atmosphere.

Cloudy

1 Adjective class representing the degree to which the sky is obscured by clouds. In weather forecast terminology, expected cloud cover of about 0.7 or more warrants use of this term. In the National Fire Danger Rating System, 0.6 or more cloud cover is termed "cloudy."

Cold Front

1 The leading edge of a relatively cold air mass which displaces warmer air, causing it to rise. If the lifted air contains enough moisture, cloudiness, precipitation and even thunderstorms may result. As fronts move through a region, in the Northern Hemisphere, the winds at a given location will experience a marked shift in direction. Ahead of an approaching cold front, winds will usually shift gradually from southeast to south, and on to southwest. As a cold front passes, winds shift rapidly to west, then northwest. Typical cold front windspeeds range between 15 and 30 mph but can be much higher.

Cold Line

1 Fireline that has been controlled. The fire has been mopped up for a safe distance inside the line and can be considered safe to leave unattended.

Cold Trailing

1 A method of controlling a partly dead fire edge by carefully inspecting and feeling with the hand for heat to detect any fire, digging out every live spot, and trenching any live edge.

Collective Control

1 Controls the pitch angle of the main (helicopter) rotor blades. Used as primary altitude control.

Colonizer

1 Species of vegetation that establish on a burned (or otherwise denuded) site from seed.

Combination Nozzle

1 A nozzle is designed to provide either a solid stream or a fixed spray pattern suitable for applying water, wet water or foam solution. Also called: Adjustable Fog Nozzle.

Combination Nozzle Tip

1 Two attached straight stream nozzle tips of different orifice size used to increase or restrict water flow.

Combustion

1 The rapid oxidation of fuel in which heat and usually flame are produced. Combustion can be divided into four phases: preignition, flaming, smoldering, and glowing.

Combustion Efficiency

1 The relative amount of time a fire burns in the flaming phase of combustion, as compared to smoldering combustion. A ratio of the amount of fuel that is consumed in flaming combustion compared to the amount of fuel consumed during the smoldering phase, in which more of the fuel material is emitted as smoke particles because it is not turned into carbon dioxide and water.

Combustion Period

1 Total time required for a specified fuel component to be completely consumed.

Combustion Rate

1 Rate of heat release per unit of burning area per unit of time.

see also: Reaction Intensity

Command

1 The act of directing, and/or controlling resources by virtue of explicit legal, agency, or delegated authority.

Command Climate

1 The working environment within the influence of a particular leader or chain of command. The command climate is based on the subordinates' understanding of how they are expected to perform, how they are treated, and how they must conform to the leader's style.

Command Presence

1 How leaders present themselves to others. The personal attributes and traits that determine whether leaders are worthy of trust and respect from their subordinates.

Command Staff

1 The command staff consists of the information officer, safety officer and liaison officer. They report directly to the incident commander and may have an assistant or assistants, as needed.

Commercial Forest Land

1 Land that is producing, or is capable of producing, crops of industrial wood and is not withdrawn from timber use by statute or administrative regulation.

Commissary

1 Supply of items such as candy, tobacco products, toilet items, and work clothes that are made available for sale to all incident personnel.

Commissary Manager (CMSY)

1 Person responsible to the time unit leader for operating the commissary at an incident base or camp.

Communications Unit

1 An organizational unit in the Logistics Section responsible for providing and maintaining communication services at an incident. May also be a facility (e.g., a trailer or mobile van) used to provide the major part of an incident communications center.

Communications Unit Leader (COML)

1 The ICS position responsible for supervising the Communications Unit. Reports to the Service Branch Director or Logistics Section Chief.

see also: Communications Unit

Community Wildfire Protection Plan (CWPP)

1 A plan developed in the collaborative framework established by the Wildland Fire Leadership Council and agreed to by state, tribal, and local government, local fire department, other stakeholders and federal land management agencies managing land in the vicinity of the planning area. A Community Wildfire Protection Plan (CWPP) identifies and prioritizes areas for hazardous fuel reduction treatments and recommends the types and methods of treatment on Federal and non-Federal land that will protect one or more at-risk communities and essential infrastructure and recommends measures to reduce structural ignitability throughout the at-risk community. A CWPP may address issues such as wildfire response, hazard mitigation, community preparedness, or structure protection – or all of the above.

Compact

1 A formal working agreement among agencies to obtain mutual aid.

Compactness

1 Spacing between fuel particles.

see also: Bulk Density

Company

1 Any piece of (fire) equipment having a full complement of personnel.

Compare and Contrast

1 An investigative technique that involves comparing same sized indicators within a category at separate locations; looking for either differences or similarities in appearance.

Compass Rose

1 A circle, graduated in degrees, printed on some charts or marked on the ground at an airport or heliport. It is used as a reference to either true or magnetic direction.

Compensation/Claims Unit

1 Functional unit within the Finance/Administration Section responsible for the overall management and direction of all Compensation-for-Injury and Claims Specialists assigned to the incident.

Compensation/Claims Unit Leader (COMP)

1 The ICS position responsible for supervising the Compensation/Claims Unit. Reports to the Finance/Administration Section Chief.

see also: Compensation/Claims Unit

Compensation-for-Injury Manager

1 Person responsible to the Compensation/Claims Unit Leader for administrative matters arising from serious injuries and fatalities occurring on the incident.

Competency

1 A broad description that groups core behaviors necessary to perform a specific function.

see also: Behavior

Competent Ignition Source

1 A source of heat that is capable of kindling a wildfire. It may be in the form of a mechanical or electrical spark, glowing ember, open flame, chemical reaction or friction.

Complex Incident

1 Two or more individual incidents located in the same general area which are assigned to a single incident commander or unified command.

Compressed Air Foam Systems (CAFS)

1 A generic term used to describe foam systems consisting of an air compressor (or air source), a water pump, and foam solution.

Computed Gross Weight

1 Term used in calculating from performance charts the permissible helicopter payload at which a helicopter is capable of hovering in ground effect or hovering out of ground effect, based on pressure altitude and air temperature.

Concentrate

1 A substance that has been concentrated; specifically, a liquid that has been made denser, as by the removal of some of its water.

Conceptual Model

1 A model that is a diagram or description of a set of relationships between factors that describe how a system works, such as an ecological model.

see also: Model

Condensation

1 The process by which a gas becomes a liquid.

Condition Class

1 Depiction of the degree of departure from historical fire regimes, possibly resulting in alternations of key ecosystem components. These classes categorize and describe vegetation composition and structure conditions that currently exist inside the Fire Regime Groups. Based on the coarse-scale national data, they serve as generalized wildfire rankings. The risk of loss of key ecosystem components from wildfires increases from Condition Class 1 (lowest risk) to Condition Class 3 (highest risk).

synonym: Fire Regime Current Condition Class

Condition of Vegetation

1 Stage of growth or degree of flammability of vegetation that forms part of a fuel complex. Herbaceous stage is at times used when referring to herbaceous vegetation alone. In grass areas minimum qualitative distinctions for stages of annual growth are usually green, curing, and dry or cured.

Conduction

1 Heat transfer through a material from a region of higher temperature to a region of lower temperature.

Confinement

1 The strategy employed in appropriate management responses where a fire perimeter is managed by a combination of direct and indirect actions and use of natural topographic features, fuel, and weather factors.

Conflagration

1 A raging, destructive fire. Often used to connote such a fire with a moving front as distinguished from a fire storm.

Conflagration Threat

1 Likelihood that a wildfire capable of causing considerable damage will occur.

Consistency (Foam)

1 Uniformity and size of bubbles.

Constant Danger

1 Resultant of all fire danger factors that are relatively unchanging in a specific area (e.g., resource values at risk, topography, fuel type, exposure to prevailing wind).

Consumption

1 The amount of a specified fuel type or strata that is removed through the fire process, often expressed as a percentage of the preburn weight.

Contained

1 The status of a wildfire suppression action signifying that a control line has been completed around the fire, and any associated spot fires, which can reasonably be expected to stop the fire's spread.

see also: Containment

Containment

1 The status of a wildfire suppression action signifying that a control line has been completed around the fire, and any associated spot fires, which can reasonably be expected to stop the fire's spread.

2 The act of controlling hazardous spilled or leaking materials.

see also: Contained

Continental Climate

1 Climate that is characteristic of the interior of a land mass of continental size, marked by large annual diurnal and day-to-day ranges of temperature, low relative humidity and irregular precipitation.

Contingency Actions

1 A back-up plan of action when actions described in the primary plan are no longer appropriate. Contingency actions are required to be taken when the result exceeds its intent. Actions are taken to return the project to its intended design.

Contingency Plan

1 The portion of a prescribed fire plan, incident action plan, or wildland fire use implementation plan that identifies possible but unlikely events and the contingency resources needed to mitigate those events.

Contingency Resources

1 Planned and identified fire suppression personnel and equipment that mitigate possible but unlikely events that exceed or are expected to exceed holding resource capabilities.

Contour Map

1 A map having lines of equal elevation that represent the land surface (Topographic).

Control Force

1 Personnel and equipment used to control a fire.

Control Line

1 An inclusive term for all constructed or natural barriers and treated fire edges used to control a fire.

Control Time

1 The time a fire is declared controlled.

Controlled

1 The completion of control line around a fire, any spot fires therefrom, and any interior islands to be saved; burned out any unburned area adjacent to the fire side of the control lines; and cool down all hot spots that are immediate threats to the control line, until the lines can reasonably be expected to hold under the foreseeable conditions.

Controlled Airspace

1 Airspace of defined dimensions within which air traffic control service is provided to IFR and VFR flights in accordance with the airspace classification.

Controlling Nozzle

1 Shut-off nozzle that permits the nozzle operator to open or close the nozzle or adjust the pattern of the stream.

Convection

1 The transfer of heat by the movement of a gas or liquid; convection, conduction, and radiation are the principal means of energy transfer.

2 As specialized in meteorology, atmospheric motions that are predominantly vertical in the absence of wind (which distinguishes this process from advection), resulting in vertical transport and mixing of atmospheric properties.

Convection Column

1 The rising column of gases, smoke, fly ash, particulates, and other debris produced by a fire. The column has a strong vertical component indicating that buoyant forces override the ambient surface wind.

see also: Smoke Plume

Convective Activity

1 General term for manifestations of convection in the atmosphere, alluding particularly to the development of convective clouds and resulting weather phenomena, such as showers, thunderstorms, squalls, hail, tornadoes, etc.

Convective-lift Fire Phase

1 The phase of a fire when most of the emissions are entrained into a definite convection column.

Convergence

1 The term for horizontal air currents merging together or approaching a single point, such as at the center of a low pressure area producing a net inflow of air. When this occurs in the lower atmosphere, the excess air is removed by rising air currents. Expansion of the rising air above a convergence zone results in cooling, which in turn often gives condensation (clouds) and sometimes precipitation.

Convergence Zone

1 The area of increased flame height and fire intensity produced when two or more fire fronts burn together.

2 In fire weather, that area where two winds come together from opposite directions and are forced upwards often creating clouds and precipitation.

Conversion Burning

1 Burning an area where brush has excluded forest reproduction to prepare the area for tree planting.

Co-op Fire

1 Refers to federal, state, and local cooperative fire programs.

Cooperating Agency

1 An agency supplying assistance including but not limited to direct tactical or support functions or resources to the incident control effort (e.g. Red Cross, law enforcement agency, telephone company, etc.).

see also: Agency
Agency Representative
Assisting Agency
Supporting Agency

Cooperative Fire Protection (CFP)

1 A staff unit within the branch of State and Private Forestry or Aviation and Fire Management in the National Forest System, USDA Forest Service, that coordinates cooperative fire activities.

Cooperator

1 A federal, tribal, state, or local agency that participates with another agency(s) in planning and conducting fire or emergency management projects and activities.

see also: Agency
Agency Representative
Assisting Agency
Cooperating Agency
Supporting Agency

Coordinated Resource Management

1 A process that directly involves everyone concerned with resource management in a given planning area.

Coordinates

1 The intersection of lines of reference, usually expressed in degrees/minutes/seconds of latitude and longitude, used to determine or report position or location.

Coordination

1 The process of systematically analyzing a situation, developing relevant information, and informing appropriate command authority of viable alternatives for selection of the most effective combination of available resources to meet specific objectives. The coordination process (which can be either intra- or interagency) does not involve dispatch actions. However, personnel responsible for coordination may perform command or dispatch functions within limits established by specific agency delegations, procedures, legal authority, etc.

Coordination Center

1 Term used to describe any facility that is used for the coordination of agency or jurisdictional resources in support of one or more incidents.

Coriolis Force

1 An apparent force due to the rotation of the earth that causes a deflection of air to the right in the Northern Hemisphere and to the left in the Southern Hemisphere. This force maximizes at the poles and is essentially zero at the equator.

Corrosion

1 Result of chemical reaction between a metal and its environment (i.e., air, water, and impurities in same).

Cost Sharing Agreements

1 Agreements that document the financial responsibility for incident resource costs, possibly identifying requirements of other party payments.

Cost Unit

1 Functional unit within the Finance/Administration Section responsible for collecting all cost data, performing cost effectiveness analyses, and providing cost estimates and cost saving advice.

Cost Unit Leader (COST)

1 The ICS position responsible for supervising the Cost Unit. Reports to the Finance/Administration Section Chief.

see also: Cost Unit

Council Tool

1 Long-handled combination rake and cutting tool, the blade of which is constructed of a single row of three or four sharpened teeth. Also called fire rake, council rake.

see also: Rich Tool

Counter Fire

1 Fire set between main fire and backfire to hasten spread of backfire. Also called draft fire.

2 Emergency firing to stop, delay, or split a fire front, or to steer a fire. Also called draft fire.

Coupling

1 Device that connects the ends of adjacent hoses or other components of hose.

see also: Adapter

Course

1 In aviation, the intended direction of horizontal flight.

Cover

1 The area on the ground covered by the combined aerial parts of plants expressed as a percent of the total area.

Cover Type

1 The designation of a vegetation complex described by dominant species, age, and form.

Coverage Level

1 Recommended amount of aerially applied retardant keyed to the NFDRS fuel models and/or fire behavior models. Coverage level 2 represents 2 gallons of retardant per hundred square feet. Levels range from 1 to 6 for most fuel models. A coverage level of greater than 6 is for heavy fuels. The levels can be adjusted for fire behavior.

Coyote Tactics

1 A progressive line construction duty involving self-sufficient crews which build fire line until the end of the operational period, remain at or near the point while off duty, and begin building fireline the next operational period where they left off.

Crazing

1 Fine cracking of glass, usually from heat of fire.

Creeping Fire

1 Fire burning with a low flame and spreading slowly.

Crew

1 An organized group of firefighters under the leadership of a crew boss or other designated official.

Crew Boss (CRWB)

1 A person in supervisory charge of usually 16 to 21 firefighters and responsible for their performance, safety, and welfare.

Crew Shuttle

1 Transportation of fireline personnel to and/or from assigned fireline locations.

Crew Transport

1 Any vehicle capable of transporting a specified number of personnel in a specified manner.

Criteria Pollutants

1 Pollutants deemed most harmful to public health and welfare and that can be monitored effectively. They include carbon monoxide (CO), lead (Pb), nitrogen oxides (Nox), sulfur dioxide (SO2), ozone (O3), particulate matter (PM) of aerodynamic diameter less than or equal to 10 micrometers (PM10) and particulate matter of aerodynamic diameter less than or equal to 2.5 micrometers (PM2.5).

Critical Burnout Time

1 Total time a fuel can burn and continue to feed energy to the base of a forward-traveling convection column.

Critical Incident Stress Debriefing (CISD)

1 The process in which teams of professional and peer counselors provide emotional and psychological support to incident personnel who are or have been involved in a critical (highly stressful) incident.

Cross Shot

1 Intersecting lines of sight from two points to the same object, frequently used to determine location of a fire from lookouts. Also called cross bearing.

Crown Consumption

1 Combustion of the twigs, and needles or leaves of a tree during a fire.

Crown Cover

1 The ground area covered by the crown of a tree as delimited by the vertical projection of its outermost perimeter.

Crown Fire

1 A fire that advances from top to top of trees or shrubs more or less independent of a surface fire. Crown fires are sometimes classed as running or dependent to distinguish the degree of independence from the surface fire.

Crown Out

1 A fire that rises from ground into the tree crowns and advances from tree top to tree top. To intermittently ignite tree crowns as a surface fire advances.

Crown Ratio

1 The ratio of live crown to tree height.

Crown Scorch

1 Browning of needles or leaves in the crown of a tree or shrub caused by heating to lethal temperature during a fire. Crown scorch may not be apparent for several weeks after the fire.

Crown Scorch Height

1 The height above the surface of the ground to which a tree canopy is scorched.

Crowning Potential

1 A probability that a crown fire may start, calculated from inputs of foliage moisture content and height of the lowest part of the tree crowns above the surface.

Cumulonimbus

1 The ultimate growth of a cumulus cloud into an anvil-shaped cloud with considerable vertical development, usually with fibrous ice crystal tops, and usually accompanied by lightning, thunder, hail, and strong winds.

Cumulus

1 A principal low cloud type in the form of individual cauliflower-like cells of sharp non-fibrous outline and less vertical development than cumulonimbus.

Cup Trench

1 A fireline trench on the downhill side of fire burning on steep slopes that is supposed to be built deep enough to catch rolling firebrands that could otherwise start fire below the fireline. A high berm on the outermost downhill side of the trench helps the cup trench catch material. Also called gutter trench.

Cupping Indicators

1 A concave or cup-shaped depression on grass stem ends, small stumps, and terminal ends of brush and tree limbs.

Curb Weight

1 Weight of a truck empty (without payload and driver) but ready to drive, including a full fuel tank, cooling system, crankcase, tools, spare wheel, and all other equipment specified as standard.

Cured

1 In the 1978 version of NFDRS, the herbaceous stage when herbaceous fuel moisture falls to 30% or less.

Curing

1 Drying and browning of herbaceous vegetation due to mortality or senescence, and also loss of live fuel moisture content of woody fuel following mechanically-caused mortality (e.g., woody debris slash.)

Curling Indicators

1 Green leaves on succulent, uncured vegetation which bends and curls inwards towards the heat source.

- D -

Daily Activity Level

1 Part of the National Fire Danger Rating System (NFDRS). In fire danger rating, a subjective estimate of the degree of activity of a potential human-caused fire source relative to that which is normally experienced. Five activity levels are defined: none, low, normal, high, and extreme.

Damage Differential

1 The difference in change or damage that occurs to similar objects after they are exposed to fire of differing intensity and/or duration. The underlying principle behind the interpretation of burn pattern.

Damage Differential Indicators

1 The amount of fire related destruction to combustible objects determined by comparing opposing sides of an object.

Dead Fuels

1 Fuels with no living tissue in which moisture content is governed almost entirely by absorption or evaporation of atmospheric moisture (relative humidity and precipitation).

Debris Burning Fire

1 In fire suppression terminology, a fire spreading from any fire originally ignited to clear land or burn rubbish, garbage, crop stubble, or meadows (excluding incendiary fires).

2 In prescribed fire terminology, a fire used to dispose of scattered, piled, or windrowed dead woody fuel, generally in the absence of a merchantable overstory. Its purpose is to reduce unsightly fuel concentrations, or consume unwanted natural fuels to facilitate subsequent resource management or land use actions on the area.

Deck

1 The helibase operational area that includes the touchdown pad, safety circle, hover lanes, and external cargo transport area.

Deck Coordinator (DECK)

1 Person responsible to the helibase manager for coordinating the movement of personnel and cargo at the helibase landing area.

Deepening

1 As it refers to atmospheric pressure, a decrease in the central pressure of a low. This is usually accompanied by intensification of the cyclonic circulation (counter-clockwise wind flow around the low).

Deep-Seated Fire

1 A fire burning far below the surface in duff, mulch, peat, or other combustibles as contrasted with a surface fire.

2 A fire that has gained headway and built up heat in a structure so as to require greater cooling for extinguishment.

Deflagration

1 Chemical decomposition by burning material in which the reaction is less than sonic velocity, for example, low explosives.

2 A burning with great heat and intense light.

Degradation

1 In a discussion of fire retardant slurries, deterioration of viscosity.

Delayed Aerial Ignition Devices (DAID)

1 Polystyrene balls, 1.25 inches in diameter, containing potassium permanganate. The balls are fed into a dispenser, generally mounted in a helicopter, where they are injected with a water-glycol solution and then drop through a chute leading out of the helicopter. The chemicals react thermally and ignite in 25-30 seconds. The space between ignition points on the ground is primarily a function of helicopter speed, gear ratio of the dispenser, and the number of chutes used (up to four).

see also: Aerial Ignition Device
Helitorch
Ping-Pong Ball System
Plastic Sphere Dispenser

Delegation of Authority

1 A statement provided to the incident commander by the agency executive delegating authority and assigning responsibility. The delegation of authority can include objectives, priorities, expectations, constraints and other considerations or guidelines as needed. Many agencies require written delegation of authority to be given to incident commanders prior to their assuming command on larger incidents.

Demobilization

1 Release of resources from an incident in strict accordance with a detailed plan approved by the incident commander.

Demobilization Unit

1 Functional unit within the planning section responsible for assuring orderly, safe and efficient demobilization of incident resources.

Demobilization Unit Leader (DMOB)

1 The ICS position responsible for supervising the Demobilization Unit. Reports to the Planning Section Chief.

see also: Demobilization Unit

Dense Layer

1 A layer of clouds whose ratio of dense sky cover to total sky cover is more than one-half.

Dense Sky Cover

1 Sky cover that prevents detection of higher clouds or the sky above it.

Density (Foam)

1 The ratio of the original volume of the nonaerated foam solution to the resultant volume of foam. The inverse of expansion.

Density Altitude

1 Pressure altitude corrected for temperature deviations from standard atmosphere. Used as an index to aircraft performance characteristics such as take-off distance and rate of climb. Density altitude bears the same relation to pressure altitude as true altitude does to indicated altitude.

Departure from Average Greenness (DA)

1 An NDVI-derived image of vegetation greenness compared to its average greenness for the current week of the year.

Deployment Zone

1 Deployment zones are last ditch areas where fire shelters must be deployed to ensure firefighter survival due to the available space and/or fire behavior conditions at the deployment zone location. Used when fire conditions are such that escape routes and safety zones have been compromised.

see also: Safety Zone

Depth of Burn (DOB)

1 The reduction in forest floor thickness due to consumption by fire.

Depth of Char Indicators

1 Sometimes referred to as "alligatoring", where combustible material appears to have a fissured or scaly appearance similar to an alligator's hide. Most commonly associated with finished lumber products, such as boards and fence posts.

Deputy

1 A qualified individual who could be delegated the authority to manage a functional operation or perform a specific task. In some cases, a Deputy could act as relief for a superior. Deputies can be assigned to the incident commander, general staff, and branch directors.

Desiccant

1 Chemical that, when applied to a living plant, causes or accelerates drying of its aerial parts; used to facilitate burning of living vegetation by substantially lowering fuel moisture content within a few hours.

Designated Area

1 Those areas identified as principal population centers or other areas requiring protection under state or federal air quality laws or regulations.

Designated Dispatch Point (DDP)

1 The address where the unit must be physically located, and dispatched from, during the mandatory availability period.

Detection

1 The act or system of discovering and locating fires.

synonym: Fire Detection

see also: Discovery

Detonation

1 An extreme rapid decomposition of a material in which the reaction is more than a sonic velocity, for example, high explosives.

Dew Point

1 Temperature to which a specified parcel of air must cool, at constant pressure and water-vapor content, in order for saturation to occur. The dew point is always lower than the wet-bulb temperature, which is always lower than the dry-bulb temperature, except when the air is saturated and all three values are equal. Fog may form when temperature drops to equal the dew point.

Diagram

1 A scale drawing showing information about a fire scene.

Die-Out Pattern Indicators

1 Fingers or islands of less intensely burned areas or areas where the fire has self extinguished.

Digital Elevation Model

1 A set of points which defines the terrain as numbers for computer applications. This data may be used to draw contours, make ortho photos, slope maps, and drive fire models.

Dilution

1 A control strategy used in managing smoke from prescribed fires in which smoke concentration is reduced by diluting it through a greater volume of air, either by scheduling during good dispersion conditions or burning at a slower rate.

see also: Dispersion

Direct Attack

1 Any treatment applied directly to burning fuel such as wetting, smothering, or chemically quenching the fire or by physically separating the burning from unburned fuel.

synonym: Direct Line

Direct Line

1 Any treatment applied directly to burning fuel such as wetting, smothering, or chemically quenching the fire or by physically separating the burning from unburned fuel.

synonym: Direct Attack

Direct Protection Area

1 That area for which a particular fire protection organization has the primary responsibility for attacking an uncontrolled fire and for directing the suppression action. Such responsibility may develop through law, contract, or personal interest of the firefighting agent (e.g., a lumber operator). Several agencies or entities may have some basic responsibilities (e.g., private owner) without being known as the fire organization having direct protection responsibility.

synonym: Protection Area

Directional Vectors

1 The physical characteristics of the indicators that show the direction of fire spread, i.e., advancing, backing, or lateral.

Director

1 The ICS title for an individual responsible for supervision of a branch.

Discovery

1 Determination that a fire exists. Location and reporting of a fire is not required as is with detection.

see also: Detection

Discovery Time

1 Elapsed time from start of fire (known or estimated) until the time of the first discovery that results directly in fire suppression action.

Discrete Frequency

1 A separate radio frequency most commonly used in air traffic control which reduces frequency congestion by controlling the number of aircraft or other resources operating on a particular frequency.

Dispatch

1 The implementation of a command decision to move a resource or resources from one place to another.

Dispatch Center

1 A facility from which resources are assigned to an incident.

Dispatcher

1 A person who receives reports of discovery and status of fires, confirms their locations, takes action promptly to provide people and equipment likely to be needed for control efforts.

see also: Agency Dispatcher

Dispersion

1 The decrease in concentration of airborne pollutants as they spread throughout an increasing volume of atmosphere.

see also: Dilution

Display Class

1 In WIMS, a one-digit number representing the number of decision points used to evaluate the magnitude of the Staffing Index.

Display Class Breakpoints

1 In WIMS, the climatological breakpoints separating the highest staffing levels. Commonly these are the index values corresponding to the 90th and 97th or 80th and 95th percentiles for the staffing index.

Display Processor (DPRO)

1 The ICS position responsible for displaying incident status information obtained from Field Observers, technical specialists, resource status reports, aerial photographs, and infrared data. Reports to the Situation Unit Leader.

see also: Situation Unit

Distance Learning (DL)

1 A concept of providing access to quality wildland fire education and training using appropriate instructional technology, delivered anywhere, anytime to prepare a fire management work force to safely achieve fire management objectives.

see also: eLearning

Distance Measuring Equipment (DME)

1 Aircraft navigational equipment that provides the slant range distance in miles (kilometers) from the aircraft to the VOR station to which the DME is tuned, usually at or near an airport.

Distributed Incident Simulation Exercise (DISE)

1 An on-line mission rehearsal event providing an individual or team with an experiential learning environment utilizing the National Interagency Incident Management System to "game" a computer generated incident from multiple training locations.

see also: Simulation

Disturbance

1 A weather system usually associated with clouds, rain and/or wind.

Diurnal

1 Daily, especially pertaining to cyclic actions which are completed within 24 hours, and which recur every 24 hours, such as temperature, relative humidity and wind.

Divergence

1 The expansion or spreading out of a horizontal wind field. Generally associated with high pressure and light winds.

Division

1 The ICS organization level between the branch and the task force/strike team. Divisions are used to divide an incident into geographical areas of operation. Divisions are established when the number of resources exceeds the span-of-control of the operations chief.

see also: Group

Division/Group Supervisor (DIVS)

1 The ICS position responsible for supervising equipment and personnel assigned to a division or group. Reports to a Branch Director or Operations Section Chief.

see also: Division
Group

Documentation Unit

1 Functional unit within the planning section responsible for collecting, recording and safeguarding all documents relevant to the incident.

Documentation Unit Leader (DOCL)

1 The ICS position responsible for supervising the Documentation Unit. Reports to the Planning Section Chief.

see also: Documentation Unit

Dormant Season Burning

1 Prescribed burning early in the dry season before the leaves and undergrowth are completely dry or before the leaves are shed, as an insurance against more severe fire damage later on.

Double Arsonist

1 An offender who sets two fires at one site, at the same time, in a single event.

Double Doughnut

1 Two lengths of hose rolled side by side or a single length rolled into two small coils for convenient handling.

see also: Doughnut Roll

Double Female Coupling

1 A hose-coupling device having two female swivel couplings to permit joining two male hose nipples of the same size and thread type when lines are laid with couplings in opposite or reverse directions.

Double Jacket Hose

1 Fire hose having two cotton or other fiber jackets outside the rubber lining or tubing.

Double Male Coupling

1 A hose-coupling device having two male thread nipples for connecting hose and for connecting two female couplings of the same diameter.

Doughnut Roll

1 A 50 or 100-foot length of hose or a 50-foot length of hose rolled up for easy handling. There are various ways of forming the doughnut. A convenient one has both couplings close together with the male thread protected by the female coupling.

see also: Double Doughnut

Downloading

1 A calculated reduction in actual payload to provide a margin of safety.

Dozer

1 Any tracked vehicle with a front mounted blade used for exposing mineral soil.

see also: Tractor

Dozer Boss (DOZB)

1 The individual responsible for supervising the operations of a dozer.

Dozer Company

1 A resource that includes a dozer, its transportation unit and a standard complement of personnel for its operation.

Dozer Line

1 Fireline constructed by the front blade of a dozer.

see also: Plow Line

Dozer Tender

1 Any ground vehicle with personnel capable of maintenance, minor repairs, and limited fueling of dozers.

Draft

1 Drawing water from static sources such as a lake, pond, cistern, river, etc. into a pump which is above the level of the water supply. This is done by removing the air from the pump and allowing atmospheric pressure [14.7 psi (101 kPa) at sea level] to push water through a noncollapsible suction hose into the pump.

Drain Time

1 The time (minutes) it takes for foam solution to drop out from the foam mass; for a specified percent of the total solution contained in the foam to revert to liquid and drain out of the bubble structure.

Draped Fuels

1 Needles, leaves, and twigs that have fallen from above and have lodged on lower branches or brush. Draped fuels are part of aerial fuels.

see also: Aerial Fuels

Drift

1 Effect of wind on smoke, retardant drops, paracargo, smokejumper streamers, etc.

Drift Smoke

1 Smoke that has drifted from its point of origin and is no longer dominated by convective motion. May give false impression of a fire in the general area where the smoke has drifted.

Drip Torch

1 Hand-held device for igniting fires by dripping flaming liquid fuel on the materials to be burned; consists of a fuel fount, burner arm, and igniter. Fuel used is generally a mixture of diesel and gasoline.

see also: Backfire Torch
Burning Torch
Flame Thrower

Drive Axle

1 An axle that supports a portion of the vehicle weight and transmits a driving force to the wheels.

Drive Wheels

1 Wheels powered by all of the vehicle's drive axles. Dual tires are considered as single wheels. The number of wheels is commonly referenced by the terms "4x2", "4x4", etc. where the first figure indicates the total number of wheels on the ground and the second figure, the number of drive wheels.

Drizzle

1 Precipitation composed exclusively of water drops smaller than 0.02 inches (0.5 mm) in diameter.

Drop Configuration

1 The type of retardant drop selected to cover a ground target. Terms that can specify the type of drop configuration include Salvo Drop and Trail Drop.

see also: Salvo Drop
Trail Drop

Drop Pass

1 Indicates that the air tanker has the target in sight and will make a retardant drop on this run over the target.

Drop Pattern

1 The distribution of an aerially delivered retardant drop on the target area in terms of its length, width, and momentum (velocity x mass) as it approaches the ground. The latter determines the relative coverage level of the fire retardant on fuels within the pattern.

synonym: Pattern

Drop Zone (DZ)

1 Target area for airtankers, helitankers, cargo dropping.

see also: Target

Drought

1 A period of relatively long duration with substantially below-normal precipitation, usually occurring over a large area.

Drought Index

1 A number representing the net effect of evaporation, transpiration and precipitation in producing cumulative moisture depletion in deep duff or upper soil layers.

see also: Keetch-Byram Drought Index

Drum Lifter

1 Device used to transport a 55-gallon drum (208 L) via sling on a helicopter.

Dry Adiabatic Lapse Rate

1 The rate of decrease of temperature with height of a parcel of dry air lifted adiabatically through an atmosphere in hydrostatic equilibrium. Numerically equal to 9.7670 C degrees per km or about 5.40 F degrees per thousand feet.

Dry Air Mass

1 A portion of the atmosphere that has a relatively low dew point temperature and where the formation of clouds, fog, or precipitation is unlikely.

Dry Bulb

1 A name given to an ordinary thermometer used to determine the temperature of the air (to distinguish it from the wet bulb).

Dry Bulb Temperature

1 The temperature of the air measured in the shade 4-8 feet above the ground.

Dry Episode (DE)

1 A contiguous series of days having a pre-established number of fire ignitions with a fuel dryness level that historically resulted in a significant fire event for a particular area.

see also: Fuel Dryness Level
Significant Fire Event

Dry Foam

1 A low expansion foam type with stable bubble structure and slow drain time which is used primarily for resource and property protection.

Dry Hydrant

1 Permanent devices with fire engine threads attached to expedite drafting operations in locations where there are water sources suitable for use in fire suppression (e.g., piers, wharves, bridges over streams, highways adjacent to ponds).

2 Permanently installed supply private fire pumps which depend upon suction sources. Also called suction pipe.

Dry Lightning Storm

1 Thunderstorm in which negligible precipitation reaches the ground. Also called dry storm.

Dry Run

1 A trial pass over the target area by a lead plane and/or an airtanker to pinpoint target areas and warn ground personnel of the impending retardant or extinguishing agent drop.

Dry Storage

1 Refers to dry chemical retardants stored at air attack bases and available for mixing with water.

see also: Wet Storage

Dry-bulb Temperature

1 Temperature of the air.

Dry-bulb Thermometer

1 In a psychrometer, the thermometer not covered with muslin which is used to determine air temperature.

Duff

1 The layer of decomposing organic materials lying below the litter layer of freshly fallen twigs, needles, and leaves and immediately above the mineral soil.

see also: Humus
Litter

Durability (Foam)

1 The effective life span of foam bubbles.

Duty Week

1 Regular number of hours worked per week by a full-time firefighter, excluding overtime.

- *E* -

Economic Fire Protection Theory

1 A concept postulating that the object of fire protection is to minimize total cost (i.e., sum of the costs of fire prevention, fire presuppression, fire detection, fire suppression, and net costs of fire damage/benefits).

Ecosystem

1 An interacting natural system including all the component organisms together with the abiotic environment and processes affecting them.

Ecosystem Sustainability

1 The capacity to maintain ecosystem health, productivity, diversity, and overall integrity, for the long term, in the context of human activity and use.

Eddy

1 A circular-like flow of a fluid (such as air or water) drawing its energy from a flow of much larger scale, and brought about by pressure irregularities as in the downwind (lee) side of a solid obstacle. For example, wind conditions may be erratic and may eddy on the downwind side of large rock outcroppings, buildings, etc.

Edge

1 The place where plant communities meet or where successional stages or vegetative conditions within plant communities come together.

2 The boundary between two fairly distinct fuel types.

Edge Firing

1 Method of burning in which fires are set along the edges of an area and allowed to spread inward.

Eductor

1 A device used to introduce and mix fire chemical into a water stream. An eductor is a fitting with three ports, an inlet for water flow, an outlet for water flow, and an inlet for fire chemical concentrate. The flow of water through the eductor produces a region of lower pressure at the fire chemical inlet, drawing the chemical into the water stream.

Effective Windspeed

1 The midflame windspeed adjusted for the effect of slope on fire spread.

Ejector

1 A siphon device used to fill an engine's tank when the water source is below or beyond the engine's drafting capability.

Elapsed Time

1 The total time taken to complete any step(s) in fire suppression. NOTE: Generally divided chronologically into discovery time, report time, getaway time, travel time, attack time, control time, mop-up time, and patrol time.

eLearning

1 Conceptually represents the optimum integration of modern educational methods and professional staff development training with state of the art technology. The primary goal is enhancing on-the-job performance, motivation, and learning performance.

see also: Distance Learning

Elevation Loss

1 In hydraulics, the pressure loss caused by raising water through hose or pipe to a higher elevation (roughly equal to one psi for every two-foot increase in elevation above the pump) (11.3 kPa per meter).

Emergency

1 Any incident which requires the response of a fire protection organization's attack units and/or support units.

Emergency Firefighter (EFF)

1 A person employed as an emergency worker on a forest or wildland fire which threatens damage to property under public management. Emergency firefighters are hired for the duration of the emergency only.

see also: Administratively Determined
Casual

Emergency Locator Transmitter (ELT)

1 A radio transmitter attached to the aircraft structure which operates from its own power source on 121.5 MHz and 243 MHz. The transmitter transmits a distinctive downward swept audio tone for homing purposes and is designed to function without human action after an accident.

Emergency Management Coordinator/Director

1 The individual within each political subdivision that has coordination responsibility for jurisdictional emergency management.

Emergency Medical Technician - Basic (EMTB)

1 A professional-level provider of emergency medical care who has received training equal to or greater than the current DOT emergency medical technician training standards, maintaining state or equivalent certification in this classification.

Emergency Medical Technician - Intermediate (EMTI)

1 A professional-level provider of emergency medical care that has been trained to the basic 1999 EMT level, state certified, and has received additional training to start IVs, use more advanced airways, and administer certain medications.

Emergency Medical Technician - Paramedic (EMTP)

1 A professional-level provider of emergency medical care trained above the level of EMT-Intermediate to administer drugs, intubate, and other advanced life support procedures in a field environment, maintaining state certification in this classification.

Emergency Operations Center (EOC)

1 A pre-designated facility established by an agency or jurisdiction to coordinate the overall agency or jurisdictional response and support to an emergency.

Emergency Operations Plan

1 The plan that each jurisdiction has and maintains for responding to appropriate hazards.

Emergency Response Provider

1 Any federal, state, or local emergency public safety, law enforcement, emergency responder, emergency medical (including hospital emergency facilities), and related personnel, agencies, and authorities. It is any organization responding to an emergency, or providing mutual aid support to such an organization, whether in the field, at the scene of an incident, or operations center.

Emergency Stabilization

1 Planned actions to stabilize and prevent unacceptable degradation to natural and cultural resource, to minimize threats to life or property resulting from the effects of a fire, or to repair/replace/construct physical improvements necessary to prevent degradation of land or resources.

Emergency Worker

see: Administratively Determined
Casual

Emission

1 A release of combustion gases and aerosols into the atmosphere.

Emission Factor (EFp)

1 The mass of particulate matter produced per unit mass of fuel consumed (pounds per ton, grams per kilogram).

Emission Rate

1 The amount, or mass of smoke produced per unit of time. For example: Emission Rate = Available Fuel x Burning Rate x Emission Factor.

Emission Reduction

1 A strategy for controlling smoke from prescribed fires that minimizes the amount of smoke output per unit area treated.

Emission Standard

1 A general type of standard that limits the mass of a pollutant that may be emitted by a source. The most straightforward emissions standard is a simple limitation on mass of pollutant per unit time (e.g., pounds of pollutant per hour).

Empty Weight

1 Weight of an aircraft/engine including the structure, powerplant, all fixed equipment, all fixed ballast, unusable fuel, undrainable oil, and total quantity of hydraulic fluid.

Energy Release Component (ERC)

1 The computed total heat release per unit area (British thermal units per square foot) within the flaming front at the head of a moving fire.

Engine

1 Any ground vehicle providing specified levels of pumping, water, and hose capacity but with less than the specified level of personnel.

Engine Company

1 A resource that includes an engine of a specific type. The type specifies tank capacity, pump rating, hose capacity and number of personnel.

Entrapment

1 A situation where personnel are unexpectedly caught in a fire behavior-related, life-threatening position where planned escape routes or safety zones are absent, inadequate, or compromised. An entrapment may or may not include deployment of a fire shelter for its intended purpose. These situations may or may not result in injury. They include "near misses."

Entrapment Avoidance

1 A process used to improve the safety of personnel on the fireline, which emphasizes tools and tactics available to prevent being trapped in a burnover situation. This process includes appropriate decision making through risk management, application of LCES, use of pre-established trigger points, and recognition of suitable escape routes and safety zones.

Envelopment

1 Direct attack with multiple anchor points, that allows for multiple points of attack. Generally used as an engine tactic in the wildland urban interface.

Environment

1 The complex surroundings of an item or area of interest, such as air, water, natural resources, and their physical conditions (temperature, humidity).

Environmental Lapse Rate

1 The actual rate of decrease of temperature with elevation.

Environmental Specialist

1 Person responsible to the planning section chief for collecting and analyzing environmental information about the incident area, determining environmental restrictions and requirements, and providing the information as an input to the incident action and to incident personnel as needed.

Episode (Pollution)

1 A condition of poor contaminant dispersion which may result in concentrations considered potentially harmful to health or welfare. Episodes may also occur during periods of fairly good dispersion if the source of air contaminants is extremely large.

Equilibrium Moisture Content (EMC)

1 Moisture content that a fuel particle will attain if exposed for an infinite period in an environment of specified constant temperature and humidity. When a fuel particle reaches equilibrium moisture content, net exchange of moisture between it and its environment is zero.

Equipment Manager

1 Person responsible to the ground support unit leader for servicing, repairing, and fueling all apparatus and equipment on the incident, for obtaining transportation and scheduling its use, and for maintaining records of equipment service and use.

Equipment Time Recorder

1 Person responsible to the time unit leader for assisting all other units at the incident in properly maintaining a daily record of equipment use time, maintaining current records for charges and credits for fuel, parts, services, and commissary items for all equipment, and checking and closing all time record forms before demobilization of equipment.

Equipment Use Fire

1 Fire caused by mechanical equipment other than railroad operations.

Escape Route

1 A preplanned and understood route firefighters take to move to a safety zone or other low-risk area. When escape routes deviate from a defined physical path, they should be clearly marked (flagged).

Escaped Fire

1 Fire which has exceeded or is expected to exceed initial attack capabilities or prescription.

Escaped Prescribed Fire

1 Prescribed fire that has exceeded or is expected to exceed prescription parameters or otherwise meets the criteria for conversion to wildfire. A state in which a prescribed fire is no longer doing what was expected.

see also: Escaped Fire

Estimated Time En Route (ETE)

1 Term used in resource planning/following to estimate time spent between points.

Estimated Time of Arrival (ETA)

1 Term used in resource planning/following to estimate time of arrival at a point.

Estimated Time of Departure (ETD)

1 Term used in resource planning/following to estimate time of departure from a point.

Evacuation

1 An organized, phased, and supervised withdrawal, dispersal, or removal of civilians from dangerous or potentially dangerous areas, and their reception and care in safe areas.

Evaluate

1 To review and compare outcomes with management and incident objectives desired for a wildland fire. One of the six component activities in an adaptive management process that may lead to adjusting future actions.

Evaluator

1 The individual who is qualified in the position being evaluated, or supervises the position being evaluated, having responsibility for observing task(s) being performed and documenting successful performance for agency certification or re-certification. Evaluator responsibilities must remain separate from the individual assigned as Trainer/Coach.

see also: Agency Certification
Re-Certification
Trainer/Coach

Evaporation

1 The transformation of a liquid to its gaseous state; heat is released by the liquid during this process.

Event

1 A planned, non-emergency activity. ICS can be used as the management system for a wide range of events, e.g., parades, concerts or sporting events.

Exempt / Nonexempt

1 Categories of employees as defined in the Fair Labor Standards Act (FLSA), who are either covered or exempted from coverage under the ActPay entitlements vary depending on the employee's FLSA status.

Exhaust Primer

1 Device which uses the exhaust gas flow of an engine for priming a centrifugal pump.

Expanded Dispatch

1 An organization needed to support an incident which expands along with the Incident Command System.

Expansion

1 The ratio of the volume of the foam in its aerated state to the original volume of the non-aerated foam solution.

Expert Witness

1 Someone with sufficient skill, knowledge, or experience in a given field so as to be capable of drawing inferences or reaching conclusions or opinions that an average person would not be competent to reach. The expert's opinion testimony should aim the judge or jury in their understanding of the fact at issue.

Exposure

1 Property that may be endangered by a fire burning in another structure or by a wildfire.
2 Direction in which a slope faces, usually with respect to cardinal directions.
3 The general surroundings of a site with special reference to its openness to winds.

see also: Aspect

Exposure Fire

1 Classification for a fire not originating in a building, but which ignites building(s). A fire originating in one building and spreading to another is classified under the original cause of fire.

Extend

1 To drop retardant in such a way that the load slightly overlaps and links a previous drop. "Extend your last drop."

Extended Attack

1 Actions taken on a wildfire that has exceeded the initial response.

see also: Extended Attack Incident

Extended Attack Incident

1 An incident that exceeds the capability of the initial attack resources and/or organization to successfully manage the incident to conclusion.

see also: Extended Attack

Exterior Fire Protection

1 The protection of structures from the exterior, with no interior access or activity.

External Load

1 A load that is carried or extends outside of the aircraft fuselage.

External Payload

1 Maximum external stress load (in pounds) with full fuel and pilot in calm air at standard atmospheric temperature.

Extinguishing Agent

1 Substance used to put out a fire by cooling the burning material, blocking the supply of oxygen, or chemically inhibiting combustion.

Extra Burning Period

1 For any particular fire which is neither contained nor controlled, any 24-hour period following the termination of the first burning period.

Extreme Fire Behavior

1 "Extreme" implies a level of fire behavior characteristics that ordinarily precludes methods of direct control action. One or more of the following is usually involved: high rate of spread, prolific crowning and/or spotting, presence of fire whirls, strong convection column. Predictability is difficult because such fires often exercise some degree of influence on their environment and behave erratically, sometimes dangerously.

see also: Blowup
Fire Storm
Flare-up

Eyewitness

1 Person who sees evidence of criminal activity, actual commission of a crime or a criminal fleeing a crime scene.

- *F* -

Facilities Unit

1 Functional unit within the logistics section that provides the layout, activation, and management of all incident facilities. These facilities may include the incident base, feeding areas, sleeping areas, sanitary facilities, etc.

Facilities Unit Leader (FACL)

1 The ICS position responsible for supervising the Facilities Unit. Reports to the Service Branch Director or Logistics Section Chief.

see also: Facilities Unit

Facility Maintenance Specialist

1 Person responsible to the base / camp manager for general maintenance of the base or camp, including provision of sleeping and sanitation facilities, lighting and electricity, and camp cleanliness.

Fahrenheit

1 A temperature scale on which 320 F denotes the temperature of melting ice, and 2120 F the temperature of boiling water, both under standard atmospheric pressure.

Faller

1 A person who fells trees. Also called sawyer, and cutter.

False Alarm

1 A reported smoke or fire requiring no suppression; for example, brush burning under control, mill smoke, false smoke, etc.

Federal Aviation Regulation (FAR)

1 Refers to the regulations governing all aviation activities of civil aircraft within the United States and its territories.

Federal Fire Policy

1 Principles and policies providing a common approach to wildland fire for federal agencies. The primary, interagency wildland fire policy document is the "Review and Update of the 1995 Federal Wildland Fire Management Policy" (January 2001). Implementation of that policy is through the "Guidance for Implementation of Federal Wildland Fire Management Policy" (February 2009).

Federal Land Policy and Management Act (FLPMA)

1 Federal Land Policy and Management Act of 1976 (Public Law 94-570, 90 Stat. 2743, 43 USC 1701).

Female Coupling

1 Coupling made to receive a male coupling of the same thread, pitch and/or diameter.

Field Observer (FOBS)

1 This ICS position is responsible for collecting and reporting situation information for an incident through personal observations and interviews and reports to the Situation Unit Leader.

see also: Situation Unit

Field Test

1 A job-related test of work capacity designed for those with moderately strenuous duties. This test consists a two-mile hike with a 25-pound pack. A time of 30 minutes, the passing score for this test, approximates an aerobic fitness score of 40.

see also: Work Capacity Test

Fill Tank

1 Large, portable tank from which helitankers can hoverfill.

Filling

1 An increase in the central pressure of a low. Counter-clockwise wind flow around the low usually decreases as filling occurs.

Final Approach

1 Flight path in the direction of the landing along the extended runway center line from the base leg to the runway.

Final Evaluator

1 The individual responsible for completing the position task book's verification statement once all tasks in the position task book have been completed and signed off. Only the evaluator on the final position performance assignment (the assignment in which all remaining tasks have been evaluated and signed off) will complete the verification statement recommending certification.

see also: Position Performance Assignment
Position Task Book

Final Run

1 An air tanker is "on final" when it is on line with the target and intends to make the drop on that pass; also applies to cargo dropping.

Finance/Administration Section

1 The section responsible for all administrative and financial considerations on an incident.

see also: Compensation/Claims Unit
Cost Unit
Procurement Unit
Time Unit

Finance/Administration Section Chief (FSC1 or FSC2)

1 The ICS position responsible for supervising the Finance/Administration Section. Reports to the Incident Commander and is a member of the General Staff. This position may have one or more deputies assigned.

see also: Finance/Administration Section

Fine Fuel Moisture

1 The probable moisture content of fast-drying fuels which have a timelag constant of 1 hour or less; such as, grass, leaves, ferns, tree moss, pine needles, and small twigs (0-1/4").

Fine Fuels

1 Fast-drying dead or live fuels, generally characterized by a comparatively high surface area-to-volume ratio, which are less than 1/4-inch in diameter and have a timelag of one hour or less. These fuels (grass, leaves, needles, etc.) ignite readily and are consumed rapidly by fire when dry.

see also: Flash Fuels

Fingers of a Fire

1 The long narrow extensions of a fire projecting from the main body.

FIRDAT (Fire Data Manipulation Program)

1 A routine of FIREFAMILY that combines historical weather records with the equations of the NFDRS to produce frequency distributions of the NFDRS indexes and components.

see also: FIREFAMILY (Fire Data Program)

Fire

1 Rapid oxidation, usually with the evolution of heat and light; heat fuel, oxygen and interaction of the three.

Fire Adapted Community (FAC)

1 A human community consisting of informed and prepared citizens collaboratively planning and taking action to safely co-exist with wildland fire.

Fire Agency

1 Official group or organization compelled and authorized under statutes or law to control fires within a designated area or upon designated lands.

see also: Protecting Agency
Responsible Fire Agency

Fire Analysis

1 Review of fire management actions taken on a specific fire, group of fires, or fire season in order to identify reasons for both effective and ineffective actions, and to recommend or prescribe ways and means of doing a more efficient job. Also called hot line review.

Fire Behavior

1 The manner in which a fire reacts to the influences of fuel, weather, and topography.

Fire Behavior Analyst

1 Person responsible to the planning section chief for establishing a weather data collection system and for developing fire behavior predictions based on fire history, fuel, weather, and topography.

Fire Behavior Forecast

1 Prediction of probable fire behavior, usually prepared by a fire behavior analyst, in support of fire suppression or prescribed burning operations.

Fire Behavior Prediction Model

1 A set of mathematical equations that can be used to predict certain aspects of fire behavior when provided with an assessment of fuel and environmental conditions.

Fire Behavior Prediction System

1 A system that uses a set of mathematical equations to predict certain aspects of fire behavior in wildland fuels when provided with data on fuel and environmental conditions.

Fire Benefits

1 Fire effects with positive monetary, social, or emotional value or that contribute, through changes in the resource base, to the attainment of organizational goals.

Fire Bug

1 Arsonist, especially a repetitive firesetter.

Fire Business

1 The characterization of fire occurrence in an area, described in terms of total number of fires and acres per year; and number of fires by time, size, cause, fire-day, large fire-day, and multiple fire-day.

Fire Business Thresholds

1 Values of one or more fire weather/fire danger indexes that have been statistically related to occurrence of fires (fire business). Generally the threshold is a value, or range of values where historical fire activity has significantly increased or decreased.

Fire Cache

1 A supply of fire tools and equipment assembled in planned quantities or standard units at a strategic point for exclusive use in fire suppression.

Fire Cause

1 Agency or circumstance which started a fire or set the stage for its occurrence; source of a fire's ignition. For statistical purposes fires are grouped into broad cause classes. The nine general causes used in the U.S. are lightning, campfire, smoking, debris burning, incendiary, machine use (equipment), railroad, children, and miscellaneous.

Fire Cause Class

1 Any class into which wildland fires are grouped according to their origin.

Fire Climate

1 Composite pattern of weather elements over time that affect fire behavior in a given region.

Fire Climax

1 Plant community maintained by periodic fires.

Fire Concentration (Complex)

1 Generally, a situation in which numerous fires are burning in a locality.

2 More specifically, the number of fires per unit area or locality for a given period, generally a year.

Fire Crew

1 General term for two or more firefighters organized to work as a unit.

Fire Crew Work Formation

1 Standard crew arrangement used for fireline construction in direct or indirect attack; consists of line locator, line cutters, rakers, torch operators, and mopup crew.

Fire Damage

1 Detrimental fire effects expressed in monetary or other units, including the unfavorable effects of fire-induced changes in the resource base on the attainment of organizational goals.

Fire Damage Appraisal

1 Method of determining financial or other losses resulting from a fire.

Fire Danger

1 Sum of constant danger and variable danger factors affecting the inception, spread, and resistance to control, and subsequent fire damage; often expressed as an index.

Fire Danger Continuum

1 The range of possible values for a fire danger index or component, given a set of NFDRS parameters and weather input.

Fire Danger Index

1 A relative number indicating the severity of wildland fire danger as determined from burning conditions and other variable factors of fire danger.

Fire Danger Rating

1 A fire management system that integrates the effects of selected fire danger factors into one or more qualitative or numerical indices of current protection needs.

Fire Danger Rating Area

1 A geographic area of relatively homogenous climate, fuels and topography, tens of thousands of acres in size, within which the fire danger can be assumed to be uniform. The basic on-the-ground unit for which unique fire management decisions are made based on fire danger ratings. Weather is represented by one or more NFDRS weather stations.

Fire Danger Rating Operating Plan

1 A guide to collection, communication, and application of fire danger ratings at the local level.

Fire Danger Rating PocketCard for Firefighter Safety

1 A communication aid designed to help firefighters develop an awareness of the local fire situation by providing a visual reference to fire danger rating.

Fire Danger Rating System

1 The complete program necessary to produce and apply fire danger ratings, including data collection, data processing, fire danger modeling, communications, and data storage.

see also: National Fire Danger Rating System

Fire Day

1 Standard 24-hour period beginning at 1000 hours, during which most wildfires undergo a predictable speeding up and slowing down of intensity, depending primarily on the influence of weather and fuel factors.

Fire Death

1 Fire casualty which is fatal or becomes fatal within one year of the fire.

Fire Dependent

1 Plants and vegetation communities which have evolved adaptations such as a reliance on fire as a disturbance agent, protection as a species against the effects of wildland fire, or even a strengthening or enhancement by it.

Fire Detection

1 Act or system of discovering and locating fires.

synonym: Detection

Fire Discovery

1 The act of determining that a fire exists; does not include determining its location.

Fire District

1 A rural or suburban fire organization, usually tax supported, that maintains fire companies and apparatus. It is also called a fire protection district.

Fire Duty

1 Actual physical engagement in firefighting service as distinguished from staff work at headquarters or maintenance division; work at an individual fire done by an individual firefighter or by a company.

Fire Ecology

1 The study of the effects of fire on living organisms and their environment.

Fire Edge

1 The boundary of a fire at a given moment.

Fire Education

1 Activities to change behaviors and attitudes about fire ecology, wildland fire and the role of fire in natural resource management. Defines the purposes for actions that provide information about and improve understanding of wildland fire.

see also: Prevention

Fire Effects

1 The physical, biological, and ecological impacts of fire on the environment.

Fire Environment

1 The surrounding conditions, influences, and modifying forces of topography, fuel, and weather that determine fire behavior.

Fire Frequency

1 A general term referring to the recurrence of fire in a given area over time.

Fire Front

1 The part of a fire within which continuous flaming combustion is taking place. Unless otherwise specified, the fire front is assumed to be the leading edge of the fire perimeter. In ground fires, the fire front may be mainly smoldering combustion.

Fire Guard

1 A general term for a firefighter, lookout, patrol, prevention guard, or other person directly employed for prevention and/or detection and suppression of fires.

Fire Hazard

1 A fuel complex, defined by volume, type condition, arrangement, and location, that determines the degree of ease of ignition and of resistance to control.

Fire Hazard Index

1 A numerical rating for specific fuel types, indicating the relative probability of fires starting and spreading, and the probable degree of resistance to control; similar to burning index, but without effects of wind speed.

Fire Hazardous Areas

1 Those wildland areas where the combination of vegetation, topography, weather, and the threat of fire to life and property create difficult and dangerous problems.

Fire Information Retrieval and Evaluation System (FIRES)

1 A personal computer (PC) program that merges fire and weather/index files, and allows plotting and analysis of fire occurrence and fire danger.

Fire Injury

1 Injury suffered as the result of a fire that requires (or should require) treatment by a practitioner of medicine within one year of the fire, regardless of whether treatment was actually received.

Fire Inspector

1 Fire prevention specialist or arson investigator.

Fire Interval

1 The number of years between two successive fire events for a given area; also referred to as fire-free interval or fire-return interval.

Fire Investigation

1 The process of determining the ignition source, materials first ignited, ignition factors, and party responsible for a fire.

Fire Lane

1 Cleared path wide enough to permit single-lane vehicular access in a remote area.

Fire Load

1 The number and size of fires historically experienced on a given unit over a given period (usually one day) at a given index of fire danger.

Fire Load Index (FLI)

1 Numerical rating of the maximum effort required to contain all probable fires occurring within a rating area during the rating period.

Fire Management

1 All activities for the management of wildland fires to meet land management objectives. Fire management includes the entire scope of activities from planning, prevention, fuels or vegetation modification, prescribed fire, hazard mitigation, fire response, rehabilitation, monitoring and evaluation.

Fire Management Area

1 One or more parcels of land having a common set of fire management objectives.

Fire Management Improvements

1 All structures built and used primarily for fire management, e.g. lookout towers, lookout cabins, telephone lines, and also firebreaks, fuelbreaks, and roads to lookouts.

Fire Management Objective

1 Planned, measurable result desired from fire protection and use based on land management goals and objectives.

Fire Management Plan (FMP)

1 A plan that identifies and integrates all wildland fire management and related activities within the context of approved land/resource management plans. A fire management plan defines a program to manage wildland fires (wildfire and prescribed fire). The plan is supplemented by operational plans, including but not limited to preparedness plans, preplanned dispatch plans, prescribed fire burn plans, and prevention plans. Fire management plans assure that wildland fire management goals and components are coordinated.

Fire Management Unit (FMU)

1 A land area definable by specified management objectives, constraints, topographic features, access, values to be protected, political boundaries, fuel types, major fire regime groups, and other defined elements that set it apart from an adjacent area. The primary purpose of developing Fire Management Units in fire management planning is to assist in organizing information in complex landscapes. A fire management unit may have dominant management objectives and pre-selected strategies assigned to accomplish these objectives.

Fire Pack

1 A one-person unit of fire tools, equipment, and supplies prepared in advance for carrying on the back.

Fire Perimeter

1 The entire outer edge or boundary of a fire.

Fire Planning

1 Systematic technological and administrative management process of designing organization, facilities, and procedures, including fire use, to protect wildland from fire.

Fire Planning Unit (FPU)

1 The geographic scope of the landscape defined for the fire management analysis. A Fire Planning Unit consists of one or more Fire Management Units. FPUs may relate to a single administrative unit, a sub-unit, or any combination of units or sub-units. FPUs are scalable and may be contiguous or non-contiguous. FPUs are not predefined by agency administrative unit boundaries, and may relate to one or more agencies. They may be described spatially.

Fire Plotting Map

1 A map used for determining the location of fires, commonly provided with an azimuth circle to facilitate location by cross bearings.

Fire Plow

1 A heavy duty plowshare or disc plow usually pulled by a tractor to construct a fireline.

Fire Potential

1 The likelihood of a wildland fire event measured in terms of anticipated occurrence of fire(s) and management's capability to respond. Fire potential is influenced by a sum of factors that includes fuel conditions (fuel dryness and/or other inputs), ignition triggers, significant weather triggers, and resource capability.

see also: Ignition Trigger
Resource Capability
Significant Weather Trigger

Fire Presuppression

1 Activities undertaken in advance of fire occurrence to help ensure more effective fire suppression. Activities includes overall planning, recruitment and training of fire personnel, procurement and maintenance of firefighting equipment and supplies, fuel treatment and creating, maintaining, and improving a system of fuelbreaks, roads, water sources, and control lines.

Fire Prevention

1 Activities such as public education, community outreach, law enforcement, engineering, and reduction of fuel hazards that are intended to reduce the incidence of unwanted human-caused wildfires and the risks they pose to life, property or resources.

Fire Progress Map

1 A map maintained on a large fire to show at given times the location of the fire, deployment of suppression forces, and progress of suppression.

Fire Progression

1 The progress of the fire outwards from the point of origin.

Fire Qualifications

1 Computerized interagency summary of fire suppression qualifications of listed personnel. Available information includes fire training record, fire experience record, and physical fitness testing score for each individual.

Fire Regime

1 Description of the patterns of fire occurrences, frequency, size, severity, and sometimes vegetation and fire effects as well, in a given area or ecosystem. A fire regime is a generalization based on fire histories at individual sites. Fire regimes can often be described as cycles because some parts of the histories usually get repeated, and the repetitions can be counted and measured, such as fire return interval.

see also: Fire Regime Groups

Fire Regime Current Condition Class

1 A qualitative measure classified into three classes describing the relative degree of departure from historical fire regimes, possibly resulting in alterations of key ecosystem components such as species composition, structural stage, stand age, canopy closure, and fuel loadings.

see also: Condition Class

Fire Regime Groups

1 A classification of fire regimes into a discrete number of categories based on frequency and severity. The national, coarse-scale classification of fire regime groups commonly used includes five groups: I - frequent (0-35 years), low severity; II - frequent (0-35 years), stand replacement severity; III - 35-100+ years, mixed severity; IV - 35-100+ years, stand replacement severity; and V - 200+ years, stand replacement severity.

see also: Fire Regime

Fire Report

1 An official record of a fire, generally including information on cause, location, action taken, damage, costs, etc., from start of the fire until completion of suppression action. These reports vary in form and detail from agency to agency.

Fire Resistant Tree

1 A species with compact, resin-free, thick corky bark and less flammable foliage that has a relatively lower probability of being killed or scarred by a fire than a fire sensitive tree.

see also: Fire Sensitive Tree

Fire Resources

1 All personnel and equipment available or potentially available for assignment to incidents.

Fire Retardant

1 Any substance except plain water that by chemical or physical action reduces flammability of fuels or slows their rate of combustion.

Fire Return Interval

see: Fire Interval

Fire Risk

1 The chance of fire starting, as determined by the presence and activity of causative agents.

2 A causative agent.

3 A number related to the potential number of firebrands to which a given area will be exposed during the rating day (National Fire Danger Rating System).

Fire Scar

1 A healing or healed injury or wound to woody vegetation, caused or accentuated by a fire.

2 The mark left on a landscape by fire.

Fire Scar Analysis

1 Analysis of one or more fire scars to determine individual tree fire frequency or mean fire intervals for specified areas.

Fire Season

1 Period(s) of the year during which wildland fires are likely to occur, spread, and affect resources values sufficient to warrant organized fire management activities.

2 A legally enacted time during which burning activities are regulated by federal, state or local authority.

Fire Sensitive Tree

1 A species with thin bark or highly flammable foliage that has a relatively greater probability of being killed or scarred by a fire.

see also: Fire Resistant Tree

Fire Service

1 The organized fire protection service; its members, individually and collectively; allied organizations assisting protection agencies.

Fire Severity

1 Degree to which a site has been altered or disrupted by fire; loosely, a product of fire intensity and residence time.

see also: Burn Severity

Fire Shelter

1 An aluminized tent offering protection by means of reflecting radiant heat and providing a volume of breathable air in a fire entrapment situation. Fire shelters should only be used in life threatening situations, as a last resort.

Fire Shelter Deployment

1 The removing of a fire shelter from its case and using it as protection against fire.

Fire Shovel

1 Type of shovel specifically designed for use in constructing a fireline; has a tapered blade with both edges sharpened for scraping, digging, grubbing, cutting, and throwing.

Fire Simulator

1 Training device that imposes simulated fire and smoke on a landscape image, for the purpose of instructing fire suppression personnel in different fire situations and fire suppression techniques.

Fire Spread Model

1 A set of physics and empirical equations that form a mathematical representation of the behavior of fire in uniform wildland fuels.

Fire Storm

1 Violent convection caused by a large continuous area of intense fire. Often characterized by destructively violent surface indrafts, near and beyond the perimeter, and sometimes by tornado-like whirls.

see also: Blowup
Extreme Fire Behavior
Flare-up

Fire Suppressant

1 Any agent used to extinguish the flaming and glowing phases of combustion by direct application to the burning fuel.

Fire Suppression

1 All work and activities connected with control and fire-extinguishing operations, beginning with discovery and continuing until the fire is completely extinguished.

Fire Suppression Organization

1 The personnel and equipment collectively assigned to the suppression of a specific fire or group of fires.
2 The personnel responsible for fire suppression within a specified area.
3 The management structure, usually shown in the form of an organization chart of the persons and groups having specific responsibilities in fire suppression.

Fire Swatter

1 A fire tool that consists of a thick, flat piece of rubber on a long handle used to drag over or smother out flames of grass fires.

see also: Flapper

Fire Tool Cache

1 A supply of fire tools and equipment assembled in planned quantities or standard units at a strategic point for exclusive use in wildland operations.

Fire Trap

1 An accumulation of highly combustible material, rendering firefighting dangerous.
2 Any situation in which it is highly dangerous to fight fire.

Fire Treatment

1 The use of fire to accomplish a specified objective.

Fire Triangle

1 Instructional aid in which the sides of a triangle are used to represent the three factors (oxygen, heat, fuel) necessary for combustion and flame production; removal of any of the three factors causes flame production to cease.

Fire Type

1 A management distinction, made to satisfy legal and budget constraints, based on whether the ignition source was planned or unplanned. Under the implementation guidance, only two types of wildland fire – wildfire and prescribed fire – are recognized.

Fire Weather

1 Weather conditions which influence fire ignition, behavior, and suppression.

Fire Weather Forecast

1 A weather prediction specially prepared for use in wildland fire operations and prescribed fire.

Fire Weather Index (FWI)

1 A numerical rating in the Canadian fire danger rating system, based on meteorological measurements of fire intensity in a standard fuel type. (The standard fuel type is representative of jack pine and lodgepole pine.) The FWI is comprised of three fuel moisture codes, covering classes of forest fuel of different drying rates, and two indices that represent rate of spread and the amount of available fuel.

Fire Weather Station

1 A meteorological station specially equipped to measure weather elements that have an important effect on fire behavior.

Fire Weather Watch

1 A Fire Weather Watch is issued to advise of conditions which could result in extensive wildland fire occurrence or extreme fire behavior, which are expected to develop in the next 12 to 48 hours, but not more than 72 hours. In cases of dry lightning, a Fire Weather Watch may be issued for the next 12 hours.

see also: Red Flag Warning

Fire Whirl

1 Spinning vortex column of ascending hot air and gases rising from a fire and carrying aloft smoke, debris, and flame. Fire whirls range in size from less than one foot to over 500 feet in diameter. Large fire whirls have the intensity of a small tornado.

Firebase

1 A computerized program utilized to analyze the fire workload and project the organization to adequately manage the workload for a given response area.

Firebrand

1 Any source of heat, natural or human made, capable of igniting wildland fuels. Flaming or glowing fuel particles that can be carried naturally by wind, convection currents, or by gravity into unburned fuels.

Firebreak

1 A natural or constructed barrier used to stop or check fires that may occur, or to provide a control line from which to work.

FIRECAST

1 Set of computerized FIREMODELS run during fire season at the operations coordination center on preselected locations to indicate possible fire spread from those points for that date.

FireCode

1 Unique code (alpha-numeric) assigned to wildland fires. One FireCode project number per fire is assigned for use by all five federal wildland firefighting agencies. Fire codes may be any combination of four-digit alpha-numeric characters. Each agency's finance community incorporates the FireCode project number into the accounting code.

Fire-Day

1 In FireFamily Plus, a day with both a weather observation and at least one fire.

see also: Large Fire-Day
Multiple Fire-Day

FIREFAMILY (Fire Data Program)

1 A computer program that uses historical weather and fire data for fire planning. Its three major routines are FIRDAT, SEASON, and FIRINF.

FireFamily Plus

1 A software application that provides summaries of fire weather/danger climatology and occurrence for one or more weather stations extracted from NIFMID.

Firefighter

1 Person whose principal function is fire suppression.

Firefighting Forces

1 Qualified firefighters, together with their equipment and material, used to suppress wildland fires.

Firefighting Technology Implementation Program (FIRETIP)

1 A computer program through which the technology of FIRESCOPE is transferred to areas outside southern California, where complex, multi-agency fires and other incidents commonly occur.

Firefinder Map

1 A map, generally mounted on a wood or metal base, that is provided with an azimuth circle at the center of which is pivoted an alidade, and forms part of an Osborne Firefinder.

see also: Osborne Firefinder

Fire-flood Cycle

1 The greatly increased rate of water run off and soil movement from steep slopes that may follow removal of the vegetative cover by burning.

Fireground

1 Operational area on which firefighters combat a fire.

Firelamp (Fire and Land Management Planning)

1 Computerized multi-resource model that simulates the effects that naturally caused prescribed fires have on the future production of natural resources such as timber, forage, wildlife, recreation, and water.

Fireline

1 The part of a containment or control line that is scraped or dug to mineral soil.

Fireline Explosives (FLE)

1 Specially developed coils containing explosive powder that are detonated to create a fireline through ground fuels.

Fireline Intensity

1 The product of the available heat of combustion per unit of ground and the rate of spread of the fire, interpreted as the heat released per unit of time for each unit length of fire edge. The primary unit is Btu per second per foot (Btu/sec/ft) of fire front.

2 The rate of heat release per unit time per unit length of fire front. Numerically, it is the product of the heat yield, the quantity of fuel consumed in the fire front, and the rate of spread.

FIREMODEL

1 Computer program which with specified information (fuel, weather, topography) predicts an hourly rate of spread from a point of origin.

Fire-proofing

1 Removal or treatment of fuels to reduce the danger of fires igniting or spreading. (E.g., fire-proofing roadsides, campsites, structural timber.) Protection is relative, not absolute.

FIRESCOPE

1 Firefighting Resources of California Organized for Potential Emergencies. A multi-agency coordination system designed to improve the capabilities of California's wildland fire protection agencies. Its purpose is to provide more efficient resources allocation and utilization, particularly in multiple or large fire situations during critical burning conditions.

Firesetter

1 Person who starts a fire, usually deliberately and maliciously.

Firesetting

1 Starting a fire, usually deliberately and maliciously.

Firing Out

1 The act of setting fire to unburned fuels located between the control line and main fire in burning out operations.

Firing Technique

1 Any method or pattern of igniting a wildland area to consume the fuel in a prescribed pattern. E.g., heading or backing fire, spot fire, strip-head fire, and ring fire.

see also: Ignition Pattern

First Order Fire Effects (FOFE)

1 The effects that concern the direct or immediate consequences of fire, such as biomass consumption, crown scorch, bole damage, and smoke production. First order effects form an important basis for predicting secondary effects such as tree regeneration, plant succession, and changes in site productivity, but these involve interaction with many other non-fire variables.

see also: Second Order Fire Effects

First-in

1 Firefighters initially attacking a fire, usually the first to arrive at the fire scene.

Fix

1 Geographical position determined by visual reference to the surface, by reference to one or more radio navigational aids, by celestial plotting, or by any other navigational device.

Fixed Tank

1 A device mounted inside or directly underneath an aircraft which can contain water or retardant for dropping onto a fire.

Fixed-point Detection

1 Detection of fires from lookout towers or other semi-permanent locations as distinguished from roving ground patrols or aerial detection.

Flame

1 A mass of gas undergoing rapid combustion, generally accompanied by evolution of sensible heat and incandescence.

2 Light given off by burning gasses during the combustion process.

Flame Angle

1 Angle between the flame at the leading edge of the fire front and the ground surface, expressed in degrees.

Flame Depth

1 The depth of the fire front.

Flame Height

1 The average maximum vertical extension of flames at the leading edge of the fire front. Occasional flashes that rise above the general level of flames are not considered. This distance is less than the flame length if flames are tilted due to wind or slope.

Flame Length

1 The distance between the flame tip and the midpoint of the flame depth at the base of the flame (generally the ground surface), an indicator of fire intensity.

Flame Thrower

1 Device for throwing a stream of flaming liquid, used to facilitate rapid ignition during burn out operations on a wildfire or during a prescribed fire operation.

synonym: Terra Torch ®
see also: Backfire Torch
Burning Torch
Drip Torch

Flaming Combustion Phase

1 Luminous oxidation of gases evolved from the rapid decomposition of fuel. This phase follows the pre-ignition phase and precedes the smoldering combustion phase, which has a much slower combustion rate. Water vapor, soot, and tar comprise the visible smoke. Relatively efficient combustion produces minimal soot and tar, resulting in white smoke; high moisture content also produces white smoke.

Flaming Front

1 That zone of a moving fire where the combustion is primarily flaming. Behind this flaming zone combustion is primarily glowing or involves the burning out of larger fuels (greater than about 3 inches in diameter). Light fuels typically have a shallow flaming front, whereas heavy fuels have a deeper front.

see also: Fire Front

Flaming Phase

1 That phase of a fire where the fuel is ignited and consumed by flaming combustion.

Flammability

1 The relative ease with which fuels ignite and burn regardless of the quantity of the fuels. Preferred to "inflammability."

Flammable

1 Easily ignitable and capable of burning and producing flames.

see also: Nonflammable

Flammable liquid

1 A liquid generally with a flash point below 140F (60C) and a vapor pressure that does not exceed 40 PSI at 100F (37.8C).

Flank Fire

1 A firing technique consisting of treating an area with lines of fire set into the wind which burn outward at right angles to the wind.

synonym: Lateral Fire

Flanking Action

see: Flanking Fire Suppression

Flanking Fire Suppression

1 Attacking a fire by working along the flanks either simultaneously or successively from a less active or anchor point and endeavoring to connect two lines at the head.

Flanks of a Fire

1 The parts of a fire's perimeter that are roughly parallel to the main direction of spread.

Flapper

1 Fire suppression tool, sometimes improvised, used in direct attack for smothering out flames along a fire edge; may consist merely of a green pine bough or wet sacking, or be a manufactured tool such as a flap of belting fabric fastened to a long handle.

see also: Fire Swatter

Flare-up

1 Any sudden acceleration in rate of spread or intensification of the fire. Unlike blowup, a flare-up is of relatively short duration and does not radically change existing control plans.

see also: Blowup
Extreme Fire Behavior
Fire Storm

Flash Fuels

1 Highly combustible fine fuels such as grass, leaves, draped pine needles, fern, tree moss and some kinds of slash, which ignite readily and are consumed rapidly when dry.

see also: Fine Fuels

Flash Point

1 Lowest temperature at which the vapor of a combustible liquid can be made to ignite in air.

Flashover

1 Rapid combustion and/or explosion of unburned gases trapped at some distance from the main fire front. Usually occurs only in poorly ventilated topography.

2 Stage of a fire at which all surfaces and objects within a space have been heated to their ignition temperature, and flame breaks out almost at once over the surface of all objects within the space.

Flight Following

1 The method and process through which an aircraft is tracked from departure point to destination. Flight following is the knowledge of the aircraft location and condition at regular intervals with a reasonable degree of certainty such that, in the event of mishap, those on board may be rescued.

Flight Path

1 Track of an aircraft over the earth's surface.

2 Specified information relating to the intended flight of an aircraft that is filed orally or in writing with an air traffic control facility.

Flight Time

1 The time from the moment the aircraft first moves under its own power for the purpose of flight until the moment it comes to rest at the next point of landing.

Flight Visibility

1 Average forward horizontal distance from the cockpit of an aircraft in flight at which prominent unlighted objects may be seen and identified by day and prominent lighted objects may be seen and identified by night.

Floatable Pump

1 Small portable pump that floats in the water source.

Flow Conditioner

1 Chemical powders that will, in very small quantities, tend to prevent other powders from caking and flocculating. Imparts free-flowing qualities to powder. Used with fire retardant chemicals.

Fluid Foam

1 A low expansion foam type with some bubble structure and moderate drain time, exhibiting properties of both wet and dry foam types, which is used for extinguishment, protection, and mopup.

Fly Ash

1 Particulate matter emitted by a fire and larger than 10 microns in diameter with a consequently short residence time in the atmosphere.

Foam

1 The aerated solution created by forcing air into, or entraining air in water containing a foam concentrate by means of suitably designed equipment or by cascading it through the air at a high velocity. Foam reduces combustion by cooling, moistening and excluding oxygen.

Foam Blanket

1 A layer of foam which forms an insulating and reflective barrier to heat and is used for fuel protection, suppression, and mopup.

Foam Concentrate

1 The concentrated foaming agent as received from the manufacturer which, when added to water, creates a foam solution; use only those approved for use in wildland fire situations by the authority having jurisdiction.

Foam Generation

1 The foam production process of forcing air into or entraining air in foam solution, creating a mass of bubbles.

Foam Line

1 A body of foam placed along areas to be protected from fire; also used as an anchor for indirect attack in place of hand-made fire line.

Foam Solution

1 A low expansion foam type with no expansion, therefore lacking bubble structure, which is used for mopup and flame knockdown.

Foam Systems

1 The apparatus and techniques used to mix concentrate with water to make solution, pump and mix air and solution to make foam, and transport and apply foam. (Systems defined here include compressed air foam and nozzle aspirated.)

Foam Type

1 A term used to describe the consistency and viscosity of low expansion foam as the combination of drain time and expansion.

Foaming Agent

1 An additive that reduces the surface tension of water (producing wet water) causing it to spread and penetrate more effectively and which produces foam through mechanical means.

Foehn Wind

1 A warm, dry and strong general wind that flows down into the valleys when stable, high pressure air is forced across and then down the lee slopes of a mountain range. The descending air is warmed and dried due to adiabatic compression producing critical fire weather conditions. Locally called by various names such as Santa Ana winds, Devil winds, North winds, Mono winds, etc.

Folding Tank

1 A portable, collapsible water tank with a tubular frame. Tank capacities vary in size from 500-1500 gallons.

Foliage Freeze Indicators

1 Small branches, needles, and leaves on green vegetation that take on a windswept appearance and "freeze" in that position.

Food Unit

1 Functional unit within the Logistics Section responsible for providing meals for incident personnel.

Food Unit Leader (FDUL)

1 The ICS position responsible for supervising the Food Unit. Reports to the Service Branch Director or Logistics Section Chief.

see also: Food Unit

Forb

1 A plant with an herbaceous (soft, rather than permanent woody) stem, that is not a grass or grasslike plant.

Forced Landing

1 Landing necessitated by failure of engines, systems, or components which makes continued flight impossible and which may not result in damage.

Forcible Entry

1 Entering a structure of vehicle illegally by means or physical force, often characterized by prying doors and breaking windows.

Forecast Area

1 Geographical area for which a fire weather forecast is specified.

Forest Fire

1 Variously defined for legal purposes (e.g., the State of California Public Resources Code: uncontrolled fire on lands covered wholly or in part by timber, brush, grass, grain, or other flammable vegetation). Types of fires are ground, surface, and crown.

Forest Planning Language and Simulator (FORPLAN)

1 Computer program developed to facilitate the use of simulation for integrating many different resource management activities, including fire, into the land management planning process. FORPLAN incorporates unique characteristics of previous systems, links numerous models and data bases, allows selection of variable resolution levels, and permits discrete time simulation of disturbances on plants, fuels, and animals.

Forest Protection

1 Forestry branch concerned with prevention and damage control to forests from human actions (unauthorized fire, grazing, felling, smoke), pests and pathogens, and damage from storm, frost, and other climatic agents.

Forest Residue

1 Accumulation in the forest of living or dead (mostly woody) material that is added to and rearranged by human activities such as harvest, cultural operations, and land clearing.

Forest Service

1 Generally understood to mean an agency of the U.S. Department of Agriculture. However, some states also use Forest Service, e.g., Colorado State Forest Service.

Forestry Weather Information System (FWIS)

1 A real time system which takes observations and forecasts supplied by NWS in coded numeric form, reformats that input by computer based algorithms, and distributes the reformatted information as numeric and worded diagnoses and forecasts for specialized users in localized areas.

Forward Looking Infrared (FLIR)

1 Hand held or aircraft mounted device designed to detect heat differentials and display their images on a video screen. FLIRs have thermal resolution similar to IR line scanners, but their spatial resolution is substantially less; commonly used to detect hot spots and flareups obscured by smoke, evaluate the effectiveness of firing operations, or detect areas needing mopup.

Forward Rate of Spread

1 The speed with which a fire moves in a horizontal direction across the landscape, usually expressed in chains per hour or feet per minute.

Fragile Fire Cause Objects

1 Objects that are easily susceptible to damage from head and flame and can be easily damaged or destroyed by suppression action and/or during the evidence collection process. E.g., cigarette ash.

Free Burning

1 The condition of a fire or part of a fire that has not been slowed by natural barriers or by control measures.

Free Drop

1 Cargo, not attached to a parachute, that is dropped intentionally from an aircraft in flight.

Free Flow (Hydraulics)

1 Maximum water flow rate a fire pump will attain when there are no restrictions at the pump outlet or losses due to friction or head.

Freezing Rain

1 Rain that freezes upon contact with objects on the ground.

Frequency of Occurrence

1 A quantitative expression of the presence or absence of individuals of a species in a population; the ratio between the number of sample units that contain a species and the total number of sample units.

Friction Layer

1 The layer of the atmosphere in which the frictional force of the earth's surface exercises an appreciable influence on winds.

Friction Loss

1 Pressure loss caused by the movement of water or solution against the interior surface of fire hose, pipe, or fittings; normally measured in pressure loss per length of hose or pipe.

Friction Reducing Agent (FRA)

1 Water soluble substance that reduces frictional drag of solutions and dampens turbulent flow while being pumped through pipe or hose.

Front

1 In meteorology, the boundary between two air masses of differing atmospheric properties.

Frost

1 Crystals of ice formed and deposited like dew, but at a temperature below freezing.

Frozen

1 In the 1978 version of NFDRS, the herbaceous stage when cold temperatures kill herbaceous plants and force woody fuels into dormancy.

Fuel

1 Any combustible material, especially petroleum-based products and wildland fuels.

Fuel Arrangement

1 A general term referring to the spatial distribution and orientation of fuel particles or pieces.

Fuel Bed

1 An array of fuels usually constructed with specific loading, depth, and particle size to meet experimental requirements; also, commonly used to describe the fuel composition.

Fuel Bed Depth

1 Average height of surface fuels contained in the combustion zone of a spreading fire front.

Fuel Characteristics

1 Factors that make up fuels such as compactness, loading, horizontal continuity, vertical arrangement, chemical content, size and shape, and moisture content.

Fuel Class

1 Part of the National Fire Danger Rating System (NFDRS). Group of fuels possessing common characteristics. Dead fuels are grouped according to 1-, 10-, 100-, and 1000-hour timelag, and living fuels are grouped as herbaceous (annual or perennial) or woody.

Fuel Condition

1 Relative flammability of fuel as determined by fuel type and environmental conditions.

Fuel Continuity

1 The degree or extent of continuous or uninterrupted distribution of fuel particles in a fuel bed thus affecting a fire's ability to sustain combustion and spread. This applies to aerial fuels as well as surface fuels.

Fuel Depth

1 The average distance from the bottom of the litter layer to the top of the layer of fuel, usually the surface fuel.

see also: Fuel Bed Depth

Fuel Dryness Level (DL)

1 A quantitative measure of fuel moisture and receptability to ignition as determined by an accepted Fire Danger Rating System index that influences fire growth, intensity, or activity.

Fuel Group

1 An identifiable association of fuel elements of distinctive species, form, size, arrangement, or other characteristics. General fuel groups are grass, brush, timber, and slash.

Fuel Loading

1 The amount of fuel present expressed quantitatively in terms of weight of fuel per unit area. This may be available fuel (consumable fuel) or total fuel and is usually dry weight.

Fuel Management

1 Act or practice of controlling flammability and reducing resistance to control of wildland fuels through mechanical, chemical, biological, or manual means, or by fire, in support of land management objectives.

Fuel Model

1 Simulated fuel complex for which all fuel descriptors required for the solution of a mathematical rate of spread model have been specified.

Fuel Modification

1 Manipulation or removal of fuels to reduce the likelihood of ignition and/or to lessen potential damage and resistance to control (e.g., lopping, chipping, crushing, piling and burning).

synonym: Fuel Treatment

Fuel Moisture Analog

1 Device that emulates the moisture response of specific classes of dead fuels, constructed from organic or inorganic materials (e.g., half-inch ponderosa pine dowels representing ten-hour timelag fuels).

Fuel Moisture Content

1 The quantity of moisture in fuel expressed as a percentage of the weight when thoroughly dried at 212 degrees F.

Fuel Moisture Indicator Stick

1 A specially prepared stick or set of sticks of known dry weight continuously exposed to the weather and periodically weighed to determine changes in moisture content as an indication of moisture changes in wildland fuels.

Fuel Reduction

1 Manipulation, including combustion, or removal of fuels to reduce the likelihood of ignition and/or to lessen potential damage and resistance to control.

Fuel Size Class

1 A category used to describe the diameter of down dead woody fuels. Fuels within the same size class are assumed to have similar wetting and drying properties, and to preheat and ignite at similar rates during the combustion process.

Fuel Temperature

1 The temperature reading measured from a fuel stick fully exposed to sunlight, above a representative fuel bed, using one of two methods (within a 3/4-inch or across a 1/2-inch pine dowel).

Fuel Tender

1 Any vehicle capable of supplying engine fuel to ground or airborne equipment.

Fuel Treatment

1 Manipulation or removal of fuels to reduce the likelihood of ignition and/or to lessen potential damage and resistance to control (e.g., lopping, chipping, crushing, piling and burning).

synonym: Fuel Modification

Fuel Type

1 An identifiable association of fuel elements of distinctive species, form, size, arrangement, or other characteristics that will cause a predictable rate of spread or resistance to control under specified weather conditions.

Fuelbreak

1 A natural or manmade change in fuel characteristics which affects fire behavior so that fires burning into them can be more readily controlled.

Fuelbreak System

1 A series of modified strips or blocks tied together to form continuous strategically located fuel breaks around land units.

Fuels Wet Flag

1 A one-character code indicating whether or not fine fuels are wet or dry.

Fugitive Color

1 A coloring agent used in fire retardants that is designed to fade rapidly following retardant application in order to minimize the visual impacts of the retardant.

Full-thickness Burn

1 A burn involving all the layer of the skin. Muscle layers below the skin and bones may also be damaged. Muscle layers below the skin and bones may also be damaged. Areas of the skin may be charred black or areas that are dry and white. (also called Third Degree Burn)

see also: Partial-thickness Burn
Superficial Burn

Fume

1 An airborne irritating, noxious, or toxic smoke, vapor, or any combination of these produced by a volatile substance or a chemical reaction.

Function

1 In ICS, function refers to the five major activities, command, operations, planning, logistics and finance/administration.

Fusee

1 A colored flare designed as a railway warning device, widely used to ignite backfires and other prescribed fires.

- G -

Gallons per Minute (GPM)

1 The measure of water flow in firefighting. It is used to measure the output of wildland and structural fire engines, pumps, hose streams, nozzles, hydrants, and water mains.

Gap

1 Weak or missed area in a retardant drop or in a fireline.

Gate Valve

1 A valve with a gate-like disk that moves up and down at right angles to the flow when actuated by a stem screw and hand wheel. Gate valves are best for service that requires infrequent valve operation and where the disk is kept either fully open or closed.

Gear Pump

1 Positive displacement pump which uses closely meshed gears to propel water when high pressures and low volumes are desired; can be used safely only with clear water-- suspended particles of soil or rocks can quickly wear the gears and reduce pressure and volume of water.

General Fire Weather Forecast

1 A forecast, issued daily during the regular fire season to resource management agencies, that is intended for planning of daily fire management activities, including daily staffing levels, prevention programs, and initial attack on wildfires. Also called presuppression forecast.

see also: Incident Weather Forecast
Spot Weather Forecast

General Origin Area

1 The larger area where the fire started that is readily identifiable based on macro scale indicators and witness statements.

General Services Administration (GSA)

1 An agency of the United States Government that includes the Federal Supply Service, the Automated Data and Telecommunications Service, the Public Buildings Service, and the National Archives and Records Service.

General Staff

1 The group of incident management personnel reporting to the Incident Commander. They may each have a deputy, as needed. The General Staff consists of: Operations Section Chief, Planning Section Chief, Logistics Section Chief, and Finance/Administration Section Chief.

General Winds

1 Large scale winds caused by high- and low-pressure systems but generally influenced and modified in the lower atmosphere by terrain.

see also: Local Winds
Slope Winds

Geographic Area

1 A boundary designated by governmental agencies (wildland fire protection agencies) within which they work together for the interagency, intergovernmental planning, coordination, and operations leadership for the effective utilization of emergency management resources within their area. There are nine geographic areas. A listing of the areas can be found in the National Interagency Mobilization Guide, Chapter 20, section 21.1 along with listings of the Geographic Coordinating Areas and Geographic Area Coordination Centers.

see also: Geographic Area Coordination Center
Geographic Coordinating Area

Geographic Area Coordinating Group (GACG)

1 An interagency body of fire management representatives from each federal and state land management agency within a nationally recognized regional area that provides leadership and support to facilitate safe and efficient fire management activities. Working collaboratively, a GACG's mission is not only for wildland fire emergencies, but for other emergency incidents, as necessary.

Geographic Area Coordination Center (GACC)

1 The physical location of an interagency, regional operation center for the effective coordination, mobilization and demobilization of emergency management resources. A coordination center serves federal, state and local wildland fire agencies through logistical coordination of resources throughout the geographic area, and with other geographic areas, as well. Listings of geographic coordination centers and their respective geographic coordinating areas can be found within the National Interagency Mobilization Guide.

see also: Geographic Area
Geographic Coordinating Area

Geographic Coordinating Area

1 A boundary designated by governmental agencies (wildland fire protection agencies), that may coincide with a geographic area boundary or may be a subdivision of a geographic area within which they work together coordinating, for the effective, mobilization and demobilization of emergency management resources within their area. Listings of geographic coordinating areas and geographic coordination centers can be found in the National Interagency Mobilization Guide, Chapter 20, Section 21.1.

see also: Geographic Area
Geographic Area Coordination Center

Geographic Information System Specialist (GISS)

1 The incident support position responsible for collecting and maintaining geospatial data and providing geospatial analysis and producing products (maps, etc.) in support of wildland fire incident planning. GISS is utilized in support of incident management, assigned to an ICS organization's Situation Unit.

Geostationary Operational Environmental Satellite (GOES)

1 The satellite used for data relay from NFDRS weather stations to ASCADS.

see also: National Fire Danger Rating System

Getaway Time

1 Elapsed time from receipt of notification by the personnel charged with initiating suppression action to the departure of the first attack unit.

Global Positioning System (GPS)

1 A system of navigational satellites operated by the U.S. Department of Defense and available for civilian use. The system can track objects anywhere in the world with an accuracy of approximately 40 feet.

Glowing Combustion

1 the process of oxidation of solid fuel accompanied by incandescence. All volatiles have already been driven off, oxygen reaches the combustion surfaces, and there is no visible smoke. This phase follows the smoldering combustion phase and continues until the temperature drops below the combustion threshold value, or until only non-combustible ash remains.

Glowing Combustion Phase

1 The final phase of combustion following flaming and smoldering phases.

see also: Glowing Combustion

Going Fire

1 Any wildfire on which suppression action has not reached an extensive mop up stage.

Gradient Wind

1 Wind flowing parallel to pressure isobars or contours with low pressure on the left of the observer in the Northern Hemisphere; velocity such that the pressure gradient, Coriolis, and centrifugal force acting in the area are in balance.

2 Wind created by differing barometric pressures between high- and low-pressure systems. Velocity is generally five to 30 miles per hour, and wind shifts are usually gradual as systems move and shift.

Grass Fire

1 Any fire in which the predominant fuel is grass or grasslike.

Grass Stem Indicators

1 Remains of grass stems having different appearances based on the direction of fire spread.

Grass Type

1 In NFDRS, the two grass types (annual, perennial) determine how seasonal drying of live herbaceous fuels is modeled.

Gravimetric

1 Of, or pertaining to, measurement by weight.

Gravity Tank

1 Water storage tank for fire protection and sometimes community water service that supplies water by gravity pressure.

Greenbelt

1 Landscaped and regularly maintained fuelbreak, usually put to some additional use (e.g., golf course, park, playground).

see also: Fuelbreak

Greenhouse Effect

1 the heating of the earth's surface by both atmospheric infrared radiation and incoming solar radiation.

Greenness Factor

1 In the 1988 version of NFDRS, a code scaled from 0 to 20 representing the greenness of grasses and shrubs from near dead to maximum greenness.

see also: Relative Greenness

Green-up

1 Green-up for the 1978 version of NFDRS model is defined as the beginning of a new cycle of plant growth. Green-up usually occurs once a year, except in desert areas where rainy periods can produce a flush of new growth more than once a year. Green-up may be signaled at different dates for different fuel models. Green-up should not be started when the first flush of green occurs in the area. Instead, the vegetation that will be the fire problem (represented by the NFDRS fuel model associated with the weather station) when it matures and cures should be identified. Green-up should start when the majority of this vegetation starts to grow.

Grid Ignition Technique

1 Method of igniting prescribed fires in which ignition points are set individually at predetermined spacing with predetermined timing throughout the area to be burned. Also called point source ignition technique.

Gridding

1 To search for a small fire by systematically traveling over an area on parallel courses or gridlines.

Gross Axle Weight Rating (GAWR)

1 The value specified by the manufacturer as the maximum allowable weight placed on an axle of a vehicle when fully equipped, including payload, fluids and occupants.

Gross Vehicle Weight (GVW)

1 Actual vehicle weight, including chassis, body, cab, equipment, water, fuel, crew, and all other load.

Gross Vehicle Weight Rating (GVWR)

1 The value specified by the manufacturer as the maximum allowable weight of a vehicle fully equipped, including payload, fluids and occupants.

Gross Weight

1 Total allowable weight of a loaded aircraft for takeoff or landing, adjusted for altitude differences.

Ground Effect

1 Reaction of a rotor downdraft against the ground surface, forming a "ground cushion" that increases lifting capability of that section of air.

Ground Fire

1 Fire that consumes the organic material beneath the surface litter ground, such as a peat fire.

Ground Fog

1 Fog which extends vertically to less than 20 feet.

Ground Fuel

1 All combustible materials below the surface litter, including duff, tree or shrub roots, punky wood, peat, and sawdust, that normally support a glowing combustion without flame.

Ground Speed

1 Speed with which an aircraft traverses the ground over which it flies.

Ground Support Unit

1 Functional unit within the Logistics Section responsible for the fueling, maintaining and repairing of vehicles, and the transportation of personnel and supplies.

Ground Support Unit Leader (GSUL)

1 The ICS position responsible for supervising the Ground Support Unit. Reports to the Support Branch Director or Logistics Section Chief.

see also: Ground Support Unit

Ground Truth

1 Verification at the site of what has been observed and/or measured from aircraft, satellites, other aerial platforms, aerial photographs, or maps.

Ground Visibility

1 Horizontal visibility observed at the ground.

Group

1 Groups are established to divide the incident into functional areas of operation. Groups are composed of resources assembled to perform a special function not necessarily within a single geographic division. Groups, when activated, are located between branches and resources in the operations section.

see also: Division

Growing Season Burning

1 Prescribed burning or wildland fire use during the photosynthetically-active growing season, where live fuel moistures are relatively high and the dominant vegetation, grasses, forbs, and herbaceous vegetation are fully greened.

Guard Unit

1 Geographic subdivision of a fire-protected area, delimiting the initial attack bounds of a single fire guard or fire crew.

Gum Thickened Sulphate (GTS)

1 A dry chemical product which is mixed with water to form a fire retardant slurry.

Gust

1 Rapid fluctuations in wind speed with a variation of 10 knots (11.5 mph) or more between peaks and lulls.

- *H* -

Haines Index

1 An atmospheric index used to indicate the potential for wildfire growth by measuring the stability and dryness of the air over a fire.

Hand Crew

1 A number of individuals that have been organized and trained and are supervised principally for operational assignments on an incident.

Handline

1 Fireline constructed with hand tools.

Hangup (Tree Falling)

1 A situation in which a tree is lodged in another, preventing it from falling to the ground.

Hard Suction Hose

1 Noncollapsible suction hose attached to a pump and used to draft water from a source lower than the pump. Customary hose sizes in wildland fire engines are 2 and 2-1/2 inches in diameter (51 and 64 mm).

Hazard

1 Any real or potential condition that can cause injury, illness or death of personnel, or damage to, or loss of equipment or property.

Hazard Assessment

1 Assess hazards to determine risks. Assess the impact of each hazard in terms of potential loss, cost, or strategic degradation based on probability and severity.

see also: Hazard Fuel
Risk

Hazard Fuel

1 A fuel complex defined by kind, arrangement, volume, condition, and location that presents a threat of ignition and resistance to control.

Hazard Map

1 Map of the area of operations that shows all of the known aerial hazards, including but not limited to power lines, military training areas, hang gliding areas, etc.

Hazard Pay

1 A salary differential that compensates employees for exposure to hazards in the course of their duties.

Hazard Reduction

1 Any treatment of living and dead fuels that reduces the potential spread or consequences of fire.

Hazardous Areas

1 Those wildland areas where the combination of vegetation, topography, weather, and the threat of fire to life and property create difficult and dangerous problems.

Hazardous Materials

1 Substances that are identified, classified, and regulated in the Code of Federal Regulations, Title 49 and Hazardous Materials Regulations 175.

2 A substance or material which has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce and which has been so designated.

Haze

1 A sufficient concentration of atmospheric aerosols to affect a visible attenuation of light and measurable reduction in visual range. The aerosol particle diameter is near the wavelength of visible light, optimizing the light scattering efficiency of the particles.

Haze Meter

1 Instrument for measuring the dependable range of distance at which a standard smoke column can be detected by the unaided eye under existing haze conditions.

Head Fire

1 A fire spreading or set to spread with the wind.

synonym: Advancing Fire

Head of a Fire

1 The most rapidly spreading portion of a fire's perimeter, usually to the leeward or up slope.

Head Pressure

1 Pressure due to elevation of water. Equals 0.433 pounds per square inch (PSI) per foot of elevation. (Approximately 0.5 PSI is required to lift water 1 foot in elevation)

Heading

1 The compass direction in which the longitudinal axis of the aircraft points.

Headlamp

1 Flashlight, ordinarily worn by firefighter on the front of the helmet.

Heat

1 Temperatures higher than that of the normal atmosphere, produced by the process of burning or oxidation.

Heat Content

1 The net amount of heat that would be given off if fuel burns when it is absolutely dry, noted as Btu per pound of fuel.

Heat Low

1 An area of low pressure caused by intense heating of the earth's surface. High surface temperature causes air to expand and rise, resulting in low atmospheric pressure and induces a weak inflow of air at the surface. Air which rises in a heat low is very dry so clouds seldom form. Rising air above a heat low produces a warm upper level high and results in a net outflow of air aloft. Heat lows remain practically stationary over areas which produce them.

Heat of Combustion

1 The heat energy resulting from the complete combustion of a fuel, expressed as the quantity of heat per unit weight of fuel. The high heat of combustion is the potential available, and the low heat of combustion is the high heat of combustion minus several losses that occur in an open system (primarily heat of vaporization of moisture in the fuel) .

Heat per Unit Area

1 Total amount of heat released per unit area as the flaming front of the fire passes, expressed as Btu/square foot; a measure of the total amount of heat released in flames.

Heat Probe

1 Apparatus used to detect heat.

Heat Release Rate

1 Total amount of heat produced per unit mass of fuel consumed per unit time.

2 Amount of heat released to the atmosphere from the convective-lift fire phase of a fire per unit time.

Heat Transfer

1 Process by which heat is imparted from one body to another, through conduction, convection, and radiation.

Heat Trough

1 A Heat Low which is elongated in shape. Also called: Heat Low; Thermal Low; Thermal Trough.

Heat Value

1 The total heat energy released during combustion, usually published as units of heat energy produced per unit mass of ovendry fuel consumed.

Heat Yield

1 The heat of combustion corrected for various heat losses, mainly the presence of moisture in the fuel. To a very close approximation, the quantity of heat per pound of fuel burned that passes through a cross section of the convection column above a fire that is burning in a neutrally stable atmosphere. Also called low heat of combustion.

Heavy Equipment Transport

1 Any ground vehicle capable of transporting a dozer, tractor, or other heavy piece of equipment. Also called lowboy.

Heavy Fuels

1 Fuels of large diameter such as snags, logs, large limbwood, which ignite and are consumed more slowly than flash fuels. Also called coarse fuels.

Heavy Ignition Source

1 Objects that will tend to settle or burrow under the surface of the materials first ignited as a result of either weight or temperature. I.e., welding slag, exhaust particles, large metal fragments, etc.

Height

1 The vertical measurement of vegetation from the top of the crown to ground level.

Held Line

1 All control line that still contains the fire when mopup is completed. Excludes lost line, natural barriers not backfired, and unused secondary lines.

Helibase

1 The main location within the general incident area for parking, fueling, maintenance, and loading of helicopters. It is usually located at or near the incident base.

Helibase Crew

1 A crew of individuals who may be assigned to support helicopter operations.

Helibase Manager (HEB1 or HEB2)

1 This ICS position is responsible for controlling helicopter take-offs and landings at a helibase, managing helibase assigned helicopters, supplies, fire retardant mixing and loading and reports to the Air Support Group Supervisor.

Helibase Radio Operator (HERO)

1 This ICS position is responsible for maintaining radio communications between incident assigned helicopters and helibases, and Takeoff and Landing Coordinator and reports to the Helibase Manager.

Helibucket

1 Specially designed bucket carried by a helicopter like a sling load and used for aerial delivery of water or fire retardants.

Helicopter

1 An aircraft that depends principally on the lift generated by one or more rotors for its support in flight.

synonym: Rotorcraft

Helicopter Boss (HELB)

1 An individual assigned to an agency helicopter to supervise assigned crew members, oversee the loading and unloading of personnel and/or cargo, and ensure that agency policies and procedures governing helicopter operations are followed.

Helicopter Coordinator (HLCO)

1 this ICS position is responsible for coordinating tactical and logistical helicopter missions at the incident and reports to the Air Tactical Group Supervisor. This position can be airborne or ground-based with one or more assigned to an incident, depending on the number and type of missions to be accomplished.

Helicopter Crewmember (HECM)

1 An individual assigned to an agency or call-when-needed helicopter to support helicopter operations.

Helicopter Manager (HCWN)

1 An individual assigned to a call-when-needed (CWN) helicopter to serve as helicopter boss, administer contracts, and verify CWN helicopter and pilot qualifications.

see also: Helicopter Boss

Helicopter Tender

1 A ground service vehicle capable of supplying fuel and support equipment to helicopters.

Helicopter Timekeeper

1 This ICS position is responsible for keeping time for helicopters assigned to the helibases and reports to the Helibase Radio Operator.

Heliport

1 A permanent facility for the operation of helicopters which has been built to FAA standards and which is marked on aeronautical charts. Natural resource agencies refer to agency heliports as permanent helibases.

Helipumper

1 Lightweight portable pump developed for transport by helicopter.

Helispot

1 A natural or improved takeoff and landing area intended for temporary or occasional helicopter use.

Helispot Manager (HESM)

1 This ICS position is responsible for controlling helicopter take-offs and landings at a helispot, managing helispot assigned helicopters, supplies, fire retardant mixing and loading and reports to the Helibase Manager.

Helitack

1 The utilization of helicopters to transport crews, equipment, and fire retardants or suppressants to the fireline during the initial stages of a fire. The term also refers to the crew that performs helicopter management and attack activities.

Helitack Crew

1 A crew of firefighters specially trained and certified in the tactical and logistical use of helicopters for fire suppression.

Helitack Foreman

1 A supervisory firefighter trained in the tactical use of helicopters for fire suppression.

Helitank

1 Specially designed tank, generally of fabric or metal, fitted closely to the bottom of a helicopter and used for transporting and dropping suppressants or fire retardants.

Helitanker

1 A helicopter equipped with a fixed tank, Air Tanker Board certified, capable of delivering a minimum of 1,100 gallons of water, foam, or retardant.

Helitorch

1 An aerial ignition device hung from or mounted on a helicopter to disperse ignited lumps of gelled gasoline. Used for backfires, burnouts, or prescribed burns.

see also: Aerial Ignition Device
Delayed Aerial Ignition Devices
Ping-Pong Ball System
Plastic Sphere Dispenser

Herb

1 A plant that does not develop woody, persistent tissue but is relatively soft or succulent and sprouts from the base (perennials) or develops from seed (annuals) each year. Includes grasses, forbs and ferns.

Herbaceous Fuel Moisture

1 In NFDRS, a calculated value representing the approximate moisture content of the live herbaceous vegetation in the rating area expressed as a percentage of the oven dry weight of the sample.

see also: Woody Fuel Moisture

Herbaceous Stage

1 The modeled condition of herbaceous vegetation (pre-green, green-up, transition, cured, frozen) for the 1978 version of NFDRS.

Hidden Fire Scar

1 Fire scar in a tree resulting from fire injury to the cambium without destruction of the overlying bark and therefore not readily discernible.

Higbee Cut

1 Removal of the first (i.e., outside) thread of a female or male coupling to prevent crossing or mutilation of threads. Dimpled rocker lug on female coupling indicates beginning of Higbee Cut.

High Expansion

1 Foam with an expansion between 201:1 and 1000:1.

High Fire Risk Day

1 A day when an ignition trigger and/or significant weather trigger and an appropriate fuel dryness level combine to create conditions that historically have resulted in a significant fire event for a particular area.

see also: Fuel Dryness Level
Ignition Trigger
Significant Fire Event
Significant Weather Trigger

High Pressure Fog

1 Small capacity spray jet produced at very high pressures (greater than 250 psi, the normal maximum pressure for standard ground tankers) and discharged through a small hose with a gun-type nozzle.

Historical Weather Station

1 In WIMS, a weather station that is no longer in service for which access to archived observations is still available in NIFMID.

Holding Actions

1 All actions taken to stop the spread of fire.

Holding Forces

see: Holding Resources

Holding Orbit

1 A predetermined maneuver which keeps an aircraft within a specified airspace while awaiting further orders.

Holding Resources

1 Resources assigned to do all required fire suppression work following fireline construction but generally not including extensive mop up.

Holdover Fire

1 A fire that remains dormant for a considerable time. Also called sleeper fire.

Home Assessment

1 Evaluation of a dwelling and its immediate surrounding to determine its potential to escape damage by an approaching wildland fire. Includes the fuels and vegetation in the yard and adjacent to the structure, roof environment, decking and siding materials, prevailing winds, topography, fire history, etc., with the intent of mitigating fire hazards and risks.

Home Unit

1 The designated agency or entity providing contracted resources that employs the individual who is actively pursuing a position performance assignment (completion of a position task book).

see also: Position Performance Assignment
Position Task Book

Hose Clamp

1 Crimping device for stopping the flow of water in a hose.

Hose Lay

1 Arrangement of connected lengths of fire hose and accessories on the ground, beginning at the first pumping unit and ending at the point of water delivery.

Hose Rack

1 Item for storing drying fire hose.

Hose Reel

1 A rotating drum used for winding booster hose (normally) for storing and dispensing.

see also: Booster Reel

Hose Thread

1 The specific dimensions of screw thread employed to coupled fire hose and equipment. American National Standards (NH) have been adopted for fire hose couplings threads in 3/4, 1-1/2, 2-1/2, 3-1/2, 4, 5, and 6-inch sizes.

Hose Washer

1 Device for cleaning the exterior of fire hose.

Hoseline Tee

1 A fitting that may be installed between lengths of hose to provide an independently controlled outlet for a branch line.

Hot Spot

1 A particularly active part of a fire.

Hotshot Crew

1 Intensively trained fire crew used primarily in hand line construction (Type-1).

Hot-spotting

1 Checking the spread of fire at points of more rapid spread or special threat. Is usually the initial step in prompt control, with emphasis on first priorities.

Hover

1 A stationary in-flight condition for helicopters when no directional flight is achieved.

Hover Ceiling

1 Highest altitude above sea level at which a helicopter can hover at maximum computed gross weight. It is generally specified whether the quoted hover ceiling refers to hovering in ground effect (HIGE) or hovering out of ground effect (HOGE).

Hover Hook-up

1 Attaching of a cargo lead line to a hovering helicopter.

Hoverfill

1 The process by which a helicopter fills a helibucket while hovering above the water source.

Hovering in Ground Effect (HIGE)

1 The situation in which a helicopter is hovering sufficiently close to the ground to achieve added lift due to the effects of "ground cushion." The HIGE ceiling, for a given gross weight, thus is greater than the HOGE (Hovering Out of Ground Effect) ceiling.

Human Resource Specialist (HRSP)

1 An individual having responsibility for assisting incident personnel and agency administrators with human resource, civil rights, and inappropriate behavior concerns. HRSP solicits involvement from the appropriate incident authorities in order to resolve human resource, civil rights, and inappropriate behavior issues informally, quickly, legally, and at the lowest impacted level.

Human-caused Fire

1 Any fire caused directly or indirectly by person(s).

Human-caused Risk

1 Part of the National Fire Danger Rating System (NFDRS). A model for predicting the average number of reportable human caused fires from a given ignition component value.

Human-caused Risk Scaling Factor

1 Part of the National Fire Danger Rating System (NFDRS). Number relating human-caused fire incidence to the ignition component in a fire danger rating area. It is based on three to five years of fire occurrence and fire weather data that adjusts the prediction of the basic human-caused fire occurrence model to fit local experience.

Humidity

1 General term referring to the moisture content of the atmosphere.

see also: Relative Humidity

Humus

1 Layer of decomposed organic matter on the forest floor beneath the fermentation layer and directly above the soil. It is that part of the duff in which decomposition has rendered vegetation unrecognizable and mixing of soil and organic matter is underway.

see also: Duff
Litter

Hydrophobicity

1 Resistance to wetting exhibited by some soils, also called water repellency. The phenomenon may occur naturally or may be fire-induced. It may be determined by water drop penetration time, equilibrium liquid-contact angles, solid-air surface tension indices, or the characterization of dynamic wetting angles during infiltration.

Hygrothermograph

1 Recording instrument combining, on one paper record, the variation of dry-bulb temperature and relative humidity as a function of time.

- I -

Identification Run

1 Dry run over the target area by the leadplane to indicate an airtanker's flight path and target, while the air tanker pilot is observing.

Igniter

1 A pyrotechnic device specifically designed to initiate burning of a fuel mixture or propellant.

Ignition Component

1 Part of the National Fire Danger Rating System (NFDRS). A rating of the probability that a firebrand will cause an actionable fire.

Ignition Energy

1 Quantity of heat or electrical energy that must be absorbed by a substance to ignite and burn.

Ignition Factor

1 The conditions, subsequent actions, and sequence of events that bring a competent ignition source into contact with the materials first ignited. Also referred to as the cause of the fire.

Ignition Method

1 The means by which a fire is ignited, such as hand-held drip torch, helitorch, and backpack propane tanks.

Ignition Pattern

1 Manner in which a prescribed fire is ignited. The distance between ignition lines or points and the sequence of igniting them is determined by weather, fuel, topography, firing technique, and other factors which influence fire behavior and fire effects.

Ignition Probability

1 Chance that a firebrand will cause an ignition when it lands on receptive fuels. (Syn. IGNITION INDEX)

Ignition Source

1 Any process or event capable of causing a fire.

see also: Fire Cause
Ignition Method

Ignition Time

1 Time between application of an ignition source and self-sustained combustion of a fuel.

Ignition Trigger

1 A causative agent for wildland fire. For example, human or lightning.)

IMI Interactivity Levels

1 Standards to which IMI products are developed conforming to interactivity level(s) which are appropriate for the instructional design, strategy, media, content, and course specifications.

see also: IMI Level 1 Interactivity
IMI Level 2 Interactivity
IMI Level 3 Interactivity
Interactive Multimedia Instruction

IMI Level 1 Interactivity

1 This is the lowest level of courseware development. It is normally a knowledge familiarity lesson, provided in a linear format (one idea after another). Use Level 1 to introduce an idea or concept, or to familiarize. Provide minimal interactivity by using selectable screen icons that are inserted into the linear, or almost linear, flow of the courseware. Allow the student little or no control of the sequence of instructional media presented, including: simple developed graphics, clip art, customer provided video and audio segments (clips). Make use of typical input/output peripherals throughout the lesson.

see also: Interactive Multimedia Instruction

IMI Level 2 Interactivity

1 This involves the recall of more information than a level 1 and allows the student more control over the lesson's scenario through screen icons and other peripherals, such as light pens or touch screens. Typically level 2 is used for non-complex operations and maintenance lessons. Simple emulations or simulations are presented to the user. As an example, the user is requested to rotate switches, turn dials, make adjustments, or identify and replace a faulted component as part of a procedure. This also may include simple to standard developed graphics, and/or clip art, and video and audio clips.

see also: Interactive Multimedia Instruction

IMI Level 3 Interactivity

1 This involves the recall of more complex information (compared to levels 1 and 2) and allows the user an increased level of control over the lesson scenario through peripherals such as light pen, touch screen, track ball, or mouse. Video, graphics, or a combination of both is presented simulating the operation of a system, subsystem, or equipment to the user. The lesson scenario training material typically is complex and involves more frequent use of peripherals to affect a transfer of learning. Operation and maintenance procedures are normally practiced with level 3 scenarios and students may be required to alternate between multiple screens to keep pace with the lesson material. Multiple software branches (two to three levels) and rapid response are provided to support remediation. Emulations and simulations are an integral part of this presentation. This may also include complex developed graphics, and/or clip art, and video and audio clips.

see also: Interactive Multimedia Instruction

Impeller

1 Rotating part of a centrifugal pump which imparts energy to the liquid to be moved. For shearing purposes, the impeller is on a rotating shaft within the body of liquid.

Implementation Plan

1 The design and definition of all the activities, resources, limitations, and contingencies required for successful wildland fire management.

Impulse

1 A term used in weather primarily to describe a weak disturbance that does not necessarily have an associated storm center or surface low. The disturbance usually does not create severe weather and is frequently associated with a marine air push.

Incendiary

1 A burning compound or metal used to produce intense heat or flame, like a bomb.

Incendiary Device

1 Contrivance designed and used to start a fire.

Incendiary Fire

1 A fire that is deliberately ignited under circumstances in which the person knows that the fire should not be ignited. An incendiary fire is not necessarily a fire that meets the legal definition of an arson fire.

Incident

1 An occurrence either human-caused or natural phenomenon, that requires action or support by emergency service personnel to prevent or minimize loss of life or damage to property and/or natural resources.

Incident Action Plan (IAP)

1 Contains objectives reflecting the overall incident strategy and specific tactical actions and supporting information for the next operational period. The plan may be oral or written. When written, the plan may have a number of attachments, including: incident objectives, organization assignment list, division assignment, incident radio communication plan, medical plan, traffic plan, safety plan, and incident map. Formerly called shift plan.

see also: Action Plan

Incident Base

1 Location at the incident where the primary logistics functions are coordinated and administered. (Incident name or other designator will be added to the term Base.) The incident command post may be collocated with the base. There is only one Base per incident.

Incident Business Advisor (IBA)

1 Liaison and advisor to the Agency Administrator or Area Commander and works directly for the Agency Administrator or Area Commander. Serves as a bridge to the Agency Administrator, Incident Management Team, and other incident support functions.

Incident Command Post (ICP)

1 Location at which primary command functions are executed. The ICP may be collocated with the incident base or other incident facilities.

Incident Command System (ICS)

1 A standardized on-scene emergency management concept specifically designed to allow its user(s) to adopt an integrated organizational structure equal to the complexity and demands of single or multiple incidents, without being hindered by jurisdictional boundaries.

Incident Commander (ICT1, ICT2, ICT3, ICT4, or ICT5)

1 This ICS position is responsible for overall management of the incident and reports to the Agency Administrator for the agency having incident jurisdiction. This position may have one or more deputies assigned from the same agency or from an assisting agency(s).

Incident Communications Center

1 The location of the communications unit and the message center.

Incident Communications Manager (INCM)

1 This ICS position is responsible for providing incident dispatch services and for receiving and transmitting radio and telephone messages to and among incident assigned personnel and reports to the Communications Unit Leader.

see also: Communications Unit

Incident Communications Technician (COMT)

1 This ICS position is responsible for the programming, tracking, installation, and maintenance of radio and telephone electronic communication equipment and system design for an incident, and reports to the Communications Unit Leader.

see also: Communications Unit

Incident Management Team

1 The incident commander and appropriate general and command staff personnel assigned to an incident.

Incident Medical Specialist Assistant (IMSA)

1 This individual assists the IMS manager in managing the IMS program and provides direct emergency medical and occupational health care to incident personnel according to the protocols of their IMS program. Frequently, this person may manage a remote camp medical unit.

Incident Medical Specialist Manager (IMSM)

1 This individual manages the IMS program on the incident and works for the medical unit leader (MEDL) if one is present. The IMS may also be a MEDL. This person must have successfully completed IMS assignments as an ISMT and IMSA, and the IMS training within their home region.

Incident Medical Specialist Program

1 An incident-based program to care for emergent and minor medical as well as common occupational health care problems of incident personnel. This program may be deployed to Type I and Type II incidents. Currently, this program is only available in three regions: Northwest (R6), Northern Rockies (R1) and Alaska (R10). In Alaska, the program is known as the Firemedic.

Incident Medical Specialist Technician (IMST)

1 This individual provides direct emergency medical and occupational health care to incident personnel according to the protocols of their IMS program and works under the supervision of the IMS manager or IMS assistant.

Incident Meteorologist (IMET)

1 A specially trained meteorologist who provides site specific weather forecasts and information at an incident. The individual works under the direction of the fire behavior analyst and the planning section chief.

see also: All Hazards Meteorological Response System
Micro-Remote Environmental Monitoring System

Incident Objectives

1 Statements of guidance and direction necessary for the selection of appropriate strategy(s), and the tactical direction of resources. Incident objectives are based upon agency administrators direction and constraints. Incident objectives must be achievable and measurable, yet flexible enough to allow for strategic and tactical alternatives.

Incident Organization

1 Resources, together with a complement of overhead personnel, calculated to be sufficient to provide fire efficient incident management.

Incident Overhead

1 All supervisory positions described in the Incident Command System.

Incident Qualifications Card

1 A card issued to persons showing their incident management and trainee qualifications to fill specified fire management positions in an incident management organization.

Incident Support Organization

1 Includes any off-incident support provided to an incident. Examples would be agency dispatch centers, airports, mobilization centers, etc.

Incident Weather Forecast

1 A special weather forecast for a specific incident prepared by a meteorologist on site at or near the incident area.

see also: General Fire Weather Forecast
Spot Weather Forecast

Incident with Potential

1 Wildland fire-related mishap that results in serious or non-serious injuries involving multiple personnel, near accident (which would have resulted in a serious injury or fatality), or substantial loss of property (less than $250,000). The mishap may be so complex and fraught with operational discrepancies that it has the potential to produce an accident, serious injury, or fatality given a similar environment or set of circumstances that existed at the time of the incident.

see also: Near Miss

Increaser

1 Increasing coupling used on hose, pump, or nozzles to permit connection of a larger size of hose.

Increment

1 Any resource or grouping of resources on which individual status is maintained.

Incremental Drop

1 Air tanker drop in which tank doors are opened in sequence so that fire retardant cascades somewhat continuously.

Independent Action

1 Fire suppression activities by other than regular fire suppression organizations or a fire cooperator.

Independent Crown Fire

1 A fire that advances in the tree crowns alone, not requiring any energy from the surface fire to sustain combustion or movement. Also called running crown fire.

Indicated Airspeed (IAS)

1 The speed of an aircraft as shown on its pitot static airspeed indicator. Calibrated to reflect standard atmosphere adiabatic compressible flow at sea level, uncorrected for airspeed system errors.

Indicator

1 Visual remains at a fire scene revealing the fire’s progress and action.

Indicator Categories

1 Classification of indicators into a variety of categories based on how they are formed and the types of material they are found on.

Indirect Attack

1 A method of suppression in which the control line is located some considerable distance away from the fire's active edge. Generally done in the case of a fast-spreading or high-intensity fire and to utilize natural or constructed firebreaks or fuelbreaks and favorable breaks in the topography. The intervening fuel is usually backfired; but occasionally the main fire is allowed to burn to the line, depending on conditions.

Indirectly Visible Area

1 Ground, or the vegetation growing thereon, that is not directly visible to a fixed point lookout but lies at not more than a specified depth (commonly 300 feet, 91 meters) below the lookout's line of sight.

Inductor

1 A control mechanism that allows a regulated quantity of foam concentrate to be introduced into the main hose line.

Industrial Fire Precaution Level (IFPL)

1 An application of fire danger rating to support regulation of contractors involved in land management activities for fire prevention purposes in the Pacific Northwest.

Industry Crew

1 Fire crew composed of mill, forestry, or construction workers.

Infrared (IR)

1 A heat detection system used for fire detection, mapping, and hotspot identification.

see also: Thermal Imagery

Infrared Groundlink (IR)

1 A capability through the use of a special mobile ground station to receive air-to-ground IR imagery at an incident.

Inhibition

1 Process of extinguishing fire by the use of an agent that interrupts the chemical reactions in the combustion process.

Inhibitor

1 Any agent which retards a chemical reaction.

Initial Attack (IA)

1 A preplanned response to a wildfire given the wildfire's potential. Initial attack may include size up, patrolling, monitoring, holding action or suppression.

Initial Attack Crew

1 Specially trained and equipped fire crew for initial attack on a fire.

Initial Attack Fire (IAF)

1 Fire that is generally contained by the attack units first dispatched, without a significant augmentation of reinforcements, within two hours after initial attack, and full control is expected within the first burning period.

Initial Attack Incident Commander (IAIC)

1 The incident commander at the time the first attack forces commence suppression work on a fire.

Initial Response

1 The initial decisions and actions taken in reaction to a reported incident.

Inmate Crew

1 Any fire crew composed of prison inmates or wards.

Inside Diameter (ID)

1 The internal diameter of a tube, conductor, or coupling, as distinguished from its OD (Outside Diameter). Fire hose sizes are classified by a nominal internal diameter.

In-stand Wind

1 Wind speed within a stand at about eye level.

Instrument Flight Rules Conditions (IFR)

1 Weather conditions below the minimum for flight under Visual Flight Rules and therefore requiring the observance of instruments inside the aircraft for controlling flight; generally considered to be less than 1000' AGL and 3 miles distant.

see also: Visual Flight Rules Conditions

Instrument Landing System (ILS)

1 System for airplane landing in which the pilot is guided by radio beams.

Instrument Shelter

1 Naturally or artificially ventilated structure, constructed to specifications and used to shield weather measuring instruments from direct sunshine and precipitation.

Interactive Multimedia Instruction (IMI)

1 A group of predominantly interactive, electronically delivered training. IMI products include instructional software and software management tools used in support of instructional programs. IMI products are teaching and management tools and may be used in combination or individually. Used individually, not all IMI products can be considered interactive, multimedia, or instructional. However, IMI products, when used in combination with one another, are interactive, multimedia, and instructional. IMI technology is one of the primary technologies to be used in distance learning.

see also: IMI Interactivity Levels

Interagency Resources Representative (IARR)

1 An individual who may be assigned to or requested by an incident to serve as the sending unit's representative to oversee the care and treatment of crews, overhead, and equipment assigned to an incident.

Interchangeable Course

1 A course developed by an interagency, all-hazard subject matter expert group containing the same learning objectives and content as an NWCG developed course. Interchangeable course do not require equivalency determination by a using agency and may have multiple course codes and/or numbers. These courses will be incorporated into IQCS/IQS and credit will be given for the NWCG course.

Intermittent Smoke

1 Smoke which becomes visible only at intervals.

Internal Load

1 Load carried inside the fuselage structure of an aircraft.

Internal Payload

1 Allowable aircraft cabin load, in pounds, with full fuel and pilot in calm air at standard atmosphere.

Inventoried Resources

1 Assigned resources which have checked in at the incident.

Inversion

1 Atmospheric inversion. The departure from the usual increase or decrease with altitude of the value of an atmospheric property. In fire management usage, nearly always refers to an increase in temperature with increasing height.
Also, the layer through which this departure occurs (also called inversion layer.) The lowest altitude at which the departure is found is called the base of the inversion.

see also: Atmospheric Inversion
Atmospheric Stability
Stable Layer of Air

Iron Pipe Thread (IPT)

1 A tapered thread standard that is used for connecting various sizes of rigid pipe. This standard may be referred to as tapered iron pipe thread (TIPT), National pipe thread (NPT), iron pipe thread (IPT), or iron pipe standard thread (IPS). With tapered thread, the threads and pipe sealant perform the seal at the connection. This is opposed to straight thread connectors which use a gasket to form the seal.

Island

1 An unburned area within a fire perimeter.

Isobar

1 A line connecting points of equal atmospheric pressure on a weather map.

Isotherm

1 A line connecting points of equal temperature on a weather map.

Isothermal Layer

1 Layer through which temperature remains constant with elevation.

I-Zone

1 An area that, in relation to wildland/urban fire, has a set of conditions that provides the opportunity for fire to burn from wildland vegetation to the home/structure ignition zone.

see also: Wildland Urban Interface

- J -

Jettison

1 Disposing of cargo, fuel, water or retardant overboard to lighten an aircraft or to improve its stability.

Job Hazard Analysis

1 A job hazard analysis identifies hazards associated with work projects and worksites, and identifies protective equipment or modified work procedures needed.

Joint Information Center (JIC)

1 A facility established as the central point of contact for news media and interest parties to coordinate incident information activities at the scene of the incident. Public information officials from all participating federal, state, and local agencies should collocate at the JIC.

Joint Information System (JIS)

1 A system that integrates incident information and public affairs into a cohesive organization designed to provide consistent, coordinated, timely information during crisis or incident operations.

Jump Spot

1 Selected landing area for smokejumpers.

Jump Suit

1 Approved protection suit worn for smokejumping.

Jurisdiction

1 The range or sphere of authority. Public agencies have jurisdiction at an incident related to their legal responsibilities and authority for incident mitigation. Jurisdictional authority at an incident can be political/geographical (e.g., city, county, state or federal boundary lines), or functional (e.g., police department, health department, etc.).

see also: Multijurisdiction Incident

Jurisdictional Agency

1 The agency having land and resource management responsibility for a specific geographical or functional area as provided by federal, state or local law.

- *K* -

Keetch-Byram Drought Index (KBDI)

1 An estimate (0-800) of the amount of precipitation (in 100ths of inches) needed to bring the top 8 inches of soil back to saturation. A value of 0 is complete saturation of the soil, a value of 800 means 8.00 inches of precipitation would be needed for saturation. In the 1988 version of NFDRS, outputs of KBDI are used to adjust live and dead fuel loadings.

see also: Drought Index

Kindling Point

1 Lowest temperature at which sustained combustion can be initiated for a specified substance. Also called ignition temperature.

KnockDown

1 To reduce the flame or heat on the more vigorously burning parts of a fire edge.

Knot

1 Nautical miles per hour, equal to 1.15 mph.

- *L* -

Ladder Fuels

1 Fuels which provide vertical continuity between strata, thereby allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease. They help initiate and assure the continuation of crowning.

Land Occupancy Fire

1 Fire started as a result of land occupancy for agricultural purposes, industrial establishment, construction, maintenance and use of rights-of-way, and residences, except equipment use and smoking.

Land Use Plan

1 A set of decisions that establish management direction for land within an administrative area; an assimilation of land-use-plan-level decisions developed through the planning process regardless of the scale at which the decisions were developed.

Land/Resource Management Plan (L/RMP)

1 A document prepared with public participation and approved by an agency administrator that provides general guidance and direction for land and resource management activities for an administrative area. The L/RMP identifies the need for fire's role in a particular area and for a specific benefit. The objectives in the L/RMP provide the basis for the development of fire management objective and the fire management program in the designated area.

Lapse Rate

1 Change of an atmospheric variable (temperature unless specified otherwise) with height.

Large Aircraft

1 Aircraft in which maximum certified gross weight at take-off exceeds 12,500 pounds.

Large Fire

1 For statistical purposes, a fire burning more than a specified area of land e.g., 300 acres.

2 A fire burning with a size and intensity such that its behavior is determined by interaction between its own convection column and weather conditions above the surface.

Large Fire-Day

1 In FireFamily Plus, a day with both a weather observation and at least one large (as defined by the user) fire.

see also: Fire-Day
Multiple Fire-Day

Lateral Fire

1 Rate or spread and intensity of a fire usually falling somewhere in between advancing and backing with spread lateral to the main direction of fire travel. Also called: flanking fire.

synonym: Flank Fire

Leach

1 Removal of soluble constituents from ashes or soil by percolation of water.

Lead Line

1 Line or set of lines made of rope, webbing, or cable and used in helicopter external load operations; usually placed between a swivel or the cargo hook and the load.

Lead Plane

1 Aircraft with pilot used to make trial runs over the target area to check wind, smoke conditions, topography and to lead air tankers to targets and supervise their drops.

Leader

1 The ICS title for an individual responsible for a task force, strike team, or functional unit.

Leader's Intent

1 A concise statement that outlines what individuals must know in order to be successful for a given assignment. The intent communicates three essential pieces of information:
- Task – What is the goal or objective
- Purpose – Why it is to be done
- End state – How it should look when successfully completed

Leadership

1 The art of providing purpose, direction, and motivation to a group of people in order to accomplish a mission and improve the organization. Leaders provide purpose by clearly communicating their intent and describing the desired end state of an assignment to their followers. Leaders provide direction by maintaining standards of performance for their followers. Leaders provide motivation by setting the example for their followers.

Leapfrog Method

1 A system of organizing workers in fire suppression in which each crew member is assigned a specific task such as clearing or digging fireline on a specific section of control line, and when that task is completed, passes other workers in moving to a new assignment.

Learning Content Management System (LCMS)

1 Any system that keeps learner information, can launch and communicate with SCOs, and can interpret instructions that tell it which SCO comes next.

see also: Shareable Content Object

Learning Objective

1 A description of the intended outcome of a training class, program, or evolution. The learning objective identifies the condition, the task, and the standard to which the student much achieve.

see also: Task

Learning Objects

1 Reusable learning objects represent an alternative approach to content development. In this approach, content is broken down into chunks. From a pedagogical perspective, each chunk might play a specific role within an instructional design methodology. Such chunks are called learning objects. There is no standard for the size (or granularity) of a learning object. Larger learning objects are typically harder to reuse, and smaller learner objects save less work for those who reuse them. Normally the happy medium has been estimated as between five and fifteen minutes of learning material. The requirements for each chunk are:
1) Each chunk must be able to communicate with learning systems using a standardized method that does not depend on the system
2) What happens within a chunk is the chunk's business.
3) How a learner moves between chunks is controlled by the learning system.
4) Each chunk must have a description (metadata tag) that enables designers to search for and find the right chunk for the right job.

see also: Shareable Content Object

Legitimate Smoke

1 Smoke from any authorized use of fire (e.g., locomotive, industrial operations, permitted debris burning).

Level of Service

1 Amount of fire prevention and fire suppression supplied; may be expressed several ways (e.g., percent of people or buildings protected, area protected, dollar value of property protected, firefighters per capita, water flow capability).

Liaison Officer (LOFR)

1 This ICS position is responsible for serving as the incident's point of contact for coordinating with agency representatives from assisting and cooperating agencies. Reports to the Incident Commander and is a member of the Command Staff. This position may have one or more assistants assigned.

see also: Agency Representative

Life-Safety

1 Refers to the joint consideration of both the life and physical well-being of individuals.

Lifting Processes

1 Any of the processes that lead to upward vertical motion in the atmosphere. These processes may include low level convergence, heating or thermal convection, orographic lifting over the mountains, and frontal lifting.

Light (Fine) Fuels

1 Fast-drying fuels, generally with a comparatively high surface area-to-volume ratio, which are less than 1/4-inch in diameter and have a timelag of 1 hour or less. These fuels readily ignite and are rapidly consumed by fire when dry.

Light Wind

1 Wind speed less than 7 mph (6 knots) measured at 20 feet above ground. At eye level, light winds are less than 3 mph (3 knots).

Lightning Activity Level (LAL)

1 Part of the National Fire Danger Rating System (NFDRS). A number, on a scale of 1 to 6, which reflects frequency and character of cloud-to-ground lightning (forecasted or observed). The scale for 1 to 5 is exponential, based on powers of 2 (i.e., LAL 3 indicates twice the lightning of LAL 2). LAL 6 is a special category for dry lightning and is closely equivalent to LAL 3 in strike frequency.

Lightning Fire

1 Wildfire caused directly or indirectly by lightning.

Lightning Fire Occurrence Index

1 Part of the National Fire Danger Rating System (NFDRS). Numerical rating of the potential occurrence of lightning-caused fires.

Lightning Risk (LR)

1 Part of the National Fire Danger Rating System (NFDRS). A number related to the expected number of cloud-to-ground lightning strokes to which a protection unit is expected to be exposed during the rating period. The LR value used in the occurrence index includes an adjustment for lightning activity experienced during the previous day to account for possible holdover fires.

Lightning Risk Scaling Factor

1 Part of the National Fire Danger Rating System (NFDRS). Factor derived from local thunderstorm and lightning-caused fire records that adjusts predictions of the basic lightning fire occurrence model to local experience, accounting for factors not addressed directly by the model (e.g., susceptibility of local fuels to ignition by lightning, fuel continuity, topography, regional characteristics of thunderstorms).

Lightning Stroke Counter

1 Electronic sensor used to record the number of lightning strokes within a predetermined range over a specified period of time.

Lightweight Ignition Source

1 Objects that tend to rest on the surface of the materials first ignited. I.e., matches, cigarette butts, flat metal fragments, etc.

Limbing

1 Removing branches from a felled or standing tree, or from brush.

Limited Containment

1 Halting of fire spread at the head, or that portion of the flanks of a prescribed fire that is threatening to exceed prescription criteria, and ensuring that this spread rate will not be encountered again; does not indicate mopup.

Line Cutter

1 Fire crew member in the progressive method of line construction who cuts and clears away brush, small saplings, vines, and other obstructions in the path of the fireline; usually equipped with ax or brush hook, or pulaski.

Line Officer

1 Managing officer, or designee, of the agency, division thereof, or jurisdiction having statutory responsibility for incident mitigation and management.

see also: Agency Administrator

Line Scout

1 A firefighter who determines the location of a fire line.

Lined Fire Hose

1 Fire hose with a smooth inner coating of rubber or plastic to reduce friction loss.

Liquid Concentrate (LC)

1 Liquid phosphate fertilizers used as fire retardants, usually diluted three to five times prior to application.

Litter

1 The top layer of forest floor, composed of loose debris of dead sticks, branches, twigs, and recently fallen leaves or needles; little altered in structure by decomposition.

see also: Duff
Humus

Little Change

1 Insignificant change in wind speed, direction, and temperature (less than 5 degrees) and relative humidity (less than five percent), respectively. When used as a general statement in a long-range forecast, all four criteria apply.

Live Fuel Moisture Content

1 Ratio of the amount of water to the amount of dry plant material in living plants.

Live Fuels

1 Living plants, such as trees, grasses, and shrubs, in which the seasonal moisture content cycle is controlled largely by internal physiological mechanisms, rather than by external weather influences.

Live Herbaceous Moisture Content

1 Ratio of the amount of water to the amount of dry plant material in herbaceous plants, i.e., grasses and forbs.

Live Line

1 Hose line filled with water under pressure and ready to use.

synonym: Charged Line
see also: Live Reel

Live Reel

1 Hose line or reel on a fire engine, carried preconnected to the pump, ready for use without making connections to pump or attaching nozzle.

Live Run

1 Indicates that the air tanker has the target in sight and will make a retardant drop on this run over the target.

Live Woody Moisture Content

1 Ratio of the amount of water to the amount of dry plant material in shrubs.

Living Fuels

see: Live Fuels

Load and Hold

1 An order given to the airtanker pilot to pick up another load of retardant or water and hold at the reload base. The tanker is still committed to the fire.

Load and Return

1 Order given to the air tanker pilot to pick up another load of fire retardant or water and return to the fire.

Load Calculation Form

1 An agency form used to calculate helicopter allowable payload.

Loading Pad

1 Concrete pad at a retardant base on which aircraft stand when being loaded.

Loadmaster

1 Individual responsible to the Deck Coordinator for the manifesting, loading and unloading of personnel, equipment and cargo.

Local Agency

1 Any agency having jurisdictional responsibility for all or part of an incident.

Local Resource

1 Resources within a dispatch center's area of responsibility.

Local Responsibility Area

1 Lands on which neither the state nor the federal government has any legal responsibility for providing fire protection.

Local Winds

1 Winds which are generated over a comparatively small area by local terrain and weather. They differ from those which would be appropriate to the general pressure pattern.

see also: General Winds
Slope Winds

Logging Debris

1 Unwanted tree parts (crowns, logs, uprooted stumps) remaining after harvest.

see also: Activity Fuels

Logistics Section

1 The ICS section responsible for providing facilities, services, and supplies in support of an incident.

Logistics Section Chief (LSC1 or LSC2)

1 This ICS position is responsible for supervising the Logistic Section. Reports to the Incident Commander and is a member of the General Staff. This position may have one or more deputies assigned.

see also: Logistics Section

Longline

1 A line or set of lines, usually in 50' increments, used in external load operations that allow the helicopter to place loads in areas in which the helicopter could not safely land.

Long-Range Forecast

1 Fire weather forecast for a period greater than five days in advance.

Long-Range Spotting

1 Large glowing firebrands are carried high into the convection column and then fall out downwind beyond the main fire starting new fires. Such spotting can easily occur 1/4 mile or more from the firebrand's source.

Long-Term Fire Danger

1 The results of those factors in fire danger affecting long-term planning; involves consideration of past records and conditions and probable future trends.

Long-Term Fire Retardant

1 Chemical that inhibits combustion primarily through chemical reactions between products of combustion and the applied chemicals, even after the water component has evaporated. Other chemical effects also may be achieved, such as film-forming and intumescence.

Lookout

1 A person designated to detect and report fires from a vantage point.
2 A location from which fires can be detected and reported.
3 A fire crew member assigned to observe the fire and warn the crew when there is danger of becoming trapped.

Lookout Dispatcher

1 Person combining the functions of lookout and dispatcher.

Lookout Firefighter

1 Person combining the functions of lookout and firefighter.

Lookout Patrol

1 Person who travels along ridges or other vantage points to discover, detect, report, and suppress fires.

Lookout Point

1 Vantage point selected for fire detection or observation.

Lookout Tower

1 Structure that elevates a person above nearby obstructions to sight for fires; generally capped by some sort of house or cupola.

Lookout(s), Communication(s), Escape Route(s), and Safety Zone(s) (LCES)

1 Elements of a safety system used by fire fighters to routinely assess their current situation with respect to wildland firefighting hazards.

Lopping

1 After felling, cutting branches, tops, and unwanted boles into lengths such that resultant logging debris will lie close to the ground.

Lopping and Scattering

1 Lopping logging debris and spreading it more or less evenly over the ground.

Lost Line

1 Any part of a fireline rendered useless by a breakover of the fire.

Low

1 An area of relatively low atmospheric pressure in which winds tend to move in a counterclockwise direction, spiraling in toward the low's center.

Low Expansion

1 Foam with an expansion between 1:1 and 20:1.

- M -

Macro Scale Indicators

1 Large single indicators or overall patterns of indicators that are readily visible from a distance.

Macroclimate

1 General large-scale climate of a large area or country as distinguished from smaller scale mesoclimate and microclimate.

Main Ridge

1 Prominent ridgeline separating river or creek drainages. Usually has numerous smaller ridges (spur) extending outward from both sides.

Major Disaster

1 Any natural catastrophe or, regardless of cause, any fire, flood, or explosion, in any part of the United States, which in the determination of the President causes damage of sufficient severity and magnitude to warrant major disaster assistance.

Major Repair (Aviation)

1 A repair (1) that, if improperly done, might appreciably affect weight, balance, structural strength, or other qualities affecting airworthiness or (2) that is not done according to accepted practices or cannot be done by elementary operations.

Male Coupling

1 An externally threaded hose nipple which fits in the thread of a female (internally threaded) swivel coupling of the same pitch and diameter. Nozzles attach to this type of coupling.

Management Action Points

1 Geographic points on the ground or specific points in time where an escalation or alternative of management actions is warranted. These points are defined and the management actions to be taken are clearly described in an approved Wildland Fire Implementation Plan (WFIP) or Prescribed Fire Plan. Timely implementation of the actions when the fire reaches the action point is generally critical to successful accomplishment of the objectives. Also called Trigger Points.

Management by Objectives

1 In ICS, this is a top-down management activity which involves a three-step process to achieve the incident goal. The steps are: establishing the incident objectives, selection of appropriate strategy(s) to achieve the objectives; and the tactical direction associated with the selected strategy. Tactical direction includes: selection of tactics, selection of resources, resource assignments and performance monitoring.

Management Requirements

1 The technical and scientific specifications for management activities or potential actions mandated by the agency administrator and defined in land/resource management plans. Management requirements are derived from land/resource management plan and fire management plan standards and guidelines information.

Managers

1 Individuals within ICS organizational units that are assigned specific managerial responsibilities, e.g., staging area manager or camp manager.

Manual Weather Station

1 A non-telemetered weather station that provides one observation every 24 hours for manual entry into WIMS.

see also: Automatic Weather Station

Manually Regulated

1 A proportioning method or device that requires a manual adjustment to maintain a desired mix ratio over a changing range of water flows and pressures.

Marine Air

1 Air which has a high moisture content and the temperature characteristics of an ocean surface due to extensive exposure to that surface. An intrusion of marine air will moderate fire conditions. Absence of marine air in coastal areas may lead to more severe fire danger.

Marine Climate

1 Regional climate under the predominant influence of the sea, that is, a climate characterized by marine air; the opposite of a continental climate.

Maritime Air

1 Air which has assumed high moisture content and the temperature characteristics of a water surface due to extensive exposure to that surface.

Mass Arsonist

1 An offender who sets three or more fires at the same location during a limited period of time.

Mass Fire

1 A fire resulting from many simultaneous ignitions that generates a high level of energy output.

Master Fire Chronology

1 Chronological listing of the dates of fires documented in a designated area, the dates being corrected by crossdating. Size of the area must be specified. Also called composite fire interval.

Material First Ignited

1 The fuel that is first set on fire by the heat of ignition; to be meaningful, both a type of material and form of material should be identified.

Mathematical Model

1 A model that is a quantitative and mathematical representation or simulation which attempts to describe the characteristics or relationship of physical events.

see also: Model

Mattock

1 Hand tool with a narrow hoeing surface at one end of the blade and a pick or cutting blade at the other end; used for digging and grubbing.

Maximum Certified Gross Weight

1 Absolute maximum allowable gross weight for an aircraft as established by the manufacturer and approved by the FAA.

Maximum Computed Gross Weight

1 Computed gross weight for an aircraft, obtained from the appropriate performance chart, which is the maximum gross weight appropriate to the applicable circumstance of configuration and/or environmental conditions.

Maximum Dry Bulb Temperature

1 The highest value for dry bulb temperature measured at the observation site during the preceding 24-hour period.

see also: Minimum Dry Bulb Temperature

Maximum Manageable Area (MMA)

1 The maximum geographic limits of spread within which a wildland fire is allowed to spread.

Maximum Relative Humidity

1 The highest value for relative humidity measured at the observation site during the preceding 24-hour period.

see also: Minimum Relative Humidity

May Day

1 International distress signal/call. When repeated three times it indicates imminent and grave danger and that immediate assistance is required.

Mcleod

1 A combination hoe or cutting tool and rake, with or without removable blades.

Mean Fire Return Interval

1 Arithmetic average of all fire intervals in a given area over a given time.

Mean Sea Level (MSL)

1 Average height of the surface of the sea for all stages of the tide over a 19-year period. NOTE: when the abbreviation MSL is used in conjunction with a number of feet, it implies altitude above sea level (e.g., 1000 feet MSL).

Measured Woody Fuel Moisture

1 Moisture content of the small branch wood and foliage of live woody plants, expressed as a percentage of the oven dry weight of the sample, collected monthly and used to supplement NFDRS modeled outputs.

see also: Woody Fuel Moisture

Medical Director

1 A physician who assumes the ultimate responsibility for the patient care aspects of the incident EMS program.

Medical Unit

1 Functional unit within the logistics section that is responsible for the emergency medical and occupational health care of incident personnel. Some incident management teams have placed this unit under safety.

Medical Unit Leader (MEDL)

1 The ICS position responsible for supervising the Medical Unit. Reports to the Service Branch Director or Logistics Section Chief.

see also: Medical Unit

Medium Expansion

1 Foam with an expansion between 21:1 and 200:1.

Medium-range Forecast

1 A forecast for a period extending from about two days to five days or a week in advance; there are no absolute limits to the period embraced by this definition.

Medivac

1 Mobile medical treatment and transportation.

Message Center

1 The message center is part of the incident communications center and is collocated or placed adjacent to it. It receives, records, and routes information about resources reporting to the incident, resource status, and administrative and tactical traffic.

Methodology

1 A set of standardized procedures and practices that have been peer-reviewed and have received general acceptance by the profession.

Micro Scale Indicators

1 Small individual indicators and patterns that are not easily observable without close observation or magnification.

Micro-Remote Environmental Monitoring System (Micro-REMS)

1 Mobile weather monitoring station. Each unit consists of a shipping container, solar panel, battery, temperature/relative humidity sensor, wind mast, wind direction/speed sensor, data logger and radio. A Micro-REMS usually accompanies an incident meteorologist and ATMU to an incident.

see also: Incident Meteorologist

Mid-Flame Windspeed

1 The speed of the wind measured at the midpoint of the flames, considered to be most representative of the speed of the wind that is affecting fire behavior.

Military Operations Area (MOA)

1 Military Operations Area found on aeronautical charts.

Military Time

1 The 24-hour clock system where midnight is 2400, one minute after midnight is 0001 and progresses to 2400 daily.

Millibar

1 A unit of pressure equal to a force of 1,000 dynes per square centimeter. (A dyne is the force that would give a free mass of one gram an acceleration of one centimeter per second per second.)

Mineral Ash

1 The residue of mineral matter left after complete combustion of wood (wood ash) or other organic material; consists largely of oxides, carbonates, and phosphates of Ca, K and Mg, together with other compounds.

Mineral Soil

1 Soil layers below the predominantly organic horizons; soil with little combustible material.

Minimum Cost Suppression Alternative

1 The alternative that achieves incident objectives, consistent with priority for firefighter and public safety, and is least expensive when considering expected costs for fire suppression and emergency stabilization and/or rehabilitation.

Minimum Dry Bulb Temperature

1 The lowest value for dry bulb temperature measured at the observation site during the preceding 24-hour period.

see also: Maximum Dry Bulb Temperature

Minimum Impact Suppression Techniques (MIST)

1 The application of strategy and tactics that effectively meet suppression and resource objectives with the least environmental, cultural and social impacts.

Minimum Relative Humidity

1 The lowest value for relative humidity measured at the observation site during the preceding 24-hour period.

see also: Maximum Relative Humidity

Miscellaneous Fire

1 Fire of known cause that cannot be properly classified into any of the eight standard causes of fires.

Mitigation Actions

1 Actions that are implemented to reduce or eliminate (mitigate) risks to persons, property or natural resources. These actions can include mechanical and physical tasks, specific fire applications, and limited suppression actions. Mitigation actions may include: fireline construction, fuel treatments and reductions, fuel breaks or barriers around critical or sensitive sites or resources, and creating "black lines" through the use of controlled burnouts to limit fire spread and behavior.

Mix Ratio

1 The ratio of liquid foam concentrate to water, usually expressed as a percent.

Mixing

1 A random exchange of air parcels on any scale from the molecular to the largest eddy.

Mixing Chamber

1 A tube, constructed with deflectors or baffles, that mixes foam solution and air to produce tiny, uniform bubbles in a short distance (1 to 2 ft).

Mixing Height

1 Measured from the surface upward, the height to which relatively vigorous mixing occurs due to convection. Also called mixing depth.

Mixing Layer

1 That portion of the atmosphere from the surface up to the mixing height. This is the layer of air, usually below a stable layer, within which pollutants are mixed by turbulence and diffusion. Also called mixed layer.

see also: Transport Wind Speed
Ventilation Factor

Mixmaster

1 The person in charge of fire retardant mixing operations with responsibility for quantity and quality of the slurry and for the loading of aircraft.

Mobile Radio

1 A two way radio unit on mobile apparatus (instead of base stations), usually semi-permanently attached to the apparatus.

Mobile Weather Unit Forecast

1 A special fire weather forecast for a specific fire prepared by a meteorologist on site at or near the fire area.

Mobilization

1 The process and procedures used by all organizations, federal, state and local, for activating, assembling, and transporting all resources that have been requested to respond to or support an incident.

Mobilization Center

1 An off-incident location at which emergency service personnel and equipment are temporarily located pending assignment, release, or reassignment.

Mobilization Guide

1 A written description of procedures used by federal, state, and local organizations for activating, assembling, and transporting resources that have been requested to respond to or support an incident.

Model

1 A simplified or generalized representation of reality; a description, analogy, picture, or hypothesis to help visualize something that cannot be directly observed.

see also: Conceptual Model
Mathematical Model

Model Arson Law

1 Model legislation, recommended by the Fire Marshals' Association of North America and adopted in most states, dealing with the subject of arson.

Model Fireworks Law

1 Model legislation recommended by the Fire Marshals' Association of North America and adopted by many states, regulating display of fireworks.

Modular Airborne Firefighting System (MAFFS)

1 A manufactured unit consisting of five interconnecting tanks, a control pallet, and a nozzle pallet, with a capacity of 3,000 gallons, designed to be rapidly mounted inside an unmodified C-130 (Hercules) cargo aircraft for use in cascading retardant chemicals on wildfires.

Moist Adiabatic Lapse Rate

1 Rate of decrease of temperature with increasing height of an air parcel lifted at saturation via adiabatic process through an atmosphere in hydrostatic equilibrium. Rate varies according to the amount of water vapor in the parcel and is usually between 2.0 and 5.0 degrees F per 1000 feet (3.6 and 9.2 degrees C per 1000 meters).

Moisture of Extinction

1 The fuel moisture content, weighed over all the fuel classes, at which the fire will not spread. Also called extinction moisture content (EMC).

Monitor

1 A turret-type nozzle usually mounted on an engine.

Monitoring

1 The orderly collection, analysis, and interpretation of environmental data to evaluate management's progress toward meeting objectives, and to identify changes in natural systems. Monitoring is also conducted on wildland fires to observe fire effects, fire behavior, or both. For example, the work done by Fire Effects Monitor (FEMO) or Field Observer (FOBS) positions.

Monsoon Climate

1 Climate characterized by (a) a long winter-spring dry season which includes a "cold season" followed by a short "hot season" immediately preceding the rains, (b) a summer and early autumn rainy season which is usually very wet (but highly variable from year to year), and (c) a secondary maximum of temperature immediately after the rainy season.

Mop Up

1 Extinguishing or removing burning material near control lines, felling snags, and trenching logs to prevent rolling after an area has burned, to make a fire safe, or to reduce residual smoke.

Mop Up Crew

1 A portion or all of a regular fire crew assigned to mop up work after the fire or a portion of the fire has been contained or controlled.

Mop Up Time

1 Elapsed time from containment or control of a fire until mop up is complete.

Mosaic

1 The intermingling of plant communities and their successional stages in such a manner as to give the impression of an interwoven design.

Most Efficient Level (MEL)

1 The fire management program budget level that results in the minimum cost plus net value change.

Move-up

1 System of redistributing remaining personnel and equipment following dispatch of other forces among a network of fire stations to provide the best possible response within the fire department's direct protection area in the event of additional calls for emergency assistance.

Moveup Method

1 Progressive method of fireline construction on a wildfire without changing relative positions in the line. Work is begun with a suitable space between workers; whenever one worker overtakes another, all of those ahead move one space forward and resume work on the uncompleted part of the line. The last worker does not move ahead until work is completed in his/her space. Forward progress of the crew is coordinated by a crew boss.

synonym: Bumpup Method

Multi-Agency Coordinating Group (MAC Group)

1 A national, regional, or local management group for interagency planning, coordination, and operations leadership for incidents. Provides an essential management mechanism for strategic coordination to ensure incident resources are efficiently and appropriately managed in a cost effective manner.

Multi-Agency Coordination (MAC)

1 A generalized term which describes the functions and activities of representatives of involved agencies and/or jurisdictions who come together to make decisions regarding the prioritizing of incidents, and the sharing and use of critical resources. The MAC organization is not a part of the on-scene ICS and is not involved in developing incident strategy or tactics.

Multi-Agency Coordination System (MACS)

1 MACS provides the framework to support coordination for incident prioritization, critical resource allocation, communication systems integration, and information coordination. MACS components include facilities, equipment, emergency operating centers EOCs), specific multi-agency coordination entities, personnel, procedures, and communications.

Multi-Agency Incident

1 An incident where one or more agencies assist a jurisdictional agency or agencies. May be single or unified command.

see also: Jurisdiction

Multicom

1 A VHF/AM aircraft radio frequency (122.9 MHz) assigned by the FAA for use in air-to-air communications.

Multijurisdiction Incident

1 An incident requiring action from multiple agencies that have a statutory responsibility for incident mitigation. In ICS these incidents will be managed under unified command.

see also: Jurisdiction

Multiple Fire Situation

1 High fire frequency over a short period of time in an administrative unit, usually overtaxing the normal initial attack capability of the unit.

Multiple Fire-Day

1 In FireFamily Plus, a day with both a weather observation and a number of fires equal to or greater than that determined by the user to be a significant workload.

see also: Fire-Day
Large Fire-Day

Multiple Points of Origin

1 Two or more separate points of fire origins at a fire scene; strong indication of arson.

Mutual Aid

1 Assistance in firefighting or investigation by fire agencies, without regard for jurisdictional boundaries.

Mutual Aid Agreement

1 Written agreement between agencies and/or jurisdictions in which they agree to assist one another upon request, by furnishing personnel and equipment.

Mutual Threat Zone

1 A geographical area between two or more jurisdictions into which those agencies would respond on initial attack. Also called mutual response zone or initial action zone.

- *N* -

Napalm

1 An incendiary mixture with a jelling agent used in flamethrowers and bombs.

National Advanced Resources Technology Center (NARTC)

1 Multi-agency training facility at Pinal Air Park, Marana, Arizona, which specializes in presentation of national-level fire management training courses.

National Ambient Air Quality Standards (NAAQS)

1 A legal limit on the level of atmospheric contamination. The level is established as the concentration limits needed to protect all of the public against adverse effects on public health and welfare, with an adequate safety margin. Primary standards are those related to health effects. Secondary standards are designed to protect the public welfare from effects such as visibility reduction, soiling, material damage and nuisances.

National Association of State Foresters (NASF)

1 An organization consisting of the State Forester from each state and territory which promotes cooperation in forestry matters between the states and territories, the federal government and private forestry groups. It promotes legislation, programs and activities which will advance the practice of forestry and use of forest products.

National Environmental Satellite, Data and Information Service (NESDIS)

1 A National Oceanic and Atmospheric Administration Agency.

National Fire Codes (NFC)

1 The collected technical fire protection standards prepared by various committees of the National Fire Protection Association and published annually in 15 volumes.

National Fire Danger Rating System (NFDRS)

1 A uniform fire danger rating system that focuses on the environmental factors that control the moisture content of fuels.

see also: Fire Danger Rating System

National Fire Protection Association (NFPA)

1 A private, non-profit organization dedicated to reducing fire hazards and improving fire service.

National Fire Protection Association Standards (NFPA)

1 Standards of the National Fire Protection Association are frequently adopted by insurance agencies such as the National Board of Fire Underwriters as a basis for their regulations and used as a guide for municipal, state, or provincial laws, ordinances, and regulations.

National Forest Lands

1 Public lands, generally forest, range, or other wildland, administered by the Forest Service, USDA.

National Forest System

1 Consists of all national forest lands, the national grasslands and land utilization projects administered under title III of the Bankhead-Jones Farm Tenant Act, and other interests as defined in Section 9 of the National Forest Management Act of 1976.

National Interagency Coordination Center (NICC)

1 Coordinates allocation of resources to one or more coordination centers or major fires within the nation. Located in Boise, Idaho.

National Interagency Fire Center (NIFC)

1 A facility located at Boise, Idaho, jointly operated by several federal agencies, dedicated to coordination, logistical support, and improved weather services in support of fire management operations throughout the United States.

National Interagency Fire Management Integrated Database (NIFMID)

1 The archive of daily weather observations from WIMS.

National Interagency Incident Management System (NIIMS)

1 An NWCG developed program consisting of five subsystems which collectively provide a total systems approach to all-risk incident management. The subsystems are: The Incident Command System, Training, Qualifications and Certification, Supporting Technologies, and Publications Management.

National Park

1 A federal reservation administered by the National Park Service of the U.S. Department of the Interior in order to conserve unique scenery, flora and fauna, and any natural and historic objects within its boundaries for public enjoyment in perpetuity.

National Pipe Straight Hose Thread (NPSH)

1 Also known as National Pipe Straight Mechanical (NPSM) thread. This is a straight (nontapered) thread standard with the same threads per inch as the appropriate size iron pipe thread. It requires a gasket to seal and is the thread standard used by most U.S. industry.

National Resource Lands (NRL)

1 Public lands administered by the Bureau of Land Management, U.S. Department of the Interior.

National Response Plan

1 A plan that integrates federal government domestic prevention, preparedness, response, and recovery plans into one all-discipline, all-hazard plan.

National Standard Thread (NH)

1 Abbreviated (NH) for national hose. Specifically defined screw thread used on fire hose couplings.

National Wildfire Coordinating Group (NWCG)

1 An intergovernmental body that provides national leadership to develop, maintain and communicate standards, guidelines, qualifications, training, and other capabilities that enable interoperable operations among federal and non-federal entities for wildland fire program management.

see also: NWCG Standard

National Wildlife Refuge System

1 All lands, waters and interests therein administered by the Fish and Wildlife Service for the protection and conservation of fish and wildlife, including those that are threatened with extinction.

Native Species

1 A species which is a part of the original fauna or flora of the area in question.

Natural Barrier

1 Any area where lack of flammable material obstructs the spread of wildfires.

Natural Fuels

1 Fuels resulting from natural processes and not directly generated or altered by land management practices.

see also: Activity Fuels

Near Miss

1 Any potential accident which, through prevention, education, hazard reduction, or luck, did not occur.

NESDIS ID

1 An 8-character identifier assigned by NESDIS that becomes the RAWS identification number for use with the GOES satellite.

Net Value Change (NVC)

1 The sum of the changes in the value of natural resources affected by a fire. The basis for computing NVC is each resource's fire-induced value change (pluses and minuses) as computed and expressed on a per unit basis.

Neutral Atmosphere

1 Condition in which temperature decrease with increasing altitude is equal to the dry adiabatic lapse rate (i.e., the atmosphere neither aids nor hinders large-scale vertical motion).

Night (Aviation)

1 The time between the end of evening civil twilight and the beginning of morning civil twilight, as published in the American Air Almanac, converted to local time.

Nitrogen Dioxide (NO2)

1 The result of nitric oxide combining with oxygen in the atmosphere. A major component of photochemical smog.

Nitrogen Oxide (NO)

1 Product of combustion from transportation and stationary sources and a major contributor to acid deposition and the formation of ground level ozone in the troposphere.

Nomex ®

1 Trade name for a fire resistant synthetic material used in the manufacturing of flight suits and pants and shirts used by firefighters. Aramid is the generic name.

Non-attainment Area

1 An area identified by an air quality regulatory agency through ambient air monitoring (and designated by the Environmental Protection Agency), that presently exceeds federal ambient air standards.

Noncommercial Forest Land

1 Forest land incapable of yielding crops of commercially useful wood because of adverse site conditions, or productive forest land withdrawn from commercial timber use through statute or administrative regulation.

Nonflammable

1 Material unlikely to burn when exposed to flame under most conditions.

see also: Flammable

Nonprecision Approach Procedure

1 Standard aircraft instrument approach procedure in which no electronic glide slope is provided.

Nonstatistical Fire

1 Any fire not posing a threat to resources or property of the jurisdictional agency, regardless of whether action was taken by the agency.

Normal Fire Season

1 A season when weather, fire danger, and number and distribution of fires are about average.

2 Period of the year that normally comprises the fire season based on historical fire occurrence.

Normalized Difference Vegetation Index (NDVI)

1 A satellite observation-derived value that is sensitive to vegetative growth, measured at 1.1 km (0.6 mile) spatial and 1 week temporal scales.

Notice to Airmen (NOTAM)

1 Notice identified as either a NOTAM or Airmen Advisory containing information concerning the establishment, condition, or change in any component of, or hazard in, the National Airspace System, the timely knowledge of which is essential to personnel concerned with flight operations.

Nozzle Aspirated Foam System

1 A foam generating device that mixes air at atmospheric pressure with foam solution in a nozzle chamber.

Nozzle Operator

1 A person assigned to operate a fire hose nozzle, usually on a hand line.

NWCG Standard

1 A defined behavior, action, process, or equipment type, agreed upon by the National Wildfire Coordinating Group for wildland fire performance, and is necessary to meet consistent, interagency fire management activities.

see also: National Wildfire Coordinating Group

- O -

Objective

1 A description of a desired condition; quantified and measured, and where possible, with established time frames for achievement.

2 Specific, achievable, measurable, time-limited results to be achieved through land management practices, either through a description of a desired condition or the degree of desired change in an attribute.

Observation Time

1 Time of day required to record meteorological data at a fire danger station.

Obstruction to Vision

1 Condition in which obscuring phenomenon restricts horizontal visibility to six statute miles (10 km.) or less.

Occluded Front or Occlusion

1 The front that is formed when and where a cold front overtakes a warm front or a stationary front.

Occurrence Index (OI)

1 A number in the National Fire Danger Rating System related to potential fire incidence within a protection unit.

Officer

1 The ICS title for personnel responsible for the Command Staff positions of Safety, Liaison, and Information.

Off-road Vehicle (ORV)

1 Any motorized vehicle designed for, or capable of, cross-country travel on or immediately over land, water, sand, snow, ice, marsh, swampland, or other terrain.

synonym: All Terrain Vehicle

Offshore Flow

1 Wind blowing from land to water.

On-Call

1 Status of a federal casual or federal regular government employee used for timekeeping purposes. An employee is considered to be in on-call status (off shift-federal casuals and federal regular government employees) when he or she is allowed to leave a telephone number or to carry an electronic device for the purpose of being contacted, even though the employee is required to remain within a reasonable call-back radius and may include restrictions on alcohol consumption or use of certain medications. 5 CFR 551.431(b)(1)

One Lick Method

1 A progressive system of building a fireline on a wildfire without changing relative positions in the line. Each worker does one to several "licks", or strokes, with a given tool and then moves forward a specified distance to make room for the worker behind.

One-hour Timelag Fuel Moisture (1-h TL FM)

1 Moisture content of one-hour timelag fuels.

One-hour Timelag Fuels

1 Fuels consisting of dead herbaceous plants and roundwood less than about one-fourth inch (6.4 mm) in diameter. Also included is the uppermost layer of needles or leaves on the forest floor.

see also: One-hour Timelag Fuel Moisture

One-hundred Hour Timelag Fuel Moisture (100-h TL FM)

1 The moisture content of the 100-hour timelag fuels.

One-hundred Hour Timelag Fuels

1 Dead fuels consisting of roundwood in the size range of 1 to 3 inches (2.5 to 7.6 cm) in diameter and very roughly the layer of litter extending from approximately three-fourths of an inch (1.9 cm) to 4 inches (10 cm) below the surface.

see also: One-hour Timelag Fuel Moisture

One-thousand Hour Timelag Fuel Moisture (1,000-h TL FM)

1 The moisture content of the 1,000-hour timelag fuels.

One-thousand Hour Timelag Fuels

1 Dead fuels consisting of roundwood 3-8 inches in diameter and the layer of the forest floor more than about 4 inches below the surface.

see also: One-hour Timelag Fuel Moisture

Onshore Flow

1 Wind blowing from water to land.

Open Burning

1 Burning of any fuel outdoors without the use of mechanical combustion enhancements.

Open Line

1 Refers to open fire front where no line has been constructed.

Operating Weight

1 For helicopters, the equipped weight plus weight of the crew and fuel.

see also: Allowable Payload

Operational Control

1 The exercise of authority over initiating, conducting, or terminating any operation. Often associated with aviation operations.

Operational Period

1 The period of time scheduled for execution of a given set of tactical actions as specified in the Incident Action Plan. Operational Periods can be of various lengths, although usually not over 24 hours.

Operational Tempo

1 The speed and intensity of actions relative to the speed and intensity of the unfolding events in the operational environment.

Operations Branch Director (OPBD)

1 This ICS position is responsible for implementing that portion of an incident action plan (IAP) appropriate to a designated operational branch and reports to the Operations Section Chief.

see also: Operations Section

Operations Coordination Center (OCC)

1 Primary facility of the Multi-agency Coordination System (MACS); houses staff and equipment necessary to perform the MACS function.

Operations Section

1 The section responsible for all tactical operations at the incident. Includes branches, divisions and/or groups, task forces, strike teams, single resources and staging areas.

Operations Section Chief (OSC1 or OSC2)

1 This ICS position is responsible for supervising the Operations Section. Reports to the Incident Commander and is a member of the General Staff. This position may have one or more deputies assigned.

see also: Operations Section

Orbit

1 A circular holding pattern of an aircraft around a fixed location often related to a wildland fire. For example, the circular pattern of an air tanker in the vicinity of a wildland fire, waiting to make a retardant drop.

Ordering Manager (ORDM)

1 This ICS position is responsible for ordering personnel, equipment, and supplies for the incident and reports to the Supply Unit Leader.

see also: Supply Unit

Organic Matter

1 That fraction of the soil that includes plant and animal residues at various stages of decomposition, cells and tissues of soil organisms, and substances synthesized by the soil population.

Organic Soil

1 Any soil or soil horizon containing at least 30% organic matter (e.g., muck, peat).

Orographic

1 Pertaining to, or caused by mountains.

Orthophoto

1 Photograph obtained from the orthogonal (i.e., horizontal) projection of a correctly oriented stereoscopic model formed by two overlapping aerial photographs; an orthophoto is free of tilt and relief displacements.

Orthophoto Maps

1 Aerial photographs corrected to scale such that geographic measurements may be taken directly from prints. They may contain graphically emphasized geographic features and may be provided with overlays of such features as: water systems, facility location, etc.

Osborne Firefinder

1 A sighting device used by lookouts to determine the horizontal bearing and sometimes the vertical angle of a fire from a lookout.

synonym: Alidade
see also: Firefinder Map

Out-of-Service Resources

1 Resources assigned to an incident but unable to respond for mechanical, rest, or personal reasons.

Outside Aid

1 Firefighting assistance given to adjacent areas and nearby communities by contract or other agreement that covers conditions and payment for assistance rendered and services performed. Contrasted to mutual aid, in which neighboring firefighting organizations assist each other without charge.

Outside Diameter (OD)

1 External diameter of a cylinder or tube, conductor, or coupling as distinguished from the internal diameter.

Overhaul

1 Fire department procedure of inspecting premises after extinguishment of fire, to insure that fire is completely out and unable to rekindle before returning control to owner or occupants.

Overhead

1 Personnel assigned to supervisory positions, including incident commander, command staff, general staff, branch directors, supervisors, unit leaders, managers and staff.

Overload

1 Gross vehicle weight (GVW) in excess of the gross vehicle weight rating (GVWR) specified by the chassis manufacturer. Also an excess of weight over the gross vehicle axle weight rating (GAWR) specified by the chassis manufacture.

2 A situation that taxes an operational system to the limit of its functional capabilities. Such as too many fires for an individual unit to handle (fire overload), or too many orders for an individual dispatch center to process (dispatch overload).

Overwintering Fire

1 A fire that persists through the winter months until the beginning of fire season.

Oxidation

1 Process during which oxygen combines with another substance.

Oxidizer

1 The portion of a chemical mixture or compound which furnishes oxygen for burning a fuel or propellant, creating an oxide.

- P -

Pack Test

1 Used to determine the aerobic capacity of fire suppression support personnel and assign physical fitness scores. The test consists of walking a specified distance, with or without a weighted pack, in a predetermined period of time, with altitude corrections.

Packing Ratio

1 The fraction of a fuel bed occupied by fuels, or the fuel volume divided by bed volume.

Panoramic Photograph

1 Photographs from a lookout point, bearing azimuth and vertical angle scales, to assist in locating fires with a firefinder.

Panoramic Profile Map

1 A panoramic sketch drawn around the circumference of a firefinder map to show the profiles of the topography as it appears from the lookout.

Paracargo

1 Anything intentionally dropped, or intended for dropping, from any aircraft by parachute, by other retarding devices, or by free fall.

Parallel Attack

1 Method of fire suppression in which fireline is constructed approximately parallel to, and just far enough from the fire edge to enable workers and equipment to work effectively, though the fireline may be shortened by cutting across unburned fingers. The intervening strip of unburned fuel is normally burned out as the control line proceeds but may be allowed to burn out unassisted where this occurs without undue delay or threat to the fireline.

Parallel Pumping

1 Procedure by which the flow from two fire pumps is combined into one hose line.

Parallel Tandem Pumping

1 Procedure by which the flow from two fire pumps is combined into a third pump.

Parameter

1 A variable which can be measured quantitatively; sometimes, an arbitrary constant; associated with populations. One of the unknown values that determine a model.

see also: Statistic

Parking Tender

1 Person responsible to the deck coordinator for take-offs and landings of helicopters at an assigned touchdown pad. There is one parking tender for each touchdown pad.

Partial Risk

1 Part of the National Fire Danger Rating System (NFDRS). Contribution of a specific source to human-caused risk, derived from the daily activity level assigned a risk source and its risk source ratio.

Partial Risk Factor

1 Part of the National Fire Danger Rating System (NFDRS). Contribution to human-caused risk made by a specific risk source; a function of the daily activity level assigned that risk source and the appropriate risk source ratio.

Partial-thickness Burn

1 A burn where the outer layer of skin is burned through and the second layer of skin (dermis) is damaged and is typically, a painful injury. Burns of this type cause reddening, blistering, and a mottled appearance. (also called Second Degree Burn)

see also: Full-thickness Burn
Superficial Burn

Particle Size

1 The size of a piece of fuel, often expressed in terms of size classes.

Particulate Matter

1 Any liquid or solid particles. "Total suspended particulates", as used in air quality, are those particles suspended in or falling through the atmosphere. They generally range in size (diameter) from 0.1 to 100 micrometers.

Partners

1 All agencies and organizations that engage in joint decision making with federal agencies in planning and conducting fire management projects and activities.

Parts of a Fire

1 Different areas of the fire usually determined by the predominant direction of fire spread and delineated from the fastest moving area (head) to the slowest moving area (base or tail). The most rapidly moving portion is designated the head of the fire, the adjoining portions of the perimeter at right angles to the head are known as the flanks, and the slowest moving portion is known as the rear or the base of the fire.

Passive Crown Fire

1 A fire in the crowns of trees in which trees or groups of trees torch, ignited by the passing front of the fire. The torching trees reinforce the spread rate, but these fires are not basically different from surface fires.

Patch Burning

1 Burning in patches to prepare sites for group planting or sowing or to form a barrier to subsequent fires.

Patrol

1 To travel over a given route to prevent, detect, and suppress fires. Includes interaction with the public for wildland fire prevention and educational purposes.

2 To go back and forth vigilantly over a length of control line during and/or after construction to prevent breakovers, suppress spot fires, and extinguish overlooked hot spots.

3 A person or group of persons who carry out patrol actions.

Patrol Time

1 Elapsed time from completion of original mopping up until the fire is declared to be extinguished.

Patrol Unit

1 Any light, mobile unit with limited pumping and water capacity.

Pattern

1 The distribution of an aerially delivered retardant drop on the target area in terms of its length, width, and momentum (velocity x mass) as it approaches the ground. The latter determines the relative coverage level of the fire retardant on fuel within the pattern.

synonym: Drop Pattern

Pattern Clusters

1 A group of indicators in a close proximity, of the same or different categories, that exhibit consistent directional values.

Payload

1 Weight of passengers and/or cargo being carried by an aircraft.

Peak Fire Season

1 That period of the fire season during which fires are expected to ignite most readily, to burn with greater than average intensity, and to create damages at an unacceptable level.

Peak Monthly Average

1 Highest monthly average of human-caused fires calculated for a protection unit.

Peak Wind

1 The greatest 5-second average wind speed during the previous hour that exceeded 25 knots.

Peak Wind Direction

1 Direction at Peak Wind Speed.

Peak Wind Speed

1 Maximum wind speed during the previous 60 minutes.

Percolation

1 Passage of liquid through a porous body, as movement of water through soil.

Perennial Plant

1 A plant that lives for more than two growing seasons. For fire danger rating purposes, biennial plants are classed with perennial plants.

see also: Annual Plant

Performance Chart

1 A chart, table, or graph provided by the manufacturer for use in determining an aspect of helicopter and fixed-wing aircraft performance.

Performance Oriented Objectives

1 On-the-job performance enhancement is a result of online training. Performance oriented objectives or learning objectives for this training is developed, agreed to, and tested to ensure skill transfer. The purpose of learning objectives is to define the type of learning or performance outcomes that will occur at the conclusion of instruction and how learning will be assessed. Both objectives and performance outcomes should be written as precisely as possible in order to best determine whether they have been achieved.

Perimeter Access

1 Any road, trail, or route that will allow firefighting forces to reach the perimeter of a wildland fire.

Period of Alert

1 Period of time when suppression crews, equipment, and aircraft are kept ready for deployment on short notice; usually employed when fire danger reaches a predetermined severity index.

Permafrost

1 A short term for "permanently frozen ground"; any part of the earth's crust, bedrock, or soil mantle that remains below 32° F (0° C) continuously for a number of years.

Personal Protective Equipment (PPE)

1 That equipment and clothing required to mitigate the risk of injury from or exposure to hazardous conditions encountered during the performance of duty. PPE includes but is not limited to: fire resistant clothing, hard hat, flight helmets, shroud, goggles, gloves, respirators, hearing protection, chainsaw chaps, and shelter.

Personnel Accountability

1 The ability to account for the location and welfare of personnel, accomplished when supervisors ensure that the ICS principles and processes are functional and personnel are working within these guidelines.

Personnel Pool

1 Personnel who have reported to the incident without an assignment (i.e., they are not assigned to an increment, strike team, or organizational unit).

Personnel Time Recorder

1 Person responsible to the time unit leader for daily recording of the time of all personnel at the incident, posting commissary charges to the time reports, closing out all records prior to personnel leaving the incident, and distributing completed time documents according to each agency's policy.

Piling and Burning

1 Piling slash resulting from logging or fuel management activities and subsequently burning the individual piles.

Pilot Balloon Operation (PIBAL)

1 A method of determining winds aloft by periodically reading the elevation and azimuth angles of a theodolite, usually at one-minute intervals, while tracking the ascent of a small free-lift balloon. A PIBAL is commonly used for constructing a wind profile.

Pilotage

1 Navigation of aircraft by visual reference to landmarks.

Pilot-in-Command

1 Pilot responsible for the operation and safety of an aircraft during flight time.

Pin Lug Coupling

1 A hose coupling with one or more cylindrical studs on its outside rim. The studs allow the use of a spanner wrench to tighten the coupling.

Pincer Action

1 Direct attack around a fire in opposite directions by two or more attack units. Usually conducted from the fire's tail to head.

Ping-Pong Ball System

1 Mechanized method of dispensing DAIDs (Delayed Aerial Ignition Devices) at a selected rate. The DAIDs are polystyrene balls, 1.25 inches in diameter, containing potassium permanganate. The balls are fed into a dispenser, generally mounted in a helicopter, where they are injected with a water-glycol solution and then drop through a chute leading out of the helicopter. The chemicals react thermally and ignite in 25-30 seconds. The space between ignition points on the ground is primarily a function of helicopter speed, gear ratio of the dispenser, and the number of chutes used (up to four).

see also: Aerial Ignition Device
Delayed Aerial Ignition Devices
Helitorch
Plastic Sphere Dispenser

Plan of Attack

1 The selected course of action and organization of personnel and equipment in fire suppression, as applied to a particular fire or to all fires of a specific type.

Planetary Boundary Layer

1 That part of the earth's lower atmosphere that is directly influenced by the presence of the earth's surface and responds to surface forcings such as fronts, friction, evapotranspiration and convective mixing.

Planned Ignition

1 The intentional initiation of a wildland fire by management actions to meet specific objectives.

see also: Prescribed Fire

Planning Interval

1 Period of time between scheduled planning meetings.

Planning Meeting

1 A meeting held regularly throughout the duration of an incident, to select specific strategies and tactics for incident control operations and to plan for needed service and support. On larger incidents, the planning meeting is a major element in the development of the Incident Action Plan.

Planning Section

1 Responsible for the collection, evaluation, and dissemination of tactical information related to the incident, and for the preparation and documentation of incident action plans. The section also maintains information on the current and forecasted situation, and on the status of resources assigned to the incident. Includes the situation, resource, documentation, and demobilization units, as well as technical specialists.

Planning Section Chief (PSC1 or PSC2)

1 This ICS position is responsible for supervising the Planning Section. Reports to the Incident Commander and is a member of the General Staff. This position may have one or more deputies assigned.

see also: Planning Section

Plastic Sphere Dispenser (PSD)

1 Device installed, but jettisonable, in a helicopter, which injects glycol into a plastic sphere containing potassium permanganate, which is then expelled from the machine and aircraft. This produces an exothermic reaction resulting in ignition of fuels on the ground for prescribed or wildland fire applications.

see also: Aerial Ignition Device
Delayed Aerial Ignition Devices
Helitorch
Ping-Pong Ball System

Plow Line

1 Fireline constructed by a fire plow, usually drawn by a tractor or other motorized equipment.

see also: Dozer
Dozer Line
Tractor
Tractor Plow

Plume

1 A convection column generated by combustion (of wildland fuel).

see also: Convection Column

Plume Rise

1 How high above the level of release an emission plume rises.

Plume-dominated Wildland Fire

1 A wildland fire whose activity is determined by the convection column.

PM10 (PM10)

1 Particulate matter of mass median aerodynamic diameter (MMAD) less than or equal to 10 micrometers.

PM2.5 (PM2.5)

1 Particulate matter of mass median aerodynamic diameter (MMAD) less than or equal to 2.5 micrometers.

Pockets of a Fire

1 Unburned indentations in the fire edge formed by fingers or slow burning areas.

Point of Attack

1 That part of the fire on which work is started when suppression crews arrive.

Point of Origin

1 The location where a competent ignition source came into contact with the material first ignited and sustained combustion occurred.

Point Source

1 A permanent source of air pollution that can be distinctly identified such as a smokestack.

Point Source Fire Predictions

1 Predictions that apply to an initiating fire burning during a time when conditions have been relatively constant, or where it can be assumed that the fire will maintain a basically elliptical shape.

Poise

1 Unit of fluid viscosity in fire retardant, defined as tangential force per unit area (dynes/square centimeter) required to maintain unit difference in velocity (1 centimeter/second) between two parallel planes separated by 1 cm of fluid (1 poise=1 dyne-second/cubic centimeter).

Portable Pump

1 Small gasoline-driven pump that can be carried to a water source by one or two firefighters or other conveyance over difficult terrain.

Portatank

1 Container, either with rigid frame or self supporting, which can be filled with water or fire chemical mixture from which fire suppression resources can be filled. It can also be a source for charging hose lays from portable pumps or stationary engines.

Position Currency Requirement

1 The requirement to perform satisfactorily in a specified position within the last five years (three years for aviation and expanded dispatch positions) in order to maintain qualification for the position.

Position Performance Assignment

1 An assignment in which an individual is being evaluated for tasks found in the position task book.

see also: Position Task Book

Position Task Book (PTB)

1 A document listing the performance requirements (competencies and behaviors) for a position in a format that allows for the evaluation of individual (trainee) performance to determine if an individual is qualified in the position. Successful performance of PTB tasks, as observed and recorded by a qualified evaluator, will result in a recommendation to the trainee's home unit that the individual be certified in the position.

see also: Agency Certification
Behavior
Competency
Evaluator
Home Unit
Trainee

Positive Displacement Pump

1 A pump which moves a specified quantity of water through the pump chamber with each stroke or cycle; it is capable of pumping air, and therefore is self-priming, but must have pressure relief provisions if plumbing or hoses have shut-off nozzles or valves . Gear pumps and piston pumps are common examples of this type.

Potato Roll

1 Quick method of rolling hose for pick up; hose is rolled as a ball of string.

Pounds per Square Inch (PSI)

1 Measurement of pressure (e.g., pump pressure, nozzle pressure, friction loss in hose, pressure loss or gain due to elevation).

Preattack

1 A planned, systematic procedure for collecting, recording, and evaluating prefire and fire management intelligence data for a given planning unit or preattack block. The planning phase is usually followed by a construction and development program integrated with other resources and activities.

Preattack Block

1 Unit of wildland delineated by logical and strategic topographic features for preattack planning.

Preattack Planning

1 Within designated blocks of land, planning the locations of firelines, fire camps, water sources, and helispots; planning transportation systems, probable rates of travel, and constraints of travel on various types of attack units; and determining what types of attack units likely would be needed to construct particular firelines, their probable rate of fireline construction, and topographic constraints on fireline construction.

Precautionary Landing

1 A landing necessitated by apparent impending failure of engines, systems, or components which makes continued flight unadvisable.

Precipitation

1 Any or all forms of water particles, liquid or solid, that fall from the atmosphere and reach the ground.

Precipitation Amount

1 The total amount of precipitation that occurred within the preceding 24-hour period.

Precipitation Duration

1 Time, in hours and fraction of hours, that a precipitation event lasts. More precisely, for fire danger rating purposes, the length of time that fuels are subjected to liquid water.

Precipitation Gauge

1 Device commonly used to collect and permit measurement of any form of rain and snow sufficiently heavy to have fallen to the earth's surface. Also called rain gauge.

Precision Approach Procedure

1 A standard instrument approach procedure for fixed-wing aircraft in which an electronic glide slope is provided, such as ILS and PAR.

Precision Approach Radar (PAR)

1 Blind landing in which the aircraft is observed from the ground by means of radar and directed along a suitable glide path by instructions radioed to the pilot.

Preconnected

1 Hard suction hose or discharge hose carried connected to pump, eliminating delay occasioned when hose and nozzles must be connected and attached at fire.

Predictive Services

1 Those Geographic Area and National-level fire weather or fire danger services and products produced by wildland fire agency meteorologists and intelligence staffs in support of resource allocation and prioritization.

Pre-Green

1 In the 1978 version of NFDRS, the herbaceous stage approximately 30 days prior to green-up.

Preignition Combustion Phase

1 Thermal or chemical decomposition of fuel at an elevated temperature. This is the pre-combustion stage of burning during which distillation and pyrolysis predominate. Heat energy is absorbed by the fuel which, in turn, gives off water vapor and flammable tars, pitches, and gases. These ignite when mixed with oxygen to initiate the flaming combustion phase.

Preignition Phase

1 Preliminary phase of combustion in which fuel elements ahead of the fire are heated, causing fuels to dry. Heat induces decomposition of some components of the wood, causing release of combustible organic gases and vapors.

Preparedness

1 Activities that lead to a safe, efficient, and cost-effective fire management program in support of land and resource management objectives through appropriate planning and coordination.

2 Mental readiness to recognize changes in fire danger and act promptly when action is appropriate.

3 The range of deliberate, critical tasks, and activities necessary to build, sustain, and improve the capability to protect against, respond to, and recover from domestic incidents.

see also: Readiness

Preparedness Level

1 Increments of planning and organization readiness commensurate with increasing fire danger.

Preparedness Plan

1 A written plan providing for timely recognition of approaching critical fire situations, priority setting, the deployment of forces, and other actions to respond to those situations.

Prescribed Burning

1 Application of prescribed fire.

Prescribed Fire

1 Any fire intentionally ignited by management actions in accordance with applicable laws, policies, and regulations to meet specific objectives.

see also: Wildfire
Wildland Fire

Prescribed Fire Burn Plan

1 A plan required for each fire application ignited by management. Plans are documents prepared by qualified personnel, approved by the agency administrator, and include criteria for the conditions under which the fire will be conducted (a prescription). Plan content varies among the agencies.

synonym: Prescribed Fire Plan
see also: Implementation Plan

Prescribed Fire Module

1 A team of skilled and mobile personnel dedicated primarily to prescribed fire management that can ignite, hold and monitor prescribed fires.

see also: Wildland Fire Module

Prescribed Fire Plan

1 A plan for each prescribed fire, prepared by qualified personnel, approved by the agency administrator, which includes criteria for the conditions under which the fire will be conducted (a prescription).

synonym: Prescribed Fire Burn Plan

Prescription

1 In the context of wildland fire, a prescription is measurable criteria that define conditions under which a prescribed fire may be ignited. Prescriptions may also be used to guide selection of management responses to wildfire to define conditions under which management actions are most likely to achieve incident management objectives. Prescription criteria typically describe environmental conditions such as temperature, humidity and fuel moisture, but may also include safety, economic, public health, geographic, administrative, social, or legal considerations.

Pressure Gradient

1 The difference in atmospheric pressure between two points on a weather map. That is, the magnitude of pressure difference between two points at sea level, or at constant elevation above sea level. Wind speed is directly related to pressure gradient. If distance between constant pressure lines is reduced by one-half, wind speed will be doubled. Conversely, if distance between lines is doubled, wind speed will be reduced by one-half.

Pressure Loss

1 Reduction in water pressure between a pump or hydrant and a nozzle due to expenditure of pressure energy required to move water through a hose; includes losses due to back pressure, friction loss, elevation loss, and/or losses in fittings.

Pressure Pattern

1 The distribution of surface atmospheric pressure features over an area of the earth as shown on a weather map. Surface pressure features include lines of constant pressure (isobars), highs, lows, and pressure gradient. The pressure pattern is directly related to wind speeds and directions at specific locations.

Presuppression

1 Activities in advance of fire occurrence to ensure effective suppression action. Includes planning the organization, recruiting and training, procuring equipment and supplies, maintaining fire equipment and fire control improvements, and negotiating cooperative and/or mutual aid agreements.

Pretreat

1 The use of water, foam or retardant along a control line in advance of the fire. Often used where ground cover or terrain is considered best for control action.

Prevention

1 Activities directed at reducing the incidence of fires, including public education, law enforcement, personal contact, and reduction of fuel hazards (fuels management).

2 Actions to avoid an incident, to intervene for the purpose of stopping an incident from occurring, or to mitigate an incident's effect to protect life and property. Includes measures designed to mitigate damage by reducing or eliminating risks to persons or property, lessening the potential effects or consequences of an incident.

see also: Fire Education

Prevention of Significant Deterioration (PSD)

1 A program identified by the Clean Air Act to prevent air quality and visibility degradation and to remedy existing visibility problems. Areas of the country are grouped into 3 classes which are allowed certain degrees of pollution depending on their uses. National Parks and Wilderness Areas meeting certain criteria are "Class I" or "clean area" in that they have the smallest allowable increment of degradation.

Primary Lookout

1 A lookout point that must be staffed to meet planned minimum seen area coverage in a given locality. For that reason, continuous service is necessary during the normal fire season and the lookout (person) is not sent to fires.

Priming

1 Filling pump with water when pump is taking water not under a pressure head. Necessary for centrifugal pumps.

Probability

1 A number representing the chance that a given event will occur. The range is from 0% for an impossible event, to 100% for an inevitable event.

Probability Forecast

1 A forecast of the probability of occurrence of one or more of a mutually exclusive set of weather contingencies as distinguished from a series of categorical statements.

Probability of Ignition

1 The chance that a firebrand will cause an ignition when it lands on receptive fuels.

Procurement Unit

1 Functional unit within the Finance/Administration Section responsible for managing all financial matters pertaining to vendor contracts.

Procurement Unit Leader (PROC)

1 The ICS position responsible for supervising the Procurement Unit. Reports to the Finance/Administration Section Chief.

see also: Procurement Unit

Progressive Hose Lay

1 A hose lay in which double shutoff wye (Y) valves are inserted in the main line at intervals and lateral lines are run from the wyes to the fire edge, thus permitting continuous application of water during extension of the lay.

Progressive Method of Line Construction

1 A system of organizing workers to build fireline in which they advance without changing relative positions in line.

Project Activity Level (PAL)

1 An application of fire danger rating to support regulation of contractors involved in land management activities for fire prevention purposes in California.

Project Objectives

1 The specific results expected from completing a project.

Proportioner

1 A device that adds a predetermined amount of foam concentrate to water to form foam solution.

Protecting Agency

1 Agency responsible for providing direct incident management within a specific geographical area pursuant to its jurisdictional responsibility or as specified and provide by contract, cooperative agreement, etc.

see also: Fire Agency
Responsible Fire Agency

Protection

1 The actions taken to mitigate the adverse effects of fire on environmental, social, political, economic, and community values at risk.

Protection Area

1 That area for which a particular fire protection organization has the primary responsibility for attacking an uncontrolled fire and for directing the suppression action. Such responsibility may develop through law, contract, or personal interest of the firefighting agent (e.g., a lumber operator). Several agencies or entities may have some basic responsibilities (e.g., private owner) without being known as the fire organization having direct protection responsibility.

synonym: Direct Protection Area

Protection Boundary

1 The exterior perimeter of an area within which a specified fire agency has assumed a degree of responsibility for wildland fire control. It may include land in addition to that for which the agency has jurisdiction or contractual responsibility.

Protection Indicators

1 Fuels that are unburned or exhibit a less damaged appearance on the non-origin side of the fuel itself or other objects.

Protection Unit

1 A geographical area which is administratively defined and which is the smallest area for which organized fire suppression activities are formally planned.

Psychrometer

1 General name for instruments designed to determine the moisture content of air. A psychrometer consists of dry- and wet-bulb thermometers that give the dry- and wet-bulb temperatures, which in turn are used to determine relative humidity and dew point.

Public Aircraft

1 Aircraft used only in the service of a government or a political subdivision. It does not include any government-owned aircraft engaged in carrying persons for commercial purposes.

Public Information Officer (PIO1, PIO2, PIOF)

1 This ICS position is responsible for developing and releasing information about the incident to the news media, incident personnel, and to other appropriate agencies and organizations. Reports to the Incident Commander and is a member of the Command Staff. This position may have one or more assistants assigned.

Pulaski

1 A combination chopping and trenching tool widely used in fireline construction, which combines a single-bitted axe blade with a narrow adze-like trenching blade fitted to a straight handle.

Punky Material

1 Partly decayed material, such as old wood, in which fire can smolder unless it is carefully mopped up and extinguished. A good receptor for firebrands when dry.

Pyrolysis

1 The thermal or chemical decomposition of fuel at an elevated temperature. This is the preignition combustion phase of burning during which heat energy is absorbed by the fuel which, in turn, gives off flammable tars, pitches, and gases.

Pyrotechnic

1 A mixture of chemicals designed to produce heat, light, gas, smoke or noise.

- Q -

Quadrangle

1 Mapping unit which defines an area in terms of longitude and latitude distance. Two common scales are 1:24,000 quadrangles, which are 7.5' longitude x 7.5' latitude, and 1:62,500 quadrangles, which are 15' longitude x 15' latitude.

Qualification Sheet

1 A written resume of an expert witness used to show that expert's sufficient special expertise in the field.

Qualifications and Certification

1 This subsystem of NIIMS provides recommended qualification and certification for those personnel responding to an incident regionally or nationally, allowing for the development of local minimum standards to meet local needs. Standards typically include training, experience, and physical fitness.

see also: National Interagency Incident Management System

- R -

Radial

1 A magnetic bearing extending from a ground-based navigational system, providing airborne navigation information.

Radiant Burn

1 A thermal trauma that maybe a superficial, partial thickness or full thickness burn.

Radiant Heat Flux

1 The amount of heat flowing through a given area in a given time, usually expressed as calories/square centimeter/second.

Radiation

1 Propagation of energy in free space by virtue of joint, undulatory variations in the electric or magnetic fields in space, (i.e., by electromagnetic waves).

2 Transfer of heat in straight lines through a gas or vacuum other than by heating of the intervening space.

Radio Cache

1 A cache may consist of a number of portable radios, base station, and, in some caches, a radio repeater that is stored in a predetermined location for dispatch to incidents.

Radio Fix

1 Determination of position by one or more radio navigational aids.

Radiosonde

1 A device carried aloft by a balloon equipped with measuring instruments that automatically convert temperature, pressure, and humidity data into electrical impulses and transmit this information to a ground recorder.

see also: Sounding (Upper Air Sounding)

Railroad Fire

1 A fire resulting from any operation or activity of a railroad, except smoking.

Range Fire

1 Any wildfire on rangeland.

Ranger District

1 An administrative subdivision of a national forest (under a district ranger) or other tract of public land.

Rappelling

1 Technique of landing specifically trained and certified firefighters from hovering helicopters; involves sliding down ropes with the aid of friction-producing devices.

Rate of Spread

1 The relative activity of a fire in extending its horizontal dimensions. It is expressed as rate of increase of the total perimeter of the fire, as rate of forward spread of the fire front, or as rate of increase in area, depending on the intended use of the information. Usually it is expressed in chains or acres per hour for a specific period in the fire's history.

see also: Forward Rate of Spread

Rate of Spread Factor

1 A factor usually on a scale of 1 to 100 which represents a relative rate of forward spread for a specific fuel condition and fixed weather conditions (or fuel model). Factors can be used as multipliers, arguments for entering tables, or provide a ratio of values between two fuels.

Rate of Spread Meter

1 A device that computes the probable rate of spread of a fire for different combinations of fuel moisture, wind speed, and other selected factors.

Rating Period

1 Part of the National Fire Danger Rating System (NFDRS). The period of time during which a fire danger rating value is considered valid or representative for administrative or other purposes. Normally it is 24 hours extending from midnight to midnight.

Rawinsonde

1 Method of upper-air observation consisting of an evaluation of the wind speed and wind direction, temperature, pressure, and relative humidity aloft by means of a balloon-borne radiosonde tracked by a radar or radio direction-finder.

Reaction Intensity

1 The rate of heat release, per unit area of the flaming fire front, expressed as heat energy/area/time, such as Btu/square foot/minute, or Kcal/square meter/second.

see also: Combustion Rate

Readiness

1 Condition or degree of being completely ready to cope with a potential fire situation.

2 Mental readiness to recognize changes in fire danger and act promptly when action is appropriate.

see also: Preparedness

Rear (Of a Fire)

1 That portion of a fire spreading directly into the wind or down slope.

2 That portion of a fire edge opposite the head.

3 Slowest spreading portion of a fire edge. Also called heel of a fire.

Reasonably Available Control Measures (RACM)

1 Control measures developed by EPA which apply to residential wood combustion, fugitive dust, and prescribed and silvicultural burning in and around "moderate" PM-10 non-attainment areas. RACM is designed to bring an area back into attainment and uses a smoke management program which relies on weather forecasts for burn/no-burn days.

see also: Best Available Control Measures

Reburn

1 Repeat burning of an area over which a fire has previously passed, but left fuel that later ignites when burning conditions are more favorable.

2 An area that has reburned.

Receiving and Distribution Manager (RCDM)

1 This ICS position is responsible for receiving and distributing supplies and equipment ordered for the incident and reports to the Supply Unit Leader.

see also: Supply Unit

Re-Certification

1 Confirmation through the re-issuance of an incident qualification card that an individual has regained qualifications for a specified position that was lost through a lack of current experience. A key component in the certification or re-certification process is the subjective evaluation by the appropriate agency official of an individual's capability to perform in a position.

Reconnaissance (RECON)

1 To examine a fire area to obtain information about current and probable fire behavior and other related fire suppression information.

Recorders

1 Individuals within ICS organizational units who are responsible for recording information. Recorders may be found in planning, logistics and finance/administration units.

Recovery

1 The increase in fuel moisture as a result of increased relative humidity, usually occurring overnight.

2 The general term used to describe the maximum overnight value of atmospheric relative humidity.

Recreation Fire

1 A fire resulting from recreational use, except smoking.

Recurrent Training

1 Training scheduled at established intervals that has been identified as required training in order to maintain position currency.

Red Flag Warning

1 Term used by fire weather forecasters to alert forecast users to an ongoing or imminent critical fire weather pattern.

see also: Fire Weather Watch

Reel

1 A frame on which hose is wound, now chiefly used for "booster" or small hose (3/4- or l-inch hose) (19 or 25 mm) supplied by a water tank on the apparatus; also, a hand-drawn 2-wheel frame for 2-1/2 inch (64 mm) hose used in industrial plants.

Regional Haze

1 Visibility impairment caused by the cumulative air pollutant emissions from numerous sources over a wide geographic area.

see also: Haze

Rehabilitation

1 Efforts undertaken within three years of a wildland fire to repair or improve fire damaged lands unlikely to recover to a management approved conditions or to repair or replace minor facilities damaged by fire.

see also: Burned Area Rehabilitation

Rekindle

1 Reignition due to latent heat, sparks, or embers or due to presence of smoke or steam.

Relative Greenness (RG)

1 An NDVI-derived image of vegetation greenness compared to how green it has been historically.

see also: Greenness Factor

Relative Humidity (RH)

1 The ratio of the amount of moisture in the air, to the maximum amount of moisture that air would contain if it were saturated. The ratio of the actual vapor pressure to the saturated vapor pressure.

Relay

1 Use of two or more fire pumps to move water a distance which would require excessive pressures in order to overcome friction loss if only one pump were employed at the source.

Relay Tank

1 A tank, usually collapsible, used as a reservoir in the relay of water from one fire pump to another.

Release Order

1 The order that defines when personnel and/or equipment will be ready for release from an incident.

Relief Valve

1 A pressure-controlled device which bypasses water at a fire pump to prevent excessive pressures when a nozzle is shut down.

Reload Base

1 An airfield where air tankers are reloaded but not permanently stationed.

see also: Air Attack Base

Remote Automatic Weather Station (RAWS)

1 A weather station that transmits weather observations via GOES satellite to the Wildland Fire Management Information system.

Repeater

1 A radio signal station that automatically relays a radio transmission, sometimes over a different frequency, thereby increasing the range of transmission. Repeaters are often named for the mountaintops or peaks where they are installed.

Report Time

1 Elapsed time from fire discovery until the first personnel charged with initiating action for fire suppression are notified of its existence and location.

Reportable Fire

1 Any wildfire that requires fire suppression to protect natural resources or values associated with natural resources, or is destructive to natural resources.

Reporting Locations

1 Location or facilities where incoming resources can check-in at the incident. Check-in locations include: incident command post (resources unit), incident base, camps, staging areas, helibases, helispots, and direct to the line. Check-in at one location only.

see also: Check-in

Required Experience

1 Documented, satisfactory performance in a specified position needed to qualify for another (usually higher level) position. Required experience cannot be challenged.

Required Training

1 A course or courses that must be completed prior to initiating a position task book. Training which has been identified as required cannot be challenged; an agency equivalent course may be used as a substitute when the course meets or exceeds a required course's learning and performance objectives.

Rescue

1 Saving a life from fire or accident; removing a victim from an untenable or unhealthy atmosphere.

Rescue Medical

1 Any staffed ground vehicle capable of providing medical services.

Rescue Medical Vehicle

1 Any staffed ground vehicle capable of providing emergency medical care and staffed with appropriate number of trained personnel and equipment for that incident.

Reserve

1 In wildland fire suppression terminology resources not assigned to a specific task, but available for assignment.

Residence Time

1 The time, in seconds, required for the flaming front of a fire to pass a stationary point at the surface of the fuel. The total length of time that the flaming front of the fire occupies one point.

Residual Combustion Stage

1 The smoldering zone behind the zone of an advancing fire front.

Residual Smoke

1 Smoke produced by smoldering material. The flux of smoke originating well after the active flaming combustion period with little or no vertical buoyancy and, therefore, most susceptible to subsidence inversions and down-valley flows.

Resistance to Control

1 The relative difficulty of constructing and holding a control line as affected by resistance to line construction and by fire behavior. Also called difficulty of control.

Resistance to Line Construction

1 The relative difficulty of constructing control line as determined by the fuel, topography, and soil.

Resource Capability

1 The ability of the wildland fire program to respond to current and anticipated workload needs for the area of concern.

Resource Order

1 The form used by dispatchers, service personnel, and logistics coordinators to document the request, ordering or release of resources, and the tracking of those resources on an incident.

Resource Ordering and Status System (ROSS)

1 A national system that provides automated support to interagency and agency dispatch and coordination offices. The system will provide current status of resources available to support all-risk activities; enable dispatch offices to exchange and track resource ordering information electronically; enable dispatch offices to rapidly and reliably exchange mission-critical emergency electronic messages.

Resource Status Board

1 Visual aid containing pertinent information regarding fire organization, current operational period resources, previous operational period resources, and next operational period resources being prepared; placed at a convenient location in fire camp for review by fireline overhead personnel on large fires.

Resource Use Specialist

1 Person responsible to the planning section chief for determining capabilities and limitations of resources at an incident.

Resource Value-at-risk

1 Fire suppression planning tool providing a relative expression (in five classes) of fire effects on all resources (not the value of the resources themselves).

Resources

1 Personnel, equipment, services and supplies available, or potentially available, for assignment to incidents. Personnel and equipment are described by kind and type, e.g., ground, water, air, etc., and may be used in tactical, support or overhead capacities at an incident.

2 The natural resources of an area, such as timber, grass, watershed values, recreation values, and wildlife habitat.

see also: Active Resources
Allocated Resources
Assigned Resources
Available Resources
Values To Be Protected
Values-At-Risk

Resources Unit

1 Functional unit within the planning section responsible for recording the status of resources committed to the incident. The unit also evaluates resources currently committed to the incident, the impact that additional responding resources will have on the incident, and anticipated resource needs.

Resources Unit Leader (RESL)

1 The ICS responsible for supervising the Resources Unit. Reports to the Planning Section Chief.

see also: Resources Unit

Respirator

1 A simple filter mask for individual protection against smoke and fumes, recommended for use in fire suppression on wildfires only; not recommended for use on structure fires or fires involving most hazardous materials.

see also: Air Pack
Self-Contained Breathing Apparatus

Responsible Fire Agency

1 Agency with primary responsibility for fire suppression on any particular land area.

see also: Fire Agency
Responsible Fire Agency

Restoration

1 The continuation of rehabilitation beyond the initial three years or the repair or replacement of major facilities damaged by the fire.

Restricted Airspace

1 Airspace of defined dimensions identified by an area on the surface of the earth within the flight of an aircraft, which is subject to restrictions (but not wholly prohibited).

Restricted Category

1 Aircraft that is generally used for cargo, retardant dropping, agricultural operations, survey work and other specific projects, and may not transport passengers.

Restrictions

1 Measures taken by jurisdictional agencies to impose bans and standards of use on certain human activities that could lead to the cause of wildland fire. Restrictions may be applied to: smoking in designated areas; open flame; mechanical operations in high-risk areas; and off-road use.

see also: Closure

Retardant

1 A substance or chemical agent which reduces the flammability of combustibles.

Retardant Base

1 Ground facilities for mixing, storing, and loading fire retardant into air tankers.

Retardant Coverage

1 Area of fuel covered and degree of coverage on the fuel by a fire retardant, usually expressed in terms of gallons per hundred square feet (liters per square meter).

Retardant Drop

1 Fire retardant cascaded from an air tanker or helitanker.

Return and Hold

1 An order to an air tanker pilot to return to the retardant base and await further instructions; mission completed, further loads not required.

Reversible Siamese (SIMWYE)

1 Hose fitting that performs the functions of a Siamese or a wye (i.e., to combine the flow from two lines into a single line or to permit two lines to be taken from a single line).

see also: Siamese
Wye

Rheologic Properties

1 Flow characteristics of liquid fire retardants, especially their cohesiveness or ability to hold together while falling through the air.

Rheology

1 Science of deformation and flow of fire retardants and other liquids, especially of the cohesiveness bodies and stress-strain relationship of their particles.

Rich Tool

1 A long-handled combination rake and cutting tool, the blade of which is constructed of a single row of mowing machine cutter teeth fastened to a piece of angle iron. Also called fire rake or council rake.

see also: Council Tool

Ridge

1 An elongated area of relatively high atmospheric pressure extending from the center of a high-pressure region.

see also: Surface High

Ring Fire

1 A fire started by igniting the full perimeter of the intended burn area so that the ensuing fire fronts converge toward the center of the burn. Set around the outer perimeter of a resource to establish a protective black-line-buffer.

Risk

1 The chance of fire starting as determined by the presence and activity of causative agents.
2 A chance of suffering harm or loss.
3 A causative agent.
4 (NFDRS) A number related to the potential of firebrands to which a given area will be exposed during the rating day.

Risk Index

1 A number related to the probability of a firebrand igniting a fire.

Risk Management (RM)

1 A continuous, five-step process that provides a systematic method for identifying and managing the risks associated with any operation.

Risk Source

1 Identifiable human activity that historically has been a major cause of wildfires on a protection unit; one of the eight general causes listed on the standard fire report.

Risk Source Ratio

1 Portion of human-caused fires that have occurred on a protection unit chargeable to a specific risk source; calculated for each day of the week for each risk source.

Rocker Lug Coupling

1 Hose coupling in which the lugs used for tightening or loosening are semicircular in shape and designed to pass over obstructions.

Roll Cloud

1 A turbulent altocumulus-type cloud formation found in the lee of some large mountain barriers. The air in the cloud rotates around an axis parallel to the range. Also sometimes refers to part of the cloud base along the leading edge of a cumulonimbus cloud; it is formed by rolling action in the wind shear region between cool downdrafts within the cloud and warm updrafts outside the cloud. Also called rotor cloud.

Rotor

1 Assembly of airfoils (rotor blades), together with a hub and attachments, that rotates about an axis to provide lift and/or thrust on a helicopter.

Rotor Blast

1 Air turbulence occurring under and around the main rotor of an operating helicopter. Also called rotor downwash.

Rotor Diameter

1 The main rotor arc in feet and inches (meters). Used for planning helispot clearance.

Rotorcraft

1 An aircraft that depends principally on the lift generated by one or more rotors for its support in flight. Also called rotary wing.

synonym: Helicopter

Rough

1 The accumulation of living and dead ground and understory vegetation, especially grasses, forest litter, and draped dead needles, sometimes with addition of underbrush such as palmetto, gallberry, and wax myrtle. Most often used for southern pine types.

Rough Reduction

1 Reduction of fire hazard in rough, usually by prescribed burning.

Route Card

1 Index card used by a dispatcher and frequently carried on fire apparatus which lists specific directions for responding to individual rural properties. The card frequently includes a description of the property, water sources available, and any special information pertinent to fire suppression and rescue operations. Also called running card.

Run (Of a Fire)

1 Rapid advance of the head of a fire, characterized by a marked transition in fireline intensity and rate of spread with respect to that noted before and after the advance.

Running Fire

1 Behavior of a fire spreading rapidly with a well defined head.

Rural

1 Any area wherein residences and other developments are scattered and intermingled with forest, range, or farm land and native vegetation or cultivated crops.

Rural Fire District (RFD)

1 An organization established to provide fire protection to a designated geographic area outside of areas under municipal fire protection. Usually has some taxing authority and officials may be appointed or elected.

Rural Fire Protection

1 Fire protection and firefighting problems that are outside of areas under municipal fire prevention and building regulations and that are usually remote from public water supplies.

- S -

Saddle

1 Depression or pass in a ridgeline.

SAFENET (SAFENET)

1 A form and process, used by wildland firefighting agencies, for reporting and resolving incidents relating to firefighter safety. The information collected is used to determine long-term trends and problem areas within the wildland fire industry.

Safety Advisory

1 A safety alert addressing wildland fire safety information that isn't related to imminent or potential threats of injury.

see also: Safety Alert

Safety Alert

1 A warning or alert concerning critical information relating to firefighter safety, that is distributed via email through an NWCG mail server. There are three types of alerts: Safety Warning, Safety Advisory, and Safety Bulletin.

see also: Safety Advisory
Safety Bulletin
Safety Warning

Safety Briefing

1 A safety briefing emphasizes key safety concerns on the incident and is presented at each briefing session. The safety briefing should contain information to alert incident personnel of potential risk/hazard considered to be most critical.

Safety Bulletin

1 A safety alert containing a factual confirmation of a serious wildland fire accident, incident or fatality.

see also: Safety Alert

Safety Circle

1 An obstruction-free circle around the (helicopter) landing pad.

Safety Officer

1 A member of the command staff responsible to the incident commander for monitoring and assessing hazardous and unsafe situations, and developing measures for assessing personnel safety.

Safety Warning

1 A safety alert addressing wildland fire safety hazards that pose an imminent threat, or have potential to pose a threat, to life or property.

see also: Safety Alert

Safety Zone

1 An area cleared of flammable materials used for escape in the event the line is outflanked or in case a spot fire causes fuels outside the control line to render the line unsafe. In firing operations, crews progress so as to maintain a safety zone close at hand allowing the fuels inside the control line to be consumed before going ahead. Safety zones may also be constructed as integral parts of fuelbreaks; they are greatly enlarged areas which can be used with relative safety by firefighters and their equipment in the event of blowup in the vicinity.

see also: Deployment Zone

Salvo

1 Dropping by an air tanker of its entire load of fire retardant at one time.

Salvo Drop

1 Total retardant or water load dropped all at once. Usually done to knock down a hot spot.

Sample

1 Part of a population; that portion of the population that is measured.

Sample Size

1 The number of items or observations in a sample; usually denoted by lower case letter n.

Sand Table Exercise (STEX)

1 A tactical decision game that employs a three-dimensional terrain model made from sand and various props to provide a visual representation of the situation described in the tactical decision game.

Scope of Practice

1 The set of responsibilities and ethical considerations that define the extent or limits of the care provider within the current standards of practice.

Scorch Height

1 Average heights of foliage browning or bole blackening caused by a fire.

Scratch Line

1 An unfinished preliminary control line hastily established or constructed as an emergency measure to check the spread of fire.

Scrubbing

1 The process of agitating foam solution and air within a confined space (usually a hose) that produces tiny, uniform bubbles - the length and type of hose determine the amount of scrubbing and, therefore, foam quality.

Sea Breeze

1 A breeze (wind) blowing inland from the sea generally during daytime hours.

Sea-level Pressure

1 Pressure value obtained by the theoretical reduction or increase of station pressure to sea level. The average atmospheric pressure at sea level is 14.7 psi.

Season Code

1 One of four designations of seasonal plant development used in the 1988 version of NFDRS.

Seasonal Monthly Average

1 Historically, the average number of human-caused fires occurring on a protection unit per month during the established fire season.

Seasonal Risk Class

1 Objective ranking of protection units within an administrative group based on the number of human-caused fires for at least the past five years.

Second Order Fire Effects (SOFE)

1 The secondary effects of fire such as tree regeneration, plant succession, and changes in site productivity. Although second order fire effects are dependent, in part, on first order fire effects, they also involve interaction with many other non-fire variables.

see also: First Order Fire Effects

Secondary Line

1 Any fireline constructed at a distance from the fire perimeter concurrently with or after a line already constructed on or near to the perimeter of the fire. Generally constructed as an insurance measure in case the fire escapes control by the primary line.

Secondary Lookout

1 (1) A lookout point intermittently used to supplement the visible area coverage of the primary lookout system when required by fire danger, poor visibility, or other factors. (2) The person who occupies such a station.

Secondary Weather Station

1 Station at which minimum weather measurements are taken to compute ratings of burning conditions; provides supplementary information on weather experience.

Second-In-Command

1 Pilot who is designated to be second-in-command of an aircraft during flight time.

Section

1 That organizational level with responsibility for a major functional area of the incident, such as operations, planning, logistics, finance/administration. The section is organizationally between branch and incident commander.

Security Manager (SECM)

1 This ICS position is responsible for providing security safeguards to protect incident personnel and prevent the loss or damage of incident equipment, supplies, and property and reports to the Facility Unit Leader.

see also: Facilities Unit

Security Weather Watch

1 Observers are posted at one or more strategic locations in the proximity of a fire to detect and warn fire personnel of pending critical weather changes that might significantly affect the fire.

Seen Area

1 Ground, or vegetation growing thereon, that is directly visible under specified atmospheric conditions from an established or proposed lookout point or aerial detection flight route.

see also: Visible Area Map

Segment

1 A geographical area in which a task force/strike team leader or supervisor of a single resource is assigned authority and responsibility for the coordination of resources and implementation of planned tactics. A segment may be a portion of a division or an area inside or outside the perimeter of an incident. Segments are identified with Arabic numbers, i.e., A-1, etc. and are not to be used as radio designators.

Self-Contained Breathing Apparatus (SCBA)

1 Portable air (not oxygen) tanks with regulators which allow firefighters to breathe while in toxic smoke conditions. Usually rated for 30 minutes of service. Used primarily on fires involving structures or hazardous materials.

synonym: Air Pack
see also: Respirator

Separation

1 Spacing of aircraft while landing and taking off at airports to achieve safe and orderly movement in flight.
2 The horizontal and vertical spacing of aircraft working over or near a wildfire or other incident.
3 Spacing of personnel while performing line construction activities.

Serious Accident Investigation Team (SAIT)

1 A formal investigation team that is organized with the purpose of conducting an accident investigation for an occurred serious accident. The team is given full authorization to conduct the investigation from involved agencies through letter of delegation.

Serious Aircraft Incident

1 An incident or malfunction that could adversely affect the safety of flight.

see also: Aircraft Incident

Service Branch

1 A branch within the logistics section responsible for service activities at the incident. Includes the communications, medical and food units.

Service Branch Director (SVBD)

1 The ICS position responsible for supervising the Service Branch. Reports to the Logistics Section Chief.

see also: Service Branch

Service Center

1 Point of support for items not ordered through dispatch.

Set

1 An individual incendiary fire.
2 The point or points of origin of an incendiary fire.
3 Material left to ignite an incendiary fire at a later time.
4 Individual lightning or railroad fires, especially when several are started within a short time.
5 Burning material at the points deliberately ignited for backfiring, slash burning, prescribed burning, and other purposes.

Severity

see: Fire Severity

Severity Funding

1 Suppression funds used to increase the level of presuppression capability and fire preparedness when predicted or actual burning conditions exceed those normally expected, due to severe weather conditions.

Severity Index

1 A number that indicates the relative net effects of daily fire danger on the fire load for an area during a specified period, such as a fire season.

Shaded Fuelbreak

1 Fuelbreaks built in timbered areas where the trees on the break are thinned and pruned to reduce the fire potential yet retain enough crown canopy to make a less favorable microclimate for surface fires.

Shareable Content Object (SCO)

1 Self-contained units of learning. They can be used as building blocks (or legos) to create packages (lessons) of SCOs, but they cannot be broken down into smaller units.

see also: Learning Content Management System
Learning Objects

Shareable Content Object Re-usable Model (SCORM)

1 A specification for standardizing the reusability and interoperability of learning content. SCORM has been developed by the Advanced Distributed Learning initiative (ADL).
SCORM focuses on two critical pieces of learning content interoperability:
1.) It defines an aggregation model for packaging learning content.
2.) It defines an API for enabling communications between learning content and the system that launches it.

see also: Learning Content Management System

Shock Wave

1 The leading edge of an expanding air mass.

Short Takeoff or Landing (STOL) Aircraft

1 An aircraft which has the capability of operating from a STOL runway in accordance with applicable airworthiness and operating regulations.

Short Takeoff or Landing (STOL) Airstrip

1 Developed or undeveloped area that has been tested and will accommodate STOL aircraft.

Short-Range Spotting

1 Firebrands, flaming sparks, or embers are carried by surface winds, starting new fires beyond the zone of direct ignition by the main fire. The range of such spotting is usually less than 1/4 mile.

Short-Term

1 Persons or work for which employment is less than 12 months (excluding firefighters hired for a particular fire).

Short-Term Fire Retardant

1 Fire retardant that inhibits combustion primarily by the cooling and smothering action of water. Chemicals may be added to the water to alter its viscosity or retard its evaporation, thereby increasing its effectiveness.

Shoulder Carry

1 Method of carrying hose on the shoulders.

Shrub

1 A woody perennial plant differing from a perennial herb by its persistent and woody stem; and from a tree by its low stature and habit of branching from the base.

Shrub Type

1 The two-category (evergreen, deciduous) classification of shrubs vegetation in the 1988 version of NFDRS.

Shutoff Nozzle

1 Common type of fire hose nozzle permitting stream flow to be controlled by the firefighter at the nozzle rather than only at the source of supply.

Shutoff Pressure

1 Maximum pressure a centrifugal pump will attain when water flow is clamped or shut off.

Siamese

1 Hose fitting (preferably gated) for combining flow from two or more lines of hose into a single stream; one male coupling to two female couplings.

see also: Reversible Siamese
Wye

Significant Fire Event

1 An event measured by the occurrence of fire(s) that requires mobilization of additional resources from outside the fire event area.

Significant Fire Potential

1 The likelihood a wildland fire event will require mobilization of additional resources from outside the area in which the fire situation originates.

Significant Weather Trigger

1 A weather phenomenon resulting in an environment that has a significant impact on fire spread, intensity, or occurrence. Example: strong wind, unstable air mass, etc.

Simms Bucket

1 Self-leveling helibucket slung under a helicopter which can be filled by hovering over a water source.

Simple Hose Lay

1 A hoselay consisting of consecutively coupled lengths of hose without laterals. The lay is extended by inserting additional lengths of hose in the line between pumps and nozzle. Also called single hose lay.

Simulation

1 A realistic portrayal of a task or operation that enables the operator/trainee to experience, under artificial conditions, situations likely to occur in actual performance of duty. Simulations are highly effective when dealing with hazardous or extremely expensive conditions.

2 An activity that imitates something real, but it's not real itself and it can be altered by users for the specific purpose of providing an experiential learning environment. (Examples: Sand Table Exercise or CBT/WBT Forest Service Wildland Fire Simulation Scenario Editor)

Single Arsonist

1 An offender who intentionally sets one fire.

Single Door Drop

1 Technique whereby fire retardant is released from only one compartment of an air tanker.

Single Resource

1 An individual, a piece of equipment and its personnel complement, or a crew or team of individuals with an identified work supervisor that can be used on an incident.

Single Stage Pump

1 Centrifugal pump with a single impeller.

Site Preparation

1 Removal or killing of unwanted vegetation, residue, etc. by use of fire, herbicides, or mechanical treatment in preparation for reforestation and future management.

Site Preparation Burning

1 Fire ignited to expose adequate mineral soil and control competing vegetation until seedlings of the desired species become established.

Situation Analysis

1 Analysis of factors which influence suppression of an escaped fire from which a plan of attack will be developed; includes development of alternative strategies of fire suppression and net effect of each.

Situation Awareness (SA)

1 An on-going process of gathering information by observation and by communication with others. This information is integrated to create an individual's perception of a given situation.

synonym: Situational Awareness

Situation Unit

1 Functional unit within the planning section responsible for the collection, organization and analysis of incident status information, and for analysis of the situation as it progresses. Reports to the planning section chief.

Situation Unit Leader (SITL)

1 The ICS position responsible for supervising the Situation Unit. Reports to the Planning Section Chief.

see also: Situation Unit

Situational Awareness (SA)

1 An on-going process of gathering information by observation and by communication with others. This information is integrated to create an individual's perception of a given situation.

synonym: Situation Awareness

Six Minutes for Safety

see: 6 Minutes for Safety

Size Class of Fire

1 As to size of wildfire:
Class A - one-fourth acre or less;
Class B - more than one-fourth acre, but less than 10 acres;
Class C - 10 acres or more, but less than 100 acres;
Class D - 100 acres or more, but less than 300 acres;
Class E - 300 acres or more, but less than 1,000 acres;
Class F - 1,000 acres or more, but less than 5,000 acres;
Class G - 5,000 acres or more.

see also: Class of Fire

Sizeup

1 The evaluation of the fire to determine a course of action for suppression.

Skid Hose Load

1 Load of hose specially arranged on top of a standard hose load to permit dropping the working line at the fire.

Skid Trail

1 Any road or trail formed by the process of skidding logs from stump to landing.

Skidder Unit

1 A self-contained unit consisting of a water tank, fire pump, and hose specially designed to be carried on a logging skidder for use in forest fire suppression.

Skimmer

1 Any aircraft equipped to pick up water while moving on or over water.

Sky Cover

1 Amount of clouds and/or other obscuring phenomena that are detectable from the point of observation.

Slash

1 Debris resulting from such natural events as wind, fire, or snow breakage; or such human activities as road construction, logging, pruning, thinning, or brush cutting. It includes logs, chunks, bark, branches, stumps, and broken understory trees or brush.

Slash Disposal

1 Treatment of slash to reduce fire hazard or for other purposes. (Preferred to Brush Disposal).

Sling

1 A net attached by a lanyard to a helicopter cargo hook and used to haul supplies.

Sling Load

1 Any cargo carried beneath a helicopter and attached by a lead line and swivel.

Sling Psychrometer

1 A hand operated instrument for obtaining wet and dry bulb temperature readings and, subsequently, relative humidity.

Slip-on Tanker

1 A tank, a live hose reel or tray, an auxiliary pump, and an engine combined into a single one-piece assembly which can be slipped onto a truck bed or trailer.

Slope Class

1 One of five categories used to describe the topography of a fire danger rating area.

Slope Percent

1 The ratio between the amount of vertical rise of a slope and horizontal distance as expressed in a percent. One hundred feet of rise to 100 feet of horizontal distance equals 100 percent.

Slope Winds

1 Small scale convective winds that occur due to local heating and cooling of a natural incline of the ground.

see also: General Winds
Local Winds

Slopover

1 A fire edge that crosses a control line or natural barrier intended to confine the fire.

synonym: Breakover

Slug Flow

1 The discharge of distinct pockets of water and air due to the insufficient mixing of foam concentrate, water, and air in a compressed air foam system.

Small Aircraft

1 An aircraft of 12,500 pounds (5,669 kg) or less, maximum certificated takeoff weight.

Smog

1 Generally considered only photochemical air pollution. Originally meant a combination of smoke and fog.

Smoke

1 Small particles of carbon, tarry and water vapor resulting from the incomplete combustion of carbonaceous materials such as wood, coal or oil.

Smoke Concentration

1 The amount of combustion products found in a specified volume of air, commonly expressed as micrograms of emission per cubic meter of air.

Smoke Intrusion

1 Smoke from prescribed fire entering a designated area at unacceptable levels.

Smoke Management

1 The policies and practices implemented by air and natural resource managers directed at minimizing the amount of smoke entering populated areas or impacting sensitive sites, avoiding significant deterioration of air quality and violations of National Ambient Air Quality Standards, and mitigating human-caused visibility impacts in Class I areas.

Smoke Pall

1 Extensive, thick blanket of smoke spreading more or less horizontally from a fire.

Smoke Plume

1 The gases, smoke, and debris that rise slowly from a fire while being carried along the ground because the buoyant forces are exceeded by those of the ambient surface wind.

see also: Convection Column

Smoke Target

1 An area that may be adversely affected by smoke from a prescribed burn. Also called smoke sensitive area.

Smoke Vent Height

1 Level, in the vicinity of the fire, at which the smoke ceases to rise and moves horizontally with the wind at that level.

Smokejumper

1 A specifically trained and certified firefighter who travels to wildland fires by aircraft and parachutes to the fire.

Smoke-Sensitive Area (SSA)

1 Area in which smoke from outside sources is intolerable, for reasons such as heavy population, existing air pollution, or intensive recreation or tourist use.

Smokey Bear

1 The symbol of the Cooperative Forest Fire Prevention Program since 1945. Smokey's image is protected by US Federal Law and is administered by the USDA Forest Service, the National Association of State Foresters and the Ad Council.

Smoking (As a Fire Cause)

1 Wildfires caused by smokers from matches, lighters, tobacco, or other smoking material.

Smoldering Combustion

1 Combined processes of dehydration, pyrolysis, solid oxidation, and scattered flaming combustion and glowing combustion, which occur after the flaming combustion phase of a fire; often characterized by large amounts of smoke consisting mainly of tars.

Smoldering Combustion Phase

1 Phase of combustion immediately following flaming combustion. Emissions are at twice that of the flaming combustion phase.

see also: Smoldering Combustion

Snag

1 A standing dead tree or part of a dead tree from which at least the leaves and smaller branches have fallen. Often called a stub, if less than 20 feet tall.

Snorkel Tank

1 A fixed tank attached to the belly of the helicopter that has a pump-driven snorkel attached. The helicopter hovers over the water source with the end of the snorkel immersed, the pump then fills the tank.

Soft Suction

1 Commonly accepted term for short length of large diameter soft hose used to connect a structural or wildland engine with a hydrant. No vacuum is involved because the hose is useful only when the engine receives water at a rate of flow in excess of the demand of the pump.

Solar Radiation

1 The amount of sunlight exposed to the fuels.

Soot

1 Carbon dust formed by incomplete combustion.

Sooting Indicators

1 The black, carbon based soot deposited on objects in the fire's path. Found on the side of objects towards the origin.

Sortie

1 Single round trip made by an air tanker from a tanker base to a fire and return.

Sound Warbler

1 A signaling device mounted on retardant aircraft which generates a tremulous siren sound to warn firefighters on the ground that a plane is approaching to drop retardant.

Sounding (Upper Air Sounding)

1 A sampling of upper air conditions made by means of instruments and a small radio transmitter on a free balloon. Automatic radio signals originated by action of weather instruments are sent to a ground receiver. These signals are interpreted for use in analyzing and predicting upper air conditions over a wide area of the earth. Weather elements determined at a number of altitude points as the balloon rises are temperature, atmospheric moisture, pressure, wind direction and speed. Similar soundings may be made using fixed balloons or tethersondes.

see also: Radiosonde

Source

1 A point, line, or area, at which mass or energy is added to a system, either instantaneously or continuously. Examples of sources in the context of air pollution are as follows: a smoke stack is a point source; a freeway is a line source; field or slash burning are area sources.

Spalling

1 Chipping or pitting of concrete, masonry, or stone surfaces.

Spalling Indicators

1 Craters or chips in the surface of rocks which indicate direction of fire spread.

Span

1 Distance equal to the wingspread of the air tanker being used; used for corrections right or left of the flight path.

Span of Control

1 The supervisory ratio of from three-to-seven individuals, with five-to-one being established as optimum.

Spanner

1 Metal wrench used to tighten and free hose connections.

Spark Arrester

1 A device installed in a chimney, flue, or exhaust pipe to stop the emission of sparks and burning fragments.

Special Interest Group (SIG)

1 In WIMS, a group of weather stations.

Special Visual Flight Rules (VFR)

1 Aircraft operating in accordance with clearances within control zones in weather conditions less than the basic Visual Flight Rules weather minima.

Specific Heat

1 The heat required to raise a unit mass of a substance one degree kelvin. It is the heat capacity of a system per unit mass; i.e., the ratio of the heat absorbed (or released) to the corresponding temperature rise (or fall).

Specific Origin Area

1 The smaller area, within the general origin, that first shows the influence of wind, fuel and/or slope.

Speed of Attack

1 Elapsed time from origin of fire to arrival of the first suppression force.

Spike-Out

1 Standby crew in an area of expected high fire occurrence, generally on a day of critical fire weather.

Split Drop

1 Retardant drop made from one compartment at a time from an air tanker with a multi-compartment tank.

Split Flow

1 A divergent wind field. Storms moving into a split field tend to lose strength. Winds are generally light in such a flow field.

Spontaneous Combustion

1 Combustion of a thermally isolated material initiated by an internal chemical or biological reaction producing enough heat to cause ignition.

Spot Burning

1 A modified form of broadcast slash burning in which the greater accumulations of slash are fired and the fire is confined to these spots. Sometimes called "Jackpot Burning" or "Jackpotting."

Spot Fire

1 Fire ignited outside the perimeter of the main fire by a firebrand.

Spot Fire Technique

1 A method of lighting prescribed fires where ignition points are set individually at a predetermined spacing and with predetermined timing throughout the area to be burned.

Spot Weather Forecast

1 A special forecast issued to fit the time, topography, and weather of a specific incident. These forecasts are issued upon request of the user agency and are more detailed, timely, and specific than zone forecasts. Usually, on-site weather observations or a close, representative observation is required for a forecast to be issued.

see also: General Fire Weather Forecast
Incident Weather Forecast
Spot Forecast

Spotter

1 In smokejumping, rappelling, and paracargo operations, the individual responsible for selecting drop target and supervising all aspects of dropping smokejumpers, rappellers, or cargo.

Spotting

1 Behavior of a fire producing sparks or embers that are carried by the wind and which start new fires beyond the zone of direct ignition by the main fire.

Spray

1 Water applied through an orifice in finely divided particles to absorb heat and smother fire, to protect exposures from radiated heat, and to carry water toward otherwise inaccessible fire.

Spread Component

1 Part of the National Fire Danger Rating System (NFDRS). A rating of the forward rate of spread of the head of a fire.

Spread Index

1 A number used to indicate relative (not actual) rate of spread.

Spread Index Meter

1 Device for combining measured ratings of various fire danger factors into numerical classes or rates of spread.

Spur Ridge

1 A small ridge which extends finger-like from a main ridge.

Squall

1 Sudden increase in wind speed to at least 17 mph (15 knots) that is sustained for at least 1 minute but not more than 5 minutes.

Squall Line

1 Any nonfrontal line or narrow band of active thunderstorms extending across the horizon. It is of importance to fire behavior due to accompanying strong gusty winds and the possibility of such a line passing between regular weather observation stations without being reported. Also called line squall.

Stable Atmosphere

1 Condition of the atmosphere in which the temperature decrease with increasing altitude is less than the dry adiabatic lapse rate. In this condition, the atmosphere tends to suppress large-scale vertical motion. Also called stable air.

Stable Layer of Air

1 A layer of air having a temperature change (lapse rate) of less than dry adiabatic (approximately -5.4 degrees F per 1,000 feet) thereby retarding either upward or downward mixing of smoke.

see also: Atmospheric Inversion
Atmospheric Stability
Inversion

Stack

1 Aircraft orbiting the rendezvous area; usually refers to vertical deployment at 500-foot (150 m) altitudinal separation between aircraft.

Staff Ride

1 A case study of a previous incident that is conducted on the actual physical site where the incident occurred. A staff ride is an experiential learning method that involves three distinct parts: a preliminary study, a site visit, and a post-visit integration session.

Staffing Index

1 A NFDRS component, index or related indicator (ignition component, spread component, energy release component, burning index, Keetch-Byram drought index) whose outputs are correlated to the local fire problem, used to determine staffing levels.

Staffing Level

1 The basis for decision support for daily staffing of initial attack resources and other activities. A level of readiness and an indicator or daily preparedness.

Staging Area

1 Locations set up at an incident where resources can be placed while awaiting a tactical assignment on a three (3) minute available basis. Staging Areas are managed by the Operations Section.

Staging Area Manager (STAM)

1 The ICS position responsible for supervising a staging area. Reports to a Branch Director or Operations Section Chief.

see also: Staging Area

Stagnant Conditions

1 Atmospheric conditions under which pollutants build up faster than the atmosphere can disperse them.

Staining Indicators

1 Glossy, varnish-like stain, usually light yellow to orange to dark brown in color, which is deposited on the origin side of objects.

Stand Replacing Fire

1 Fire which kills all or most of the living overstory trees in a forest and initiates forest succession or regrowth. Also explicitly describes the nature of fire in grasslands and some shrublands.

Standard Coupling

1 Fire hose coupling with American National Standard (NH) threads.

Standard Drying Day

1 Part of the National Fire Danger Rating System (NFDRS). Day which produces the same net drying as experienced during a 24-hour period under laboratory conditions in which dry-bulb temperature is maintained at 80° F and relative humidity is maintained at and relative humidity is maintained at 20%.

Standard Hydrologic Exchange Format code (SHEF)

1 A two-character code to describe each measurement taken at a weather station.

Standard Operating Procedure (SOP)

1 Specific instructions clearly spelling out what is expected of an individual every time they perform a given task. A standard operating procedure can be used as a performance standard for tasks that are routinely done in the operational environment.

synonym: Standard Operational Procedure

Standard Operational Procedure (SOP)

1 Specific instructions clearly spelling out what is expected of an individual every time they perform a given task. A standard operational procedure can be used as a performance standard for tasks that are routinely done in the operational environment.

synonym: Standard Operating Procedure

Stand-By Crew

1 A group of trained firefighters stationed at a dispatch point for quick, rapid deployment.

State Forest

1 Forests owned and administered by a state, and not by a federal government.

State Implementation Plan (SIP)

1 A plan required by the Clean Air Act and prepared by an Air Quality Regulatory Agency, which describes how the state will attain and maintain air quality so as to not violate National Ambient Air Quality Standards.

State of Weather

1 A code which expresses the amount of cloud cover, kind of precipitation, and/or restrictions to visibility being observed at the fire danger station at basic observation time.

State Park

1 An area established by the government of a state primarily for public recreation or for the preservation of unique natural or historic resources, administrative details varying widely. NOTE: Such parks may also be established by lesser administrative units, e.g. counties, municipalities, and also by large private owners.

Static Pressure

1 Water pressure head available at a specific location when no water is being used so that no friction loss is being encountered. Static pressure is that pressure observed on the engine inlet gauge before any water is taken from the hydrant.

Static Water Supply

1 Supply of water at rest which does not provide a pressure head for fire suppression but which may be employed as a suction source for fire pumps (e.g., water in a reservoir, pond, or cistern).

Station Catalog

1 A WIMS file that contains all the information defined for a weather station.

Station ID

1 A six-digit number assigned to a specific weather station by the servicing National Weather Service Fire Weather Office.

Station Pressure

1 Pressure of the atmosphere at an assigned station location and elevation.

Statistic

1 The number that results from manipulating raw data according to a specified procedure; associated with samples.

see also: Parameter

Statistical Fire

1 In general, an actionable fire, on which any fire agency reports and maintains specified information (e.g., cause, date and point of origin, size, fire damage).

Statistics

1 A branch of mathematics dealing with the collection, analysis, and interpretation of numerical data.

Status/Check-In Recorder (SCKN)

1 This ICS position is responsible for checking in and maintaining current status for incident assigned resources and reports to the Resources Unit Leader. Each incident check-in location will have at least one Check-In Recorder assigned.

see also: Resources Unit

Step Test

1 Five-minute test used to predict a person's ability to take in, transport, and use oxygen (aerobic capacity), the most important factor limiting the ability to perform arduous work.

Storm Center

1 The central point or area of a weather system associated with increased winds, clouds or precipitation (or any combination thereof).

Straight Stream

1 Water or fire retardant projected directly from the nozzle (as contrasted with a fog or spray cone), provided by a solid stream orifice or by adjusting a fog jet into a straight stream pattern.

Straight Stream Nozzle

1 A hose tip spout designed to provide the maximum reach of water without feathering.

Strainer

1 A wire or metal guard used to keep debris from clogging pipe or other openings made for removing water; used in pumps and on suction hose to keep foreign material from clogging or damaging pumps.

Strategic Objective

1 A broad statement, specified in a land/resource management or fire management plan that identifies change in water, soil, air, or vegetation from the present to proposed conditions, or describes an existing resource condition that should be maintained. Strategic objectives deal with large areas over long time periods and project intended outcomes of management activities that contribute to the maintenance or achievement of desired conditions.

Strategy

1 The general plan or direction selected to accomplish incident objectives.

Strength of Attack

1 Number of resources used to attack a fire.

Strength of Force

1 Total firefighting resources available, during a specified period, to conduct and support firefighting operations.

Strike Team

1 Specified combinations of the same kind and type of resources, with common communications, and a leader.

Strike Team Leader (STCR, STDZ, STEN or STPL)

1 The ICS position responsible for supervising a strike team. Reports to a Division/Group Supervisor or Operations Section Chief. This position may supervise a strike team of engines (STEN), crews (STCR), dozers (STDZ),or tractor/plows (STPL).

see also: Strike Team

Strike Team leader Crew (STCR)

1 This ICS position is responsible for the direct supervision of a crew strike team.

see also: Strike Team

Strike Team Leader Dozer (STDZ)

1 This ICS position is responsible for the direct supervision of a dozer strike team.

see also: Strike Team

Strike Team Leader Engine (STEN)

1 This ICS position is responsible for the direct supervision of an engine strike team.

see also: Strike Team

Strike Team Leader Tractor/Plow (STPL)

1 This ICS position is responsible for the direct supervision of a tractor/plow strike team.

see also: Strike Team

Stringer

1 A narrow finger or band of fuel that connects two or more patches or areas of wildland fuel.

Strip Burning

1 Burning by means of strip firing.

2 In hazard reduction, burning narrow strips of fuel and leaving the rest of the area untreated by fire.

Strip Firing

1 Setting fire to more than one strip of fuel and providing for the strips to burn together. Frequently done in burning out against a wind where inner strips are fired first to create drafts which pull flames and sparks away from the control line.

Strip-Head Fire

1 A series of lines of fire ignited near and up wind (or downslope) of a firebreak or backing fire so they burn with the wind (or upslope) toward the firebreak or backing fire.

Structural Fire Protection

1 The protection of homes or other structures from wildland fire.

Structure

1 A constructed object, usually a free-standing building above ground.

Structure (Vegetative)

1 The arrangement of vegetation in terms of density, basal area, cover, and vertical arrangement.

Structure Fire

1 Fire originating in and burning any part or all of any building, shelter, or other structure.

Structure Protection Plan

1 A plan developed by the Structure Protection Specialist that provides operational guidelines to suppression resources responsible for providing wildland fire structure protection.

see also: Structure Protection Specialist

Structure Protection Specialist (STPS)

1 An individual responsible for developing an incident's structure protection plan, providing tactical direction and recommendations to incident planning and operations on efficient and safe utilization of resources assigned to provide wildland fire structure protection.

see also: Structure Protection Plan

Subsidence

1 Downward or sinking motion of air in the atmosphere. Subsiding air warms due to compression. Increasing temperature and decreasing humidities are present in subsiding air. Subsidence results in a stable atmosphere inhibiting dispersion. Subsidence is generally associated with high atmospheric pressure.

Subsidence Inversion

1 An inversion caused by subsiding air, often resulting in decreased atmospheric mixing conditions.

Succession

1 The process of vegetational development whereby an area becomes successively occupied by different plant communities of higher ecological order.

Suction Lift

1 In fire service, the number of feet (meters) of vertical lift from the surface of the water to the center of the pump impeller. In testing, e.g., fire department pumpers are required to discharge their rated capacity at 150 pounds (1034 kPa) net pump pressure at a 10-foot (3 meter) lift. The suction gauge would indicate the vertical suction lift in inches of mercury when the pump was primed with no appreciable water flowing.

Sunny

1 The adjective classification of the sky when 5/10 or less of the sky is obscured by clouds. Part of the National Fire Danger Rating System (NFDRS).

Sunset and Sunrise

1 The mean solar times of sunset and sunrise as published in the Nautical Almanac, converted to local standard time for the locality concerned.

Superficial Burn

1 A minor thermal burn involving the outer layer of skin, i.e. "a sunburn". It is characterized by reddening of the skin and perhaps some swelling without blisters. (also called First Degree Burn)

see also: Full-thickness Burn
Partial-thickness Burn

Supervisor

1 The ICS title for individuals responsible for command of a division or group.

Supplemental Fire Department Resources

1 Overhead tied to a local fire department, generally by agreement, who are mobilized primarily for response to incidents or wildland fires outside their district or mutual aid zone. Supplemental fire department resources are not a permanent part of the local fire organization and are not required to attend scheduled training, meetings, etc. of the department staff.

Supplies

1 Minor items of equipment and all expendable items assigned to an incident.

Supply Unit

1 Functional unit within the support branch of the logistics section responsible for ordering equipment and supplies required for incident operations.

Supply Unit Leader (SPUL)

1 The ICS position responsible for supervising the Supply Unit. Reports to the Support Branch Director or Logistics Section Chief.

see also: Supply Unit

Support Branch

1 A branch within the logistics section responsible for providing personnel, equipment and supplies to support incident operations. Includes the supply, facilities and ground support units.

Support Branch Director (SUBD)

1 The ICS position responsible for supervising the Support Branch. Reports to the Logistics Section Chief.

see also: Support Branch

Support Costs

1 On-incident costs and off-incident costs. On-incident costs include caterer, shower units, mobile commissary, cache supplies, and materials, etc. Off-incident costs include expanded dispatch, buying teams, administrative payment teams, cache personnel, area command, transportation to/from incident, etc.

Support Resources

1 Non-tactical resources under the supervision of the logistics, planning, finance/administration sections or the command staff.

Supporting Agency

1 An agency providing suppression or other support and resource assistance to a protecting agency.

see also: Agency
Assisting Agency
Cooperating Agency

Supporting Technologies

1 Any technology which may be used to support NIIMS. Examples of these technologies include GIS mapping, infrared technology, NFDRS, communications, dispatch coordination, and national cache system.

see also: National Interagency Incident Management System

Suppress a Fire

see: Suppression

Suppressant

1 An agent that extinguishes the flaming and glowing phases of combustion by direct application to the burning fuel.

Suppression

1 Management action to extinguish a fire or confine fire spread beginning with its discovery.

Suppression Crew

1 Two or more firefighters stationed at a strategic location for initial action on fires. Duties are essentially the same as those of individual firefighters.

Suppression Firing

1 Intentional application of fire to speed up or strengthen fire suppression action on wildfires. Types of suppression firing include burning out, counter firing, and strip burning.

Surface Area-to-Volume Ratio

1 The ratio between the surface area of an object, such as a fuel particle, to its volume. The smaller the particle, the more quickly it can become wet, dry out, or become heated to combustion temperature during a fire.

Surface Fire

1 Fire that burns loose debris on the surface, which includes dead branches, leaves, and low vegetation.

Surface Fuel

1 Fuels lying on or near the surface of the ground, consisting of leaf and needle litter, dead branch material, downed logs, bark, tree cones, and low stature living plants.

Surface High

1 An area on the earth's surface where atmospheric pressure is at a relative maximum. Winds blow clockwise around highs in the Northern Hemisphere but, due to friction with the earth's face, tend to cross constant pressure lines away from the high center. Air is usually subsiding above a surface high. This causes warming due to air compression. This results in stable atmospheric conditions and light surface winds.

see also: Ridge

Surface Low

1 An area on the earth's surface where atmospheric pressure is at a relative minimum. Winds blow counter-clockwise around lows in the Northern Hemisphere but, due to friction with the earth's surface, tend to cross constant pressure lines toward the low center. Upon converging into the low's center, air currents are forced to rise. As air rises it cools due to expansion. Cooling reduces its capacity to hold moisture; so cloudiness and precipitation are common in lows. If a low center intensifies sufficiently it will take on the characteristics of a storm center with precipitation and strong winds.

Surface Tension

1 The elastic-like force at the surface of a liquid, tending to minimize the surface area and causing drops to form. Expressed as Newtons per meter or dynes per centimeter (1 Newton/m=1,000 dynes/cm).

Surface Wind

1 Wind measured at a surface observing station, customarily at some distance (usually 20 feet) above the average vegetative surface to minimize the distorting effects of local obstacles and terrain.

Surfactant

1 A surface active agent; any wetting agent. A formulation which, when added to water in proper amounts, will materially reduce the surface tension of the water and increase penetration and spreading abilities of the water.

Surge

1 Rapid increase in water flow which may result in a corresponding pressure rise.

Surplus Property

1 Any excess personal property not required for the needs and the discharge of the responsibilities of all federal agencies as determined by the General Services Administration (GSA).

Survival Zone

1 A natural or cleared area of sufficient size and location to protect fire personnel from known hazards while inside a fire shelter. Examples include rock slides, road beds, clearings, knobs, wide ridges, benches, dozer lines, wet areas, cleared areas in light fuels, and previously burned areas. These are all areas where you expect no flame contact or prolonged heat and smoke.

see also: Deployment Zone
Safety Zone

Sustained Attack

1 Continuing fire suppression action until fire is under control.

Swamper

1 A worker who assists fallers and/or sawyers by clearing away brush, limbs and small trees. Carries fuel, oil and tools and watches for dangerous situations.

3 A worker on a dozer crew who pulls winch line, helps maintain equipment, etc., to speed suppression work on a fire.

Swampout

1 Act of clearing brush and other material from around the base of trees and where trees are to be bucked, prior to falling or bucking, as protection against saw kickback and to provide safe footing.

Swivel

1 An accessory used between the helicopter cargo hook and sling load to allow free turning of the load.

Synoptic

1 Literally, at one time. Thus, in meteorological usage, the weather conditions over a large area at a given point in time.

Synoptic Chart

1 In meteorology, any chart or map on which data and analyses are presented that describe the state of the atmosphere over a large area at a given moment in time.

- T -

Tactical Decision Game (TDGS)

1 A simple role-play simulation technique that challenges participants to make decisions and communicate those decisions to others. A tactical decision game is an experiential learning method that is tactical in nature and has time and information constraints to put participants under some level of stress. http://www.fireleadership.gov

Tactical Direction

1 Direction given by the operations section chief which includes the tactics appropriate for the selected strategy, the selection and assignment of resources, tactics implementation, and performance monitoring for each operational period.

Tactics

1 Deploying and directing resources on an incident to accomplish the objectives designated by strategy.

Tag-on

1 Connecting a (airtanker) drop to the forward part of a previous drop.

Tail Rotor

1 A small rotor, mounted on the tail of a conventional helicopter, which counteracts torque of the main rotor and provides a measure of directional control.

Tailboard

1 Back step of a wildland or structural fire engine.

Tailgate Safety Session

1 Brief meetings held at the beginning, during, or end of an operational period to discuss new work assignments, new work methods, changes in plans, use of tools and equipment, and recognition and protection against work hazards that may be encountered.

Take-off and Landing Coordinator (TOLC)

1 This ICS position is responsible for coordinating take-offs and landings of helicopters at a helibase and any helicopter movement around the helibase and reports to the Helibase Manager.

see also: Helibase

Tandem

1 Two or more units of any one type working one in front of the other to accomplish a specific fire suppression job; the term can be used in connection with crews of firefighters, power pumps, bulldozers, etc.

Tank and Gating System

1 Tanks, doors, and release mechanism installed in aircraft for cascading fire retardants.

Tank Trailer

1 Specialized trailer on which is mounted a tank, fire pump, hose, and ancillary equipment.

Target

1 Specific portion of the fire on which fire retardant or water is to be dropped by air tankers or helitankers.

see also: Drop Zone

Target Hazard

1 Facilities in which there is great likelihood of loss of life or property.

Task

1 A unit of work activity that is a logical and necessary action in the performance of a behavior; how the behavior is demonstrated or performed in a particular context.

see also: Behavior

Task Force

1 Any combination of single resources assembled for a particular tactical need, with common communications and a leader. A task force may be pre-established and sent to an incident, or formed at an incident.

Task Force Leader (TFLD)

1 The ICS position responsible for supervising a task force. Reports to a Division/Group Supervisor or Operations Section Chief.

see also: Task Force

T-Card

1 Cards filled out with essential information for each resource they represent. The cards are color-coded to represent different types of resources.

Technical Advisory Unit

1 This unit consists of advisors with special skills who are activated only when needed. Advisors may be needed in the areas of water resources, environmental concerns, resource use, and training.

Technical Specialist (THSP)

1 An individual with specialized job skills requiring no established minimum qualifications standards by the wildland fire community. THSP may perform the same duties during an incident that are performed in their regular job assignment with supplemental training in the Incident Command System and/or adaptations of their specialized skills for the incident environment that they are assigned. These specialized individuals whose skills may be gained through educational degree programs or industrial training required by established standards may be utilized anywhere within an incident organization.

Temperature Coefficient

1 The relative change of some measurable quantity with change of temperature, like burning time per unit length, mostly expressed as mean change per degree in percentage of mean temperature within a certain range.

Temporary Flight Restriction (TFR)

1 A restriction requested by an agency and put into effect by the Federal Aviation Administration in the vicinity of an incident which restricts the operation of nonessential aircraft in the airspace around that incident.

Ten-hour Timelag Fuel Moisture (10-h TL FM)

1 The moisture content of the l0-hour timelag roundwood fuels.

Ten-hour Timelag Fuels

1 Dead fuels consisting of roundwood 1/4 to l-inch (0.6 to 2.5 cm) in diameter and, very roughly, the layer of litter extending from immediately below the surface to 3/4 inch (1.9 cm) below the surface.

see also: Ten-hour Timelag Fuel Moisture

Terra Torch ®

1 Device for throwing a stream of flaming liquid, used to facilitate rapid ignition during burn out operations on a wild fire or during a prescribed fire operation.

synonym: Flame Thrower

Terrorism

1 Any premeditated, unlawful act dangerous to human life or public welfare that is intended to intimidate or coerce civilian populations or governments.

Test Fire

1 A prescribed fire set to evaluate such things as fire behavior, fire effects, detection performance, or control measures.

Thermal Belt

1 An area of mountainous slope (characteristically the middle third), where the top of the radiation inversion intersects the slope. It typically experiences the least variation in diurnal temperatures and has the highest average temperatures and, thus, the lowest relative humidity. Its presence is most evident during clear weather with light wind.

Thermal Imagery

1 The display or printout of an infrared scanner operating over a fire. Also called infrared imagery.

see also: Infrared

Thin Layer

1 Layer of clouds whose ratio of dense sky cover to total sky cover is 1/2 or less.

Thin Sky Cover

1 Sky cover through which higher clouds or the sky can be detected.

Threat Fire

1 Any uncontrolled fire near to or heading toward an area under organized fire protection.

Throw Out

1 Soil pushed over the edge of a fireline by a tractor plow or dozer.

see also: Berm

Thunderstorm

1 Localized storm characterized by one or more electrical discharge(s).

Tie-In

1 Act of connecting a control line to another fireline or an intended firebreak.

Time Delay Device

1 A device employed to allow a fire setter the opportunity to leave the scene prior to the ignition of the fire.

Time in Service

1 With respect to maintenance time records, the time from the moment an aircraft leaves the surface of the earth until it touches at the next point of landing.

Time Unit

1 Functional unit within the Finance/Administration Section responsible for recording personnel time and managing the commissary.

Time Unit Leader (TIME)

1 The ICS position responsible for supervising the Time Unit. Reports to the Finance/Administration Section Chief.

see also: Time Unit

Timelag (TL)

1 Time needed under specified conditions for a fuel particle to lose about 63 percent of the difference between its initial moisture content and its equilibrium moisture content. If conditions remain unchanged, a fuel will reach 95 percent of its equilibrium moisture content after 4 timelag periods.

Time-Temperature Curve

1 Graph showing the increase in temperature at a specified point in a fire as a function of time, beginning with ignition and ending with burnout.

Tinder

1 Burnable organic material (duff, peat, rotten wood, etc.) with a high surface to volume ratio.

Tips

1 Nozzle tips used to change orifice size of a hose stream.

Tool and Equipment Specialist

1 Person responsible to the receiving/distribution manager for sharpening, servicing, and repairing hand tools.

Torch

1 Ignition and subsequent envelopment in flames, usually from bottom to top, of a tree or small group of trees.

2 To set fire to property deliberately and maliciously.

3 A professional firesetter-for-hire.

Torching

1 The burning of the foliage of a single tree or a small group of trees, from the bottom up.

synonym: Candling

Total Fuel

1 All plant material both living and dead that can burn in a worst case situation.

Total Mobility

1 The capability to move, position, and utilize established forces to meet existing and anticipated fire protection needs nationwide.

Total Risk

1 Part of the National Fire Danger Rating System (NFDRS). Sum of lightning and human-caused risk values; cannot exceed a value of 100.

Total Suspended Particulate Matter (TSP)

1 Particles emitted from a pollution source regardless of size. Federal and state ambient and emission standards exist for TSP.

Touchdown Pad

1 That portion of a heliport or helispot where the helicopter lands.

Toxic

1 Relating to a harmful effect by a poisonous substance on the human body by physical contact, ingestion, or inhalation.

Toxic Substance

1 A chemical or mixture that may present an unreasonable risk of injury to health or the environment.

Tractor

1 A rubber tired or tracked rider-controlled automotive vehicle, used in wildland fire management for pulling a disk or a plow to construct fireline by exposing mineral soil.

see also: Dozer
Plow Line
Tractor Plow

Tractor Plow

1 Any tractor with a plow for constructing fireline by exposing mineral soil. Also as a resource for typing purposes, a tractor plow includes the transportation and personnel for its operation.

see also: Dozer
Plow Line
Tractor

Traffic Pattern

1 Traffic flow that is prescribed for aircraft landing at, taxiing on, and taking off from, an airport. Usual components of a traffic pattern are upwind leg, crosswind leg, downwind leg, base leg, and final approach.

Trail Drop

1 An unbroken line of retardant used for constructing a retardant line.

Trailer

1 Combustible material, such as rolled rag, blankets and newspapers, or flammable liquid, used to spread fire from one area to others; usually used in conjunction with an incendiary device.

Trainee

1 An individual who has met all required training and position experience for a specified position and is approved by their home unit's certifying official, to initiate a performance based training assignment in order to become qualified in the position.

Trainer/Coach

1 A position-qualified individual who provides instruction to a trainee in the classroom, on-the-job, or on an incident. While many of the requirements of the trainer/coach are similar to the evaluator, it is important that the roles of training and evaluation remain separate.

Training Officer

1 The chief or other officer under the agency or department responsible for organizing and conducting a complete training program for the suppression agency.

Training Specialist (TNSP)

1 Person responsible to the planning section chief for coordinating the use of trainees on the incident and for assuring that the trainees meet their training objectives and receive performance evaluation reports.

Transfer of Command

1 The ICS management process in which the on-scene incident commander at a specified time hands off command responsibilities to the incident commander that will be taking over incident command.

Transition

1 In the 1978 version of NFDRS, the herbaceous stage when herbaceous fuel moisture is between 120% and 30%.

Translational Lift

1 Lift that is gained when a helicopter translates from a hover into forward flight; additional lift increases with increasing airspeed and is derived by the rotor system moving into undisturbed air.

Transport Wind Speed

1 A measure of the average rate of the horizontal transport of air within the Mixing Layer. May also be the wind speed at the final height of plume rise. Generally refers to the rate at which emissions will be transported from one area to another.

see also: Mixing Layer
Ventilation Factor

Transportation Map

1 Base map of the planning unit showing all roads, trails, heliports, and airfields existing and programmed for construction.

Travel Time

1 Compensable time en route to or from an emergency incident.

Travel Time Map

1 Map showing the time required for the initial attack crew to reach various parts of a protection unit from specified positions.

Trench

1 A small ditch often constructed below a fire on sloping ground (undercut or underslung line) to catch rolling material.

Trigger Points

see: Management Action Points

Trough

1 An elongated area of relatively low atmospheric pressure, usually extending from the center of a low pressure system.

Truck Trail

1 Substantial transportation route for fire suppression motor vehicles, built prior to a fire. Also called fire road.

True Airspeed

1 Velocity of an aircraft in its flight path relative to the air through which it is moving.

True Bearing

1 Bearing by true north rather than magnetic north.

Turbulence

1 Irregular motion of the atmosphere usually produced when air flows over a comparatively uneven surface such as the surface of the earth; or when two currents of air flow past or over each other in different directions or at different speeds.

Turn the Corner

1 Contain a fire along a flank of the fire and begin containing it across the head. Refers to ground or air attack.

Turnaround Time

1 Time used by an air tanker or helitanker to reload and return to the fire.

Turnout Coat

1 A coat with a fire resistant outer shell and a thermal and moisture barrier liner. Used primarily by structure firefighters. Also called fire coat.

Two-Way Radio

1 Radio equipment with transmitters in mobile units on the same frequency as the base station, permitting conversation in two directions using the same frequency in turn.

Type

1 Refers to resource capability. A Type 1 resource provides a greater overall capability due to power, size, capacity, etc., than would be found in a Type 2 resource. Resource typing provides managers with additional information in selecting the best resource for the task.

- U -

Ultra High Frequency (UHF-FM)

1 Radio frequencies from 300 Megahertz (MHz) to 3,000 MHz with a normal range of less than 50 miles. Radio frequency common to military aircraft and used in the logistics radio system. The most common frequencies used by fire and public safety are from 406 MHz to 512 MHz.

Unacceptable Risk

1 Level of risk as determined by the risk management process which cannot be mitigated to an acceptable safe level.

Uncontrolled Airport

1 Airport not having an approved agency with radio communications to direct aircraft take-offs and landings.

Uncontrolled Fire

1 Any fire which threatens to destroy life, property, or natural resources, and (a) is not burning within the confines of firebreaks, or (b) is burning with such intensity that it could not be readily extinguished with ordinary tools commonly available.

see also: Wildfire

Underburn

1 A fire that consume surface fuels but not the overstory canopy.

see also: Understory Burning

Undercut Line

1 A fireline below a fire on a slope. Should be trenched to catch rolling material. Also called underslung line.

see also: Cup Trench

Understory Burning

1 Prescribed burning under a forest canopy.

see also: Underburn

Unicom

1 VHF/AM aircraft radio frequencies assigned by the FAA for use in air-to-ground communications at uncontrolled airfields. The frequencies most commonly used are 122.8 MHz and 122.85 MHz.

Unified Area Command

1 A unified area command is established when incidents under an area command are multijurisdictional.

Unified Command

1 In ICS, unified command is a unified team effort which allows all agencies with jurisdictional responsibility for the incident, either geographical or functional, to manage an incident by establishing a common set of incident objectives and strategies. This is accomplished without losing or abdicating authority, responsibility, or accountability.

Unit

1 The organizational element of an incident having functional responsibility for a specific activity in the planning, logistics, or finance/administration activity.

Unity of Command

1 The concept by which each person within an organization reports to one and only one designated person.

Unity of Effort

1 A command philosophy that encourages leaders to work together to find common ground and act in the best interest of those responding to the incident, the public, and the resources that are threatened.

Unlined Fire Hose

1 Hose commonly of cotton, linen, or synthetic fiber construction without rubber tube or lining, often used for wildfires because of its light weight and self protecting (weeping) characteristics; such hose is attached to first-aid standpipes in buildings. At a specified flow, friction loss in unlined hose of a stated diameter is about twice that of lined fire hose.

Unplanned Ignition

1 The initiation of a wildland fire that was unplanned, regardless of cause.

see also: Wildfire

Upper Level (Cold) Low

1 (Upper Level Disturbance, Cold Low Aloft) A circulation feature of the upper atmosphere where pressure, at a constant altitude, is lowest. Winds blow counter-clockwise around the center in an approximately circular pattern. Upper level lows are usually quite small. The mechanics of these upper lows is such that a pool of cool moist air always accompanies their development. There is often no evidence of low pressure at the earth's surface. An upper low may exist above a surface high pressure system.

Upper Level (Cold) Trough

1 (Trough, Trough Aloft, Upper Level [Cold] Low) An elongated area of relatively low pressure, at constant altitude, in the atmosphere. The opposite of an upper level ridge. Upper level troughs are usually oriented north-south with the north end open. That is, air currents moving from west to east around the earth flow around three sides of the trough then turn eastward rather than toward the west, as in the case of a closed circulation. A large upper level trough may have one or more small upper level closed low circulation systems within it.

Upper Level High

1 (Upper High, High Aloft, Upper Level Ridge) A circulation feature of the upper atmosphere where pressure, at a constant altitude, is higher than in the surrounding region. Winds blow clockwise around an upper level high. Air in an upper level high is usually subsiding. This results in comparatively warm dry air with light winds over a large area. An upper level high may exist without there being high pressure at the earth's surface.

Upper Level Ridge

1 (Upper Level High, Ridge Aloft) An elongated area of relatively high pressure, at a constant altitude, in the atmosphere. The opposite of an upper level trough. Upper level ridges are often oriented north-south, alternating between upper level troughs, however, during summer they may assume random orientations and vast dimensions.

Urban Interface

see: Wildland Urban Interface

Use Level

1 The appropriate ratio of liquid foam concentrate to water recommended by the chemical manufacturer for each class of fire, usually expressed as a percent (such as 0.5%).

Use of Wildland Fire

1 Management of wildfire or prescribed fire to meet resource objectives specified in land/resource management plans.

see also: Prescribed Fire
Wildland Fire

Useful Load

1 Maximum computed gross weight minus equipped weight of a helicopter.

- V -

V Pattern

1 Characteristics fire cone-shaped pattern left by a fire on a wall, at or near its point of origin.

see also: V Pattern Indicators

V Pattern Indicators

1 The overall "V" or "U" shape of the exterior perimeter of a fire.

Values To Be Protected

1 Include property, structures, physical improvements, natural and cultural resources, community infrastructure, and economic, environmental, and social values.

Values-At-Risk

see: Values To Be Protected

Vapor Suppression

1 Creating a seal with foam which prevents a release of flammable vapors from fuels.

Variable

1 Any changing characteristic; in statistics, a measurable characteristic of an experimental unit.

Variable Ceiling

1 A ceiling of less than 3,000 feet (900 m) which rapidly increases or decreases in height by one or more reportable values during the period of observation.

Variable Danger

1 Resultant of all fire danger factors that vary from day to day, month to month, or year to year (e.g., fire weather, fuel moisture content, condition of vegetation, variable risk)

Variable Sky Condition

1 A sky condition that varies between reportable values of sky cover amounts during the period of observation.

Variable Visibility

1 A condition when the prevailing visibility is less than 3 miles (5 km) and rapidly increases and decreases by one or more reportable values during the period of observation.

Variable Wind Direction

1 Wind direction which varies by 60 degrees or more during the period of time the wind direction is being determined.

Vectors

1 Directions of fire spread as related to rate of spread calculations (in degrees from upslope).

Vegetative Regeneration

1 Development of new aboveground plants from surviving plant parts, such as by sprouting from a root crown or rhizomes. Even if plants form their own root system, they are still genetically the same as the parent plant.

Vegetative Reproduction

1 Establishment of a new plant from a seed that is a genetically distinct individual.

Vehicle Fire

1 Fire originating in or on a vehicle or mobile equipment.

Vent

1 The release of enclosed smoke and heat from a structure by creating openings in it, as by hacking a hole in the roof, to allow free passage of air.

Ventilation Factor

1 A numerical value relating the potential of the atmosphere to disperse airborne pollutants from a stationary source, calculated by multiplying the mixing height by the transport wind speed.

see also: Mixing Layer
Transport Wind Speed

Ventilation Index

1 A measure of the volume rate of horizontal transport of air within the mixing layer, per unit distance, normal to the wind. Units are measured in square meters per second or knot-feet.

Vertical Fuel Arrangement

1 Fuels above ground and their vertical continuity, which influences fire reaching various levels or vegetation strata.

Vertical Temperature Profile

1 Plot of the actual dry-bulb temperature against height above the earth's surface, most commonly determined by a RAWINSONDE observation.

Very High Frequency (VHF-AM)

1 Radio frequency range from 30 MHz to 299 MHz. The sub-bands most commonly used by fire are:
VHF-FM Lo band: Frequency Modulation 30 MHz - 80 MHz, of which fire frequencies are between 30 MHz and 50 MHz.
VHF-FM Hi band: Frequency Modulation 150 MHz - 174 MHz. This is the most widely used band by fire agencies.
VHF-AM: Amplitude Modulation. This band is commonly referred to as the "Victor or VHF" band. The frequency range is from 118 MHz to 136 MHz. The only authorized use of this band is for aviation. The FAA controls and assigns all frequencies within this sub-band.

VHF Omnidirectional Radio Range (VOR)

1 System of radio navigation in which any magnetic bearing relative to a special radio transmitter on the ground may be chosen and flown by an aircraft pilot.

Vigor

1 A subjective assessment of the health of individual plants in similar site and growing conditions; or a more specific measure based upon a specific facet of growth, such as seed stalk or tiller production per plant or per unit area.

Virga

1 Precipitation falling out of a cloud but evaporating before reaching the ground.

Viscosity

1 Thickness of a liquid, the degree to which it resists flow.

Viscous Water

1 Water that contains a thickening agent to reduce surface runoff; tends to cling to burning fuels and spread in layers that are several times thicker than plain water, thereby having an increased capacity to absorb heat, cool fuel, and exclude oxygen. Also called thickened water.

Visibility

1 The greatest horizontal distance at which selected objects can be seen and identified, or its equivalent derived from instrumental measurements.

Visible Area Map

1 Map showing the different classes of visible area covered by a lookout point or points; may differentiate between seen areas, indirectly visible areas, and blind areas, or only between seen areas and blind areas. Also called seen area map.

see also: Seen Area

Visual Flight Rules Conditions (VFR)

1 Basic weather conditions prescribed for flight under Visual Flight Rules: ceiling above 1,000 feet (300 m) and flight visibility in excess of 3 miles (5 km).

see also: Instrument Flight Rules Conditions

Visual Greenness (VG)

1 An NDVI-derived image of vegetation greenness compared to a very green reference such as a golf course.

see also: Greenness Factor

Visual Range

1 Maximum distance at which a given object can just be seen by an observer with normal vision.

Visual Resource Management (VRM)

1 The inventory and planning actions taken to identify visual values and to establish objectives for managing those values; and the management actions taken to achieve the visual management objectives.

Visual Resources

1 The visible physical features on a landscape (e.g., land, water, vegetation, animals, structures and other features).

Volatile

1 Readily changeable into vapor at low temperatures.

Volatiles

1 Readily vaporized organic materials which, when mixed with oxygen, are easily ignited.

Volunteer Fire Company

1 A fire department company or a response unit, the members of which are not paid.

Volunteer Fire Department (VFD)

1 A fire department of which some or all members are unpaid.

Volunteer Firefighter

1 Legally enrolled firefighter under the fire department organization laws who devotes time and energy to community fire service without compensation other than Worker's Compensation or other similar death and injury benefits.

Vortex Turbulence

1 Miniature whirlwinds trailing from the wingtips of any aircraft in flight. Vortex will be in the form of a horizontal whirlwind with velocities up to 25 mph (40 km) per hour or more. Also created by action of rotor blades on helicopters; these whirlwinds tend to move downward toward the ground. If an aircraft flies low over a fire, vortices may reach the ground and suddenly cause violent and erratic fire behavior.

- W -

Walk Test

1 The walk test is designed to determine the ability to carry out light duties. It consists of a one-mile test with no load that approximates an aerobic fitness score of 35. A time of 16 minutes, the passing score for this test, ensures the ability to meet emergency and evacuate to a safety zone.

see also: Work Capacity Test

Warm Front

1 The leading edge of a relatively warm air mass which moves in such a way that warm air replaces colder air that moves away from a region. Winds associated with warm frontal activity are usually light and mixing is limited. The atmosphere is relatively stable when compared to cold front activity.

Water Bar

1 A shallow channel or raised barrier, e.g., a ridge of packed earth or a thin pole laid diagonally across the surface of a road or trail so as to lead off water, particularly storm water. (Frequently installed in firelines on steep slopes to prevent erosion.)

Water Expansion Pumping System (WEPS)

1 Apparatus utilizing an air compressor and positive displacement pump coupled to the same engine, plumbed to a non-pressurized tank, for producing foam. The operation involves injecting compressed air into a liquid stream containing a suitable foaming agent.

Water Expansion System (WES)

1 Apparatus utilizing a pressurized tank, hose, and nozzle for producing foam by injection of compressed air or gas into a liquid stream downstream from the pumping source. The liquid stream must contain a suitable foaming agent.

Water Hammer

1 A force created by the rapid acceleration or deceleration of water, commonly created by opening or closing a valve too quickly. Pressures developed in a water hammer, proportional to the mass multiplied by the square of the velocity, can damage a pipe or hose.

Water Resources Specialist

1 Person responsible to the planning section chief for collecting information of water resources in and adjacent to the incident area, determining water use requirements of firefighting resources, and providing input to the Incident Action Plan about available water resources and/or anticipated shortages.

Water Source

1 Any strategically located supply of water that is readily available for pumps, tanks, trucks, helicopters, or fire camp use.

Water Supply Map

1 A map showing location of supplies of water readily available for pumps, tanks, trucks, camp use, etc.

Water Tender

1 Any ground vehicle capable of transporting specified quantities of water.

Water Thief

1 A type of bleeder valve designed for installation at convenient points in hose lines to permit drawing off water for filling backpack pumps or other use without interfering with pump or nozzle operation.

Wave

1 A disturbance that transfers energy from one point to another point and may take the form of a deformation of pressure or temperature. In the atmosphere such disturbances may result in major storms or merely result in changes in cloud, wind and temperature conditions. Development of a wave on a front usually slows the advance of the front due to transfer of energy to the wave development and movement.

Weather Advisory

1 In aviation forecasting, an expression of hazardous weather conditions not predicted in the zone weather forecast, as they affect the operation of air traffic.

Weather Information Management System (WIMS)

1 A centralized weather data processing system at which daily fire danger ratings are produced.

Weather Observer

1 Person responsible to the situation unit leader for collecting current weather data and information at the incident and providing them to an assigned meteorologist, fire behavior specialist, or the Situation Unit Leader.

Weighted Monthly Occurrence

1 Part of the National Fire Danger Rating System (NFDRS). Number used to determine seasonal risk class for a protection unit, calculated by multiplying peak monthly average by two and adding seasonal monthly average.

Western Regional Climate Center (WRCC)

1 One of six NOAA regional climate centers in the United States at which all hourly observations from all RAWS and many AWS are archived.

Wet Foam

1 A low expansion foam type with few and varied bubbles and rapid drain time which is used for rapid penetration and fire extinguishment.

Wet Line

1 A line of water, or water and chemical retardant, sprayed along the ground, and which serves as a temporary control line from which to ignite or stop a low-intensity fire.

Wet Storage

1 Fire retardants mixed with water and stored in tanks at air attack bases for immediate use by air tankers.

see also: Dry Storage

Wet Water

1 Water with added chemicals, called wetting agents, that increase water's spreading and penetrating properties due to a reduction in surface tension.

Wet-bulb Depression

1 The difference between the wet and dry-bulb temperatures recorded by a psychrometer; used in conjunction with the dry-bulb temperature as a measure of the relative humidity of the air.

Wet-bulb Temperature

1 The lowest temperature to which air can be cooled by evaporating water into it at a constant pressure when the heat required for evaporation is supplied by the cooling of the air. It is measured by the wet bulb thermometer, which usually employs wetted wicking on the bulb as a cooling (through evaporation) device.

Wet-bulb Thermometer

1 In a psychrometer, the thermometer with its bulb covered with a jacket of clean muslin which is saturated with distilled water before an observation.

Wetting Agent

1 A chemical that when added to water reduces the surface tension of the solution and causes it to spread and penetrate exposed objects more effectively than the untreated water.

Wetting Rain

1 A widespread rain that over an extended period of time significantly reduces fire danger. One-tenth of an inch may be sufficient to reduce fire danger in grass fuel models. One half inch may be necessary for timber fuels under closed canopies.

Wheelbase

1 The distance from the centerline of the front axle to the centerline of the rear axle. For a tandem rear axle vehicle the center line is midpoint between the centers of the two rear axles.

Widow-Maker

1 A loose limb or top or piece of bark lodged in a tree, which may fall on anyone working beneath it.

Wildfire Suppression

1 An appropriate management response to wildfire, escaped wildland fire use or prescribed fire that results in curtailment of fire spread and eliminates all identified threats from the particular fire.

Wildland

1 An area in which development is essentially non-existent, except for roads, railroads, powerlines, and similar transportation facilities. Structures, if any, are widely scattered.

Wildland Fire

1 Any non-structure fire that occurs in vegetation or natural fuels. Wildland fire includes prescribed fire and wildfire.

see also: Prescribed Fire
Wildfire

Wildland Fire Assessment System (WFAS)

1 An internet-based information system, providing national views of weather and fire potential, including national fire danger and weather maps and satellite-derived greenness maps.

Wildland Fire Investigator (INVF)

1 An individual responsible for identifying and securing a wildfire's origin and determining the probable cause and documenting causal factors in a case report. INVF may not be directly assigned to an incident, working in conjunction with incident management as not to interfere with incident operations, while ensuring that an incident does not impede the on-scene investigation.

Wildland Fire Leadership Principles

1 Eleven principles describing tangible behaviors that reflect and demonstrate the wildland fire leadership values. The eleven principles are:
1. Be proficient in your job.
2. Make sound and timely decisions.
3. Ensure tasks are understood, supervised, and accomplished.
4. Develop your subordinates for the future.
5. Know your subordinates and look out for their well-being.
6. Keep your subordinates informed.
7. Build the team.
8. Employ your subordinates in accordance with their capabilities.
9. Know yourself and seek improvement.
10. Seek responsibility and accept responsibility for your actions.
11. Set the example.

see also: Wildland Fire Leadership Values

Wildland Fire Leadership Values

1 Three guiding values that should be the basis for the decisions that leaders make. The three values are:
1. Duty – How a leader values their job. Duty begins with everything required by law and policy, but is much more than that. A leader commits to excellence in all aspects of their professional responsibility so that when the job is done they can look back and say, "I couldn't have given any more."
2. Respect – How a leader values their co-workers. Respect for the individual forms the very basis for the rule of law in America. This value reminds leaders that those who follow are their greatest resource. Not all followers will succeed equally, but they all deserve respect.
3. Integrity – How a leader values himself or herself. An individual cannot be in charge of others unless they are in charge of their own actions. People of integrity separate what is right from what is wrong and act according to what they know is right, even at personal cost.

see also: Wildland Fire Leadership Principles

Wildland Fire Management Information (WFMI)

1 A Web site providing current weather and lightning data, as well as historic fire occurrence data. NWCG Unit Identifiers are also maintained on the site.

Wildland Fire Module

1 A group of 7-10 highly skilled personnel specifically associated with the planning and implementation of planned and unplanned wildland fire and hazardous fuels treatments. Maybe classified as a Type 1 or Type 2 dependent on qualifications and experience.

Wildland Fire Serious Accident

1 Any accident where one or more fatalities occur and/or three or more personnel are inpatient hospitalized as a direct result, or in support of wildland fire suppression or prescribed fire operations. Accident may result in substantial property or equipment damage of $250,000 or more.

Wildland Urban Interface (WUI)

1 The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. Describes an area within or adjacent to private and public property where mitigation actions can prevent damage or loss from wildfire.

see also: I-Zone

Wind

1 The horizontal movement of air relative to the surface of the earth.

Wind Direction

1 Compass direction from which wind is blowing.

Wind Profile

1 A chart of wind speed in relation to height, most commonly determined by a pilot balloon observation.

Wind Shear

1 A variation in wind speed and/or direction in a layer of the atmosphere or between layers. The variation may be in the horizontal or vertical dimensions and may result in significant turbulence depending upon the magnitude of the wind speed/direction differences. A strong wind shear may act like an inversion and inhibit plume rise. It may also fracture the smoke plume, not allowing smoke to rise much above terrain levels. A strong horizontal anticyclonic shear results in downward motion and may bring smoke aloft to the surface.

Wind Shift

1 For aviation purposes, a change in the average wind direction of 45 degrees or more which takes place in less than 15 minutes if the wind speed during this period is 6 knots (3 m/s) or greater.

2 For ground observation purposes, a change of at least 45 degrees in the direction of a significant wind, which occurs in a relatively short time frame.

Wind Speed

1 Wind, in miles per hour, measured at 20 feet above open, level ground or as adjusted to meet this standard to compensate for height of ground cover, uneven ground, and nearby obstructions.

2 (NFDRS) Wind, in mph, measured at 20 feet above ground, or above the average height of vegetation, and averaged over at least a 10-minute period. Also called wind velocity.

Wind Vectors

1 Wind directions used to calculate fire behavior.

Wind-driven Wildland Fire

1 A wildland fire that is controlled by a strong consistent wind.

Windfall

1 Tree that has been uprooted or broken off by wind.

Windrow Burning

1 Burning slash that has been piled into long continuous rows. Also includes wildfire in vegetation planted to protect improvements or agriculture.

Winds Aloft

1 Generally, wind speeds and wind directions at various levels in the atmosphere above the domain of surface weather observations.

Windspeed Meter

1 A handheld device which indicates wind speed, usually in miles per hour.

Woody Fuel Moisture

1 In NFDRS, a calculated value representing the approximate moisture content of the live woody vegetation in the rating area expressed as a percentage of the oven dry weight of the sample.

see also: Herbaceous Fuel Moisture
Measured Woody Fuel Moisture
Woody Vegetation Condition

Woody Vegetation Condition

1 Part of the National Fire Danger Rating System (NFDRS). A code reflecting the moisture content of the foliage and small twigs [less than 1/4 inch (0.6 cm)] of living woody plants.

see also: Woody Fuel Moisture

Work Capacity Test (WCT)

1 A family of tests to determine firefighter physical capabilities.
Work capacity tests are used to ensure that persons assigned to fire activities are physically capable of performing the duties of wildland firefighting and to meet National Wildfire Coordinating Group (NWCG) standards for wildland firefighters (Wildland Fire Qualification Subsystem Guide 310-1, NWCG, 1993). The WCT is a family of tests to determine firefighter physical capabilities at three levels:

Arduous:
"Duties involve field work requiring physical performance calling for above-average endurance and superior conditioning. These duties may include an occasional demand for extraordinarily strenuous activities in emergencies under adverse environmental conditions and over extended periods. Requirements include running, walking, climbing, jumping, twisting, bending, and lifting more than 50 pounds; the pace of work typically is set by the emergency condition."

Moderate:
"Duties involve field work requiring complete control of all physical faculties and may include considerable walking over irregular ground, standing for long periods, lifting 25 to 50 pounds, climbing, bending, stooping, squatting, twisting, and reaching. Occasional demands may be required for moderately strenuous activities in emergencies over long periods. Individuals usually set their own work pace."

Light:
"Duties mainly involve office-type work with occasional field activity characterized by light physical exertion requiring basic good health. Activities may include climbing stairs, standing, operating a vehicle, and long hours of work, as well as some bending, stooping, or light lifting. Individuals almost always can govern the extent and pace of their physical activity"

Each performance level has its own unique Work Capacity Test:

Pack Test:
The pack test is a job-related test of the capacity for arduous work. It consists of a 3-mile hike with a 45-pound pack over level terrain. A time of 45 minutes, the passing score for the test, approximates an aerobic fitness score of 45, the established standard for wildland firefighters.

Field Test:
The field test is a job-related test of work capacity designed for those with moderately strenuous duties. It consists of a 2-mile hike with a 25-pound pack. A time of 30 minutes, the passing score, approximates an aerobic fitness score of 40.

Walk Test:
The walk test is designed to determine the ability to carry out light duties. It consists of a 1-mile test with no load that approximates an aerobic fitness score of 35. A time of 16 minutes, the passing score for the test, ensures the ability to meet emergencies and evacuate to a safety zone.

Work/Rest Ratio

1 An expression of the amount of rest that is required for each hour an individual is in work status. Current NWCG guidelines require one hour of rest for every two hours in work status.

Woven Jacket Fire Hose

1 Fire hose of conventional construction, woven on looms from fibers of cotton or synthetic fibers. Most fire department hose is double jacketed (i.e., it has an outer jacket protecting the inner one against wear and abrasion).

Wye

1 A hose connection with two outlets permitting two connections of the same coupling diameter to be taken from a single supply line.

see also: Reversible Siamese
Siamese

- Z -

Zone Weather Forecast

1 A portion of the general fire weather forecast issued on a regular basis during the normal fire season specifically to fit the requirements of fire management needs; i.e., time, areas, and weather elements. These zones or areas are a combination of administrative and climatological areas, usually nearly the size of an individual forest or district.

Table 3-11 Wind Storms in Umatilla County and Near UIR

Date	Type	Location	Comments	Information Source
July 1964	Wind Thunderstorm	County	Winds of 51 and 52 knots (58 and 60 miles/hour)	National Weather Service (NWS)
Feb 1965	Wind	County		SHELDUS
Nov 1965	Wind	County		SHELDUS
Jan 1971	Wind	County		SHELDUS
March 1971	Wind	County		SHELDUS
Jan 1972	Wind	County		SHELDUS
Feb 21, 1974	Wind	County		SHELDUS
Feb 26, 1974	Wind	County		SHELDUS
Aug 1978	Wind	County		SHELDUS
Aug 1982	Wind Thunderstorm	County	Winds of 87 knots (100 miles/hour)	NWS
Nov 1984	Wind	County	Crop damage - $10,000	SHELDUS
Sept 1985	Wind	Milton – Freewater	Crop damage - $50,000	SHELDUS
July 1990	Wind Thunderstorm	County	Winds of 55 knots (63 miles/hour)	NWS
March 1991	High Wind	County		SHELDUS
Aug 1991	Wind Thunderstorm	County	Winds of 100 knots (115 miles/hour)	NWS
Aug 1997	Wind	Pendleton		NWS
June 1998	High Wind	County		SHELDUS
Aug 1999	Dry Microburst	Ukiah		SHELDUS
Sept 1999	High Wind	Pendleton		SHELDUS
Dec 17, 1999	Wind Thunderstorm	Pendleton Airport	Winds of 54 knots (62 miles/hour)	NWS
Jan 2000	High Wind	Columbia Basin		SHELDUS
May 2000	High Wind	Blue Mountains		SHELDUS
Dec 14, 2000	High Wind	County		SHELDUS
Dec 15, 2000	High Wind	County		SHELDUS
June 2001	High Wind	Pendleton		SHELDUS
May 2002	High Wind	County		SHELDUS
Dec 2002	High Wind	County		SHELDUS
Aug 2004	Wind Thunderstorm	Lehman	Winds of 60 knots (69 miles/hour)	NWS
June 2005	Wind Thunderstorm	Ukiah	Winds of 60 knots (69 miles/hour)	NWS

April 2006	Wind Thunderstorm	Echo	Winds of 54 knots (62 miles/hour)	NWS
April 2006	Wind Thunderstorm	Helix	Winds of 64 knots (74 miles/hour)	NWS
Nov 2006	High Wind 12th -15th	Blue Mountains	Winds of 52-57 knots (59-65 miles/hour)	NWS
Dec 2006	High Wind	Basin/Blue Mountains	Winds of 54 knots (62 miles/hour)	NWS
Jan 2007	High Wind	Basin/Blue Mountains	Winds of 56 knots (64 miles/hour)	NWS
Nov 2007	High Wind	Blue Mountains	Winds of 54 knots (62 miles/hour)	NWS
Dec 2007	High Wind	Blue Mountains	Winds of 57 knots (66 miles/hour)	NWS
Jan 4, 2008	High Wind	UIR	Wind gusts of 70 knots (81 miles per hour)	CUJ and Tom Groat, Emergency Manager
Feb 2008	High Wind	Blue Mountains	Winds of 63 knots (72 miles/hour)	NWS
Mar 2009	High Wind	Basin/Blue Mountains	Winds of 63 knots (72 miles/hour)	NWS
May 2010	High Wind	Basin/Blue Mountains	Winds of 53 knots (61 miles/hour)	NWS
Nov 2010	High Wind	Basin/Blue Mountains	Winds of 58 knots (67 miles/hour)	NWS
Nov 2011	High Wind	Basin/Blue Mountains	Winds of 50 knots (58 miles/hour)	NWS
Feb 22, 2012	High Wind	Basin/Blue Mountains	Winds of 56 knots (64 miles/hour)	NWS
Feb 25, 2012	High Wind	Basin/Blue Mountains	Winds of 51 knots (59 miles/hours)	NWS
Nov 2012	High Wind	Basin/Blue Mountains	Winds of 52 knots (60 miles/hour)	NWS
Dec 2012	High Wind	N. Blue Mountains	Winds of 57 knots (66 miles/hour)	NWS
Jan 2014	High Wind	Basin/Blue Mountains	Winds of 54 knots (64 miles/hour)	NWS

Table 4-1: Assets and Critical Facilities

CTUIR Economic Assets	Critical at time of disaster	Special Needs Population	Estimated Replacement Cost	Building Type
Coyote Business Parks			$5,500,000	Commercial
Wildhorse Casino, warehouse, misc.	X		$71,324,466	Commercial
Wildhorse Cineplex			$8,315,888	Commercial
Wildhorse Golf Course-Pro Shop			$1,477,258	Commercial
Wildhorse RV Park			$2,018,097	Commercial
Wildhorse Hotel			$40,234,348	Commercial
Mission Market			$890,520	Commercial
Native Plant Nursery			$656,069	Commercial
Arrowhead Travel Center			$9,101,484	Commercial
Davita Dialysis Center		X	$496,719	Medical
US Forest Service (leased from CTUIR)			$3,000,000	Government
Field Station Laboratory			$4,500,000	Science Research
Kayak Public Transit (fleet maintenance and bus barn)		X	$2,900,000	Public Transportation
Tribal Environmental Recovery Center			$1,077,586	Solid Waste
Commercial Rentals; various sites			$4,763,339	Commercial
Cultural & Historic Resources				
Tamastslikt Cultural Institute			$12,279,230	Cultural
Nixyáawii Community School			$267,598	Education
St. Andrews Mission				Historical
Indian cemeteries and burial grounds				Cultural
Veterans Memorial			$216,990	Historical
Identified and unidentified cultural resources and First Foods				Cultural
Infrastructure & Critical Facilities				
Tribal Government Offices	X		$40,939,205	Governmental
Umatilla Tribal Fire Department	X		$1,964,843	Governmental
Yellowhawk Tribal Health Clinic	X	X	$7,061,148	Medical
Public safety building (Police Station, Emergency Management)	X	X	$2,753,990	Governmental
Tribal Housing	X	X	$29,658,668	Governmental
Transportation corridor [I-84, railroad]	X			Infrastructure
Water system; wells, tanks, lines	X	X	$1,534,419	Governmental
Gas transmission pipelines	X			Infrastructure
Sewer system lines	X			Infrastructure
Electric transmission system	X			Infrastructure
Environmental Assets				
Fish hatchery facilities				Cultural
First Foods habitat				Cultural
Wetlands Park			$202,809	Residential/Recreation
Indian Lake Dam				Recreation

Explanation of the Benefit-Cost Assessment (Form 1)

The Benefit-Cost Assessment Form is part of a two step prioritization process. This form is the first step. It is designed to help the hazard mitigation plan's steering committee evaluate and prioritize mitigation measures using criteria which allow comparisons among various types of proposed mitigation actions. This form or table has a place to list the mitigation actions or projects, a scale for measuring estimated benefits and estimated costs, and two categories for concluding whether the participant believes the project's benefits are greater than its costs and if the project is eligible for a FEMA grant.

Estimated Benefits

Under the Estimated Benefits category, the form provides for a quick assessment of whether the proposed mitigation measure's will prevent or reduce the following:

- Injuries or deaths
- Displacement Costs
- Disruption Costs
- Loss of Service
- Business Closure
- Bridge/Road Closure
- Recovery Costs
- Replacement Costs

Based on the perceived ability of the mitigation measures value in preventing or reducing losses from hazardous events, the user of this form will circle a 50 if the benefits from the mitigation action are very high, a 40 if the benefits are high, a 30 if a medium level of benefits are derived, a 20 if the benefits are low and a 10 if they are very low.

Estimated Costs

A similar process, as used to assess benefits, is used for assessing project costs. Because mitigation measures were not analyzed for their actual costs, five categories of costs were provided to help compare project benefits with project costs. The five categories are as follows:

< $10,000
$10,000 to $25,000
$25,001 to $100,000
$100,001 to $ 250,000
> $250,000

If a project is less than $10,000, it falls into the "very low" category for cost, and a 50 is circled; if a projects costs between $10,000 and $25,000, it has "low" costs and a 40 is circled. "Medium" costs are $25,001 to $100,000 and receive a 30. Between $100,001 and $250,000 are considered "high" costs and receive a 20. Costs greater than $250,000 are considered "very high" and receive a 10. By completing this form in this manner, an emphasis on the benefits and costs of each mitigation measure has been incorporated into the prioritization process as required by FEMA.

B>C and FEMA Eligible?

The "benefit greater than cost" category gives those assessing proposed mitigation measures the opportunity to conclude whether they believe the proposed mitigation measure provides greater benefits in mitigating against future hazardous events than the costs associated with implementing the proposed measure. If information is available about whether the proposed mitigation measure is eligible for a FEMA grant, indicating whether it is eligible or not is entered on the form.

Mitigation Measure Prioritization (Form 2)

Once the Benefit-Cost assessment is complete, assessing how the proposed mitigation projects satisfy FEMA and local objectives and whether they can or cannot easily obtain funding are considerations helpful in prioritizing proposed mitigation actions. Like the previous benefit-cost assessment form, assessing points using the following criteria will help in determining which proposed mitigation actions are high, medium and low priority projects.

The criteria and the possible points under each criterion are as follows:

Eliminates Repetitive Loss (0-10 pts)
Greatest Economic Impact (0-10)
Greatest Good for Most People (0-10)
Least Expensive Option (0-10)
Funding Is Secure or Easy to Obtain (0-5)
Can Fund Sooner (0-5)
Has Greater Public and Political Support (0-5)
Benefits More Than One Jurisdiction (0-5)
Addresses Two or More Goals (0-5)
Local Ability to Perform Project (0-5)

Using the first four criteria, the participant is allowed to award up to 10 points because these criteria address major mitigation objectives and save tax dollars. Participants are allowed to award up to 5 points for the remaining criteria which focus primarily on the ability to implement the mitigation measure or the measures value in successfully executing of the hazard mitigation plan.

Once the Benefit-Cost Assessment and Mitigation Action Prioritization Process forms are completed, the scores are totaled for each mitigation project to determine an overall score used for ranking the measures overall priority.

(For confidentiality, each completed form will be given a number and will be used for tallying and documentation purposes only)

FORM 1: Benefit – Cost Assessment

Measure/Action	Estimated Benefits				Estimated Cost			B > C
PE-1: INFORMATION.	**Prevents or Reduces:** - Injury or Loss of Life - Displacement Costs - Disruption Costs - Loss of Service - Business Closure - Bridge/Road Closure - Recovery Costs - Replacement Costs	Very High High Medium Low Very Low	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
PE-2: BUSINESS CONTINUITY PLAN.	**Prevents or Reduces:** - Injury or Loss of Life - Displacement Costs - Disruption Costs - Loss of Service - Business Closure - Bridge/Road Closure - Recovery Costs - Replacement Costs	Very High High Medium Low Very Low	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
PE-3: GOVERNMENT CONTINUITY PLAN.	**Prevents or Reduces:** - Injury or Loss of Life - Displacement Costs - Disruption Costs - Loss of Service - Business Closure - Bridge/Road Closure - Recovery Costs - Replacement Costs	Very High High Medium Low Very Low	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
PE-4: HAZARDOUS EVENTS ON WEBSITE	**Prevents or Reduces:** - Injury or Loss of Life - Displacement Costs - Disruption Costs - Loss of Service - Business Closure - Bridge/Road Closure - Recovery Costs - Replacement Costs	Very High High Medium Low Very Low	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
PE-5: PARTNER TO SHARE RESOURCES.	**Prevents or Reduces:** - Injury or Loss of Life - Displacement Costs - Disruption Costs - Loss of Service - Business Closure - Bridge/Road Closure - Recovery Costs - Replacement Costs	Very High High Medium Low Very Low	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
PE-6: REGIONAL E.M. and INFO HUB.	**Prevents or Reduces:** - Injury or Loss of Life - Displacement Costs - Disruption Costs - Loss of Service - Business Closure - Bridge/Road Closure - Recovery Costs - Replacement Costs	Very High High Medium Low Very Low	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**

(For confidentiality, each completed form will be given a number and will be used for tallying and documentation purposes only)

PE-7: STORM-READY.	**Prevents or Reduces:** **- Injury or Loss of Life** **- Displacement Costs** **- Disruption Costs** **- Loss of Service** **- Business Closure** **- Bridge/Road Closure** **- Recovery Costs** **- Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
PE-8: EMERGENCY ALERT SYSTEM.	**Prevents or Reduces:** **- Injury or Loss of Life** **- Displacement Costs** **- Disruption Costs** **- Loss of Service** **- Business Closure** **- Bridge/Road Closure** **- Recovery Costs** **- Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
PE-9: COMMUNITY RATING SYSTEM. (NFIP program)	**Prevents or Reduces:** **- Injury or Loss of Life** **- Displacement Costs** **- Disruption Costs** **- Loss of Service** **- Business Closure** **- Bridge/Road Closure** **- Recovery Costs** **- Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
PE-10: EMERGENCY OPERATIONS PLAN.	**Prevents or Reduces:** **- Injury or Loss of Life** **- Displacement Costs** **- Disruption Costs** **- Loss of Service** **- Business Closure** **- Bridge/Road Closure** **- Recovery Costs** **- Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
PE-11: EDUCATE. **(promote local awareness of hazards and mitigation)**	**Prevents or Reduces:** **- Injury or Loss of Life** **- Displacement Costs** **- Disruption Costs** **- Loss of Service** **- Business Closure** **- Bridge/Road Closure** **- Recovery Costs** **- Replacement Costs**	**Very High** **High** **Medium** **Low** **Very Low**	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**
PE-12A: FLOODING. Assist home owners that have previously flooded to protect their structures from future damage.	**Prevents or Reduces:** **- Injury or Loss of Life** **- Displacement Costs** **- Disruption Costs** **- Loss of Service** **- Business Closure** **- Bridge/Road Closure** **- Recovery Costs** **- Replacement Costs**	Very High High Medium Low Very Low	**5** **4** **3** **2** **1**		< $10,000 $10,000 to $25,000 $25,001 to $100,000 $100,001 to $ 250,000 > $250,000	Very Low Low Medium High Very High	**5** **4** **3** **2** **1**	**Yes** **No**