CTUIR

Climate Adaptation Plan

Executive Summary

Suggested Citation: CTUIR Climate Adaptation Plan. 2022. First Foods Policy Program: Sanders, C; Quaempts, E.; Huesties-Wolf, A.; Merkle, C; Butler, E.; and Marks, C. Department of Natural Resources (DNR), Confederated Tribes of the Umatilla Indian Reservation (CTUIR).

With generous funding from CTUIR, Meyer Memorial Trust, and BIA Tribal Resilience.

Within this Community Plan:

Executive Summary (see full document separately)

Ṫúx̱ṫux̱it ku hulí ku x̱ʷáamičan án, awkú ṫłáawx̱maamɨnna átawišamataš. [FH] –

Ṫúx̱ṫux̱ʷit hulíʔin ku x̱ʷáamičan án, awkú ṫłáawx̱ imaamɨnay átawitma. [TMO] –

"In rain, and wind, and sun above, but most of all for those we love."

- Umatilla Traditional Prayer

Thank you so much to our presenters and panelists in the CTUIR Climate Adaptation Webinar Series!

Wenix Red Elk (CTUIR DNR CRPP), Althea Huesties-Wolf (CTUIR DNR FFPP and Health Commission); Kate Ely (CTUIR DNR WRP), John Barkley (CTUIR TWC); Scott O'Daniel (CTUIR OIT GIS); Mary Wister (NOAA/NWS); Gary James, Aaron Jackson, Jerimiah Bonifer, Donna Nez (CTUIR DNR Fisheries); Scott Peckham, Carl Scheeler, Lindsay Chiono (CTUIR DNR Wildlife); Ken Hall, Bud Herrera Jeremy Wolf, Corrine Sams (CTUIR FWC); Cheryl Shippentower, Andrew Addessi (CTUIR DNR RAF), Jeff Casey (BIA Fire Management Ops); Bobby Fossek, Brosnan Spencer, Meadow Fossek-Spencer (Naknuwithlama Tiichamna); JD Tovey, Holly Anderson, Dani Schulte, Samantha Matlock, (CTUIR TPO), Frank Anderson (CTUIR Public Works Dept); Tanner Michael, Kimberly Hughes (CTUIR Housing Dept); Sydelle Harrison (OSU School of Public Health); Caleb Minthorn, Patrick Mills, Mason Murphy (CTUIR DNR EESP); Caryn Appler, Jeni Hall, Dave Moldal, and Donald Williams (Energy Trust of Oregon); Antone Minthorn (CTUIR ECDC); Leona Enright, Kaeleen McGuire, and Bruce Zimmerman, Ashley Picard (CTUIR DECD); Skya Ducheneaux (Akiptan CDFI); Dave Tovey (CTUIR NCFS); Julie Taylor and CTUIR Tribal Youth Council (CTUIR DCFS); Matthew Johnson (CTUIR Communications); Judge Abby Abinanti (NCTCC); Judge William Johnson (CTUIR Tribal Court); Katrina Miller, Fred Hill, (CTUIR Education); Naomi Stacy (CTUIR OLC); and Colleen Sanders (CTUIR DNR FFPP)

Thanks also to those who moderated and provided opening invocations: Lindsey X. Watchman (CTUIR BOT GC); Aaron Worden (CTUIR DNR); Lora Elliot (CTUIR TPO); John Barkley (CTUIR TWC); Wenix Red Elk (CTUIR DNR CRPP); Jeremy Wolf (CTUIR BOT FWC); Julie Taylor (CTUIR DCFS); and Judge William Johnson (CTUIR Tribal Court)

Thank you to the CTUIR Tribal Language Program for the translations in this document; Master Speakers Fred Hill and Thomas Morning Owl, Linguist Jonathan Geary, and Language Program Manager Katrina Miller.

With Generous Guidance

Thank you to everyone who spent time dreaming and planning for a brighter future—this is for those who follow in our footsteps, and for the First Foods who promised themselves, and whose promise we keep.

Iwá naamí miyanašmíyay ana kúma čáw áx̣ʷay pawá čná. -
It is for our children and those that aren't here yet.

Thank you to all that were involved with this Plan:

CTUIR Board of Trustees 2018, 2020, and 2022 for their support. CTUIR CAP (2022) was adopted by CTUIR BOT Resolution No. 22-103 on Dec 19th, 2022.

Dedicated guidance from members of the CTUIR Fish and Wildlife Commission, Tribal Water Commission, Economic and Community Development Commission, Land Protection and Planning Commission, Health Commission, Education and Training Committee, and Science and Technology Committee; thank you!

Significant Contributions from

Eric Quaempts, Chris Marks, Carl Merkle, Ermia Butler, Althea Huesties-Wolf, Allen Wilson, Wenix Red Elk, Kate Ely, Fred Hill, Antone Minthorn, Andrea Hall, Lisa Ganuelas, Trevor Williams, John Barkley, Lindsey Watchman, Dani Schulte, Samantha Matlock, Caleb Minthorn, Cheryl Shippentower, Scott O'Daniel, Bethy Rogers-Pachico, and Teara Farrow Ferman.

Acknowledgements and Thanks to

Jonathan Geary, Pat Hall-Walters, Caryn Appler and Energy Trust of Oregon, Aaron Worden, Dara Williams-Worden, Judge Abby and NCTCC, Clifford Stanger and the Nicht-Yow-Way Seniors Center, Teddi Bronson, Rae Ann Oatman, Michelle Thompson, J.D. Tovey, Lora Elliot, Holly Anderson, Don Motanic, Jim Marsh, Boots Pond, Jerimiah Bonifer, Lindsey Chiono, Jon Lovrak, David Haire, Will Sigo, Andrew Addessi, Donna Nez, Adrienne Berry, and everyone else who participated in the webinar series and various outreach opportunities!

Special thanks to Meyer Memorial Trust for their generous and dedicated funding of this work.

Edited by Colleen Sanders, Climate Adaptation Planner, First Foods Policy Program CTUIR DNR

THE CTUIR COMPREHENSIVE PLAN VISION

This vision was developed in support of the Tribal community vision was formulated through a series of community meetings and a visioning rally, Vision Quest 2020. Mission statement adopted by Board of Trustees Resolution No. 10-008 on February 1, 2010.

"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."

CTUIR COMMUNITY VISION

Respect The Environment

Umatilla, Walla Walla, Cayuse community will protect and strengthen our natural environments of water, air, land. Each one of these resources is an essential link to the preservation of our Tribal natural & culturally sustainable practices as a healthy nation in survival from the past, to the present and into the future.

Respect For Our Tribal People

We support and protect the personal health and viability of all our members with a holistic, physical and spiritual approach. We will have respect and consideration of lifestyles, quality of life and community & cultural values including the unique needs and rights of our Tribal Elders and Youth

Connect With The CTUIR Tribal People

Fair and open communication, with focus on improved sharing & interpretation of information through all venues (computers, CUJ, radio and city newspaper) enhancing community connection for all members living on, around or off the CTUIR reservation

Be Sustainable With Community Focus on Growth and Prosperity

A sustainable community that focuses on the priorities and goals for jobs, economics and housing, with investment that can meet the needs of our people short and long-term, to create economic vitality to sustain our community labor force to develop and strengthen our Tribal tourism. Continue growth as the largest employer to be able to sustain and support our people. "Managing their own affairs" including a way to help our people help each other—e.g. creation of jobs, organizing volunteer pools, Tribal food bank and resources to enhance our elders health care and livability. A strong vision for our future business and cultural growth with the unique creation and thought for the young people to be trained, educated & self reliant in both business and Tribal leadership for continued Tribal sustainability into the future.

This Climate Adaptation Plan upholds the vision set forth in the CTUIR Comprehensive Plan visioning session, and projects this vision out into an uncertain future. This document is not intended to replace or substitute specific resource plans or other policy documents, but rather to provide guidance for community and decision makers to help ensure current and future natural, built, and social resource management activities are aligned with, and account for, the protection and enhancement of the CTUIR's First Foods into the future. This vision document can be used to guide management plans and help inform policy, and future implementation strategies should be directed by departments and programs affected.

Revisions and updates to this document should be re-visited every 5 years to provide for the most recent and relevant information, or more frequently as it is necessary, and as capacity allows.

How to Use This Plan

Visioning into an Uncertain Future

This Climate Adaptation Plan is a document that is intended to be used as a guide for CTUIR to achieve an orderly, harmonious, environmentally and economically stable community, with the knowledge that historical conditions are no longer a reliable predictor of future conditions.

This Plan will also attempt to build opportunities to safeguard CTUIR Tribal Treaty Rights, land preservation and unique needs to preserve cultural and Tribal traditions are also protected as defined by Tribal community members, even as seasonal conditions deviate from historic ones.

This document is also a partner plan to the CTUIR Comprehensive Plan, and should be used to inform forthcoming updates to that and other relevant plans, with climate impacts as a consideration for the development and implementation of planning benchmarks.

The monitoring process also includes periodic progress reports to and from the Tribal community to improve communication between the Tribal government operations, community and the governing body, the CTUIR Board of Trustees (BOT).

Downstream Projections of Modeling Efforts

Chapter 3 of this plan contains detailed analysis of projected climate impacts to CTUIR resources, as well as community-identified adaptation goals to mitigate for those impacts. These goals are directly connected to the progress benchmarks found in the CTUIR Comprehensive Plan Chapter 5: Plan Elements, and connects with the fundamental goals and objectives important to the CTUIR in achieving the organizational and community visions.

Projections and Proxy Estimates – Climate modeling and downscaled projections can provide a rough overview of atmospheric changes that are to be anticipated, including one which was conducted for CTUIR in the Climate Change Vulnerability Assessment (2015) (see Chapter 2), but does not provide for analysis of how these atmospheric impacts translate into effects on First Foods. This Plan provides estimates for how atmospheric changes will impact Tribal resources in specific detail, utilizing data and modeling from sources as relevant as possible. Prioritization of modeling placed 1) Umatilla Indian Reservation (UIR)/Blue Mountain/Columbia River estimates , 2) Pacific Northwest regional impacts , 3) national estimates, and 4) global projections as available when sourcing data for this Plan.

Due to gaps in data and modeling for many of these impacts, a number of these estimates are “proxy estimates,” meaning that similar—but not exact—data may serve as a stand in for modeling climate impacts of certain resources. The best example of this is where agricultural or non-native species estimates are used to approximate specific impacts to First Foods where data and modeling for these native species does not currently exist. Filling in gaps First Foods-specific data collection and monitoring should be a priority for future updates to this Plan.

Community Identified Adaptations – Adaptation goals found in Chapter 3 have been identified by the CTUIR community through various channels, including direct communications, participation in outreach activities, guidance from CTUIR committees and commissions, and through Climate Adaptation Webinar Series (Nov 2020 – June 2021) engagement. A full inventory of the community engagement that informs this Plan is found in Appendix 4.

Celebrating CTUIR Sovereignty and Resilience

This Plan also represents an opportunity to strengthening Tribal sovereignty by further formalizing reciprocal systems of responsibility between CTUIR and First Foods, through identifying direct connections between Indigenous knowledge and climate resilience. Indigenous people are uniquely qualified to lead climate adaptation response; future and existing plans developed by the CTUIR and its Departments, as well as decisions made by the Tribal governing bodies, should be compliant and consistent with the goals and

objectives as identified within this Plan and as it connects to the CTUIR Comprehensive Plan Chapter 5.

Creating a Model to Guide the Way – Indigenous knowledge is beginning to be recognized as the guiding force behind climate adaptation efforts, but Indigenous knowledge cannot be applied without the participation of Indigenous people. This Plan represents a framework for understanding the integral role of Indigenous knowledge in climate adaptation, as it can be accessed and replicated by non-Indigenous agencies and organizations.

Climate Adaptation Plan Goals

We prepare to be efficient, and to create a cohesive response at a scale that is manageable, in the face of global change.

It is the goals of this Climate Adaptation Plan to:

1. Center Indigenous knowledge and environmental justice in climate crisis planning.

Tribes and Indigenous people have an essential role in implementing climate adaptations because of reciprocal responsibilities to lands and First Foods carried forward for thousands of years. By expanding traditional management and Tribal sovereignty, Tribes are the people who are best to develop strategies based on deep cultural knowledge, as the original people of these lands.

2. Identify, develop, and support interdisciplinary strategies to mitigate impacts from: 1) short term variability and 2) long term climatic shifts.

The climate crisis will affect everyone and all sectors of modern life, and it is essential to have all voices participate in the planning and adaptation process. Collaborative strategies that address multiple impacts will be most efficient.

For many aspects of CTUIR Tribal governance, resilience is built into traditional ways of life and working with people and places. Departments and programs within CTUIR can work together to boost one another's projects to create adaptability and flexibility in governance and community operations, and together support the whole Tribal Nation's readiness for uncertainty.

3. Celebrate existing CTUIR adaptation strategies.

Indigenous people have always adapted to natural climatic changes since time immemorial. This Plan is not inventing anything new, but is a chance to identify and celebrate many of the strategies that will be necessary.

CTUIR is a leader in holistic resource management, and Tribal governance is rooted in Tamanwit, and a knowledge that we are all connected.

1.9 Summary of Adaptation Recommendations

The following Chapter 2 provides a brief overview of climate modeling and projection efforts that have been conducted for the Pacific Northwest and for CTUIR specifically. Chapter 3 "Šapátunx̣wit Adaptation Goals" reviews specific climate projections for impacts that will affect First Foods and the CTUIR community. These impacts are divided into seven areas of focus: A) Water, B) First Foods Access and Availability, C) Infrastructure and Built Systems, D) Human Health and Happiness, E) Energy Production and Use, F) Economics and Community, and G) Tribal Sovereignty and Treaty Rights. This chapter also contains extensive adaptation goals that have been community-identified through the Climate Adaptation webinar series, conducted from November 2020 to June 2021, as virtual outreach and engagement. Though these adaptation goals are specific to each area of focus, broad themes emerge, and inform how the Tribal community plans to build resilience to changing conditions and needs.

Sustaining First Foods and cultural knowledge will be essential for building climate resilience.

1. First Foods Knowledge, Access, Processing, and Safe Harvest

Reciprocal systems of responsibility to First Foods are central to CTUIR culture and ways of life. These relationships have sustained Tribal people through other cataclysmic events, and are robust to climate changes when land management practices are placed in Indigenous stewardship. Securing and expanding Tribal Member and community ability to uphold these reciprocal relationships is a core adaptation priority.

2. Information Collection, Sharing, and Networks for Tribal Sovereignty

Tribes (especially those with federal recognition and a reservation land base like CTUIR) have the unique right to self-determination of their Nations, which includes the ability to set and enforce certain regulations. Information collection and analysis that centers Indigenous knowledge is essential to the maintenance of this ability. Working with other partners and Tribes can also support and expand this ability for the benefit of the CTUIR community and surrounding region.

3. Training, Education, and Opportunity for Tribal Community

Knowledge of climate impacts and opportunities to mitigate for possible harm will be a large part of adapting to changing conditions. Opportunities for education and training exist in all areas of focus, for all ages and occupations, and are especially important for:

- Tribal Youth and Students – who are future leaders and most impacted by future changes;
- Tribal Harvesters and Entrepreneurs – who spend much of their time outdoors and will experience disproportionate mental and physical health impacts.

4. Flexibility/Adaptability in Governance, Economy, Community, and Self

Though less dramatic than extreme weather events, uncertainty and seasonal variability are also part of climate impacts Tribes will experience. Historic conditions are no longer a reliable measure of climatic

5. Building Capacity to Implement Adaptation

Tribes have always adapted to natural changes in climate, and these resilience strategies are threaded throughout cultural and First Foods learnings. Tribal governments and communities often have vast knowledge and enthusiasm to tackle emerging problems, but capacity to fund, administer, and implement these strategies on a broad scale are a limiting factor. Securing programmatic funding for adaptation strategies, expanding Tribal community capacity to implement adaptations, and prioritizing solutions with an interdisciplinary approach will be essential for the success of these strategies.

Excerpt Citations

1. "Wiyaxayxt,|Wiyaakaa'awn: As Days Go By: Our History, Our Land, and Our People." Karson, Jennifer; Cash Cash, Philip E.; Conner, Roberta; Croswell, Debra; Farrow, Michael J.; Hester, Daniel W.; Johnson, William; Lang, William L.; Luce, Charles F.; Minthorn, Antone; Pond, Ronald J.; Sampson, Donald; Tovey, John David Jr. 2006. Tamastslikt Cultural Institute.

2. Comprehensive Plan: The Confederated Tribes of the Umatilla Indian Reservation (2010, updated in 2018).

3. Čáw Pawá Láakni | They Are Not Forgotten: Sahaptian Place Names Atlas of the Cayuse, Umatilla, and Walla Walla. Hunn, Euguen S.; Morning Owl, E. Thomas; Cash Cash, Phillip E.; Karson Engum, Jennifer. 2015 Confederated Tribes of the Umatilla Indian Reservation.

4. "Saxu|Siwaala|Seewi'cs: River Mussels Through Time" CTUIR 2015.

5. The Umatilla River Vision. Confederated Tribes of the Umatilla Indian Reservation Department of Natural Resources; Krista L. Jones, Geoffrey C. Poole, Eric J. Quaempts, Scott O'Daniel, Tim Beechie. October 1, 2008, Revised May, 2011 by Eric J. Quaempts.

6. Umatilla Indian Reservation Hazard Mitigation Plan (2016, 2021).

7. Comprehensive Economic Development Strategy for the Confederated Tribes of the Umatilla Indian Reservation (2016).

8. "First Foods Upland Vision." Confederated Tribes of the Umatilla Indian Reservation Department of Natural Resources Bryan A. Endress, Eric J. Quaempts, Shawn Steinmetz April 2019. DOI:10.13140/RG.2.2.30561.35689

9. Quaempts, E. J., K. L. Jones, S. J. O'Daniel, T. J. Beechie, and G. C. Poole. 2018. Aligning environmental management with ecosystem resilience: a First Foods example from the Confederated Tribes of the Umatilla Indian Reservation, Oregon, USA. Ecology and Society 23(2):29. https://doi.org/10.5751/ES-10080-230229.

10. Vermeulen, SJ, Campbell BM, Ingram J SI. 2012. Climate Change and Food Systems. Annual Review of Environment and Resources.

Additional References and Resources

"Foods Named Themselves" story from Umatilla Language Dictionary

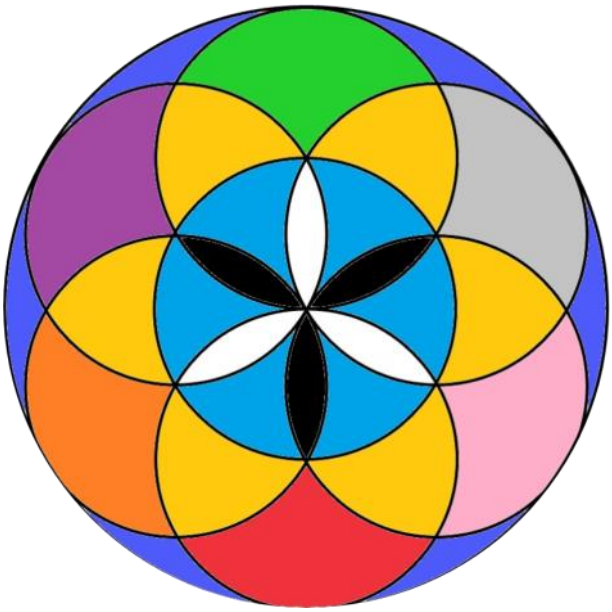
DNR Forest Management Plan (2010)

Umatilla Language Dictionary (2016) and online resource (2021)

Yellowhawk Community Health Assessment Report (2016; to be updated 2022)

CTUIR Energy Policy (2009)

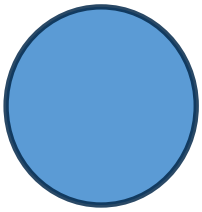
CTUIR Adaptation Wheel



"That which is connected cannot be separated."
- Atway Louie Dick, Tribal Knowledge Keeper

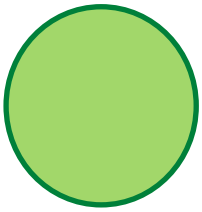
Indigenous knowledge is reciprocally interconnected. To parse out climate impacts into separate efforts detracts from this vision of a connected world. Our plan focuses on intersections of climate impacts for a holistic adaptation approach that does not sever natural connections.

The following sections examine the effects climate change will have on each of these areas of Tribal resources, as well as provide adaptation goals and strategies to achieve them.



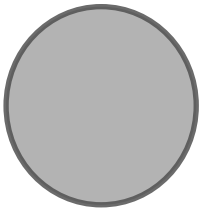
Water (Surface- & Groundwater)

Water is the first and last of the First Foods, and will be profoundly affected by climate changes. Both surface and groundwaters will be impacted, and the effect of this ripples out into all other areas of life.



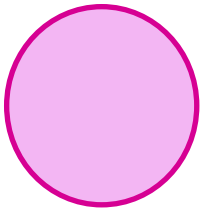
First Foods Availability & Access

Protecting and enhancing cultural and sustaining connections to traditional First Foods through their natural availability, health, and abundance, as well as Tribal member ability to access these foods, is essential.



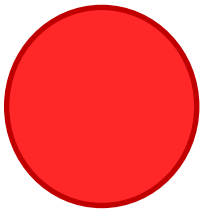
Infrastructure & Built Systems

Buildings, roads, bridges, and communication networks are some of the ways Tribal Members access sovereignty and Treaty Rights; These will face impacts from extreme weather and chronic stress.



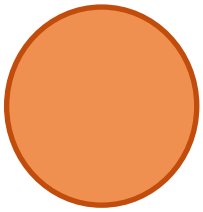
Human Health & Happiness

For Tribal people health is more than just medical. Cultural and spiritual connections to land and First Foods affect physical and emotional wellbeing, and chronic and acute impacts must be mitigated to protect these connections.



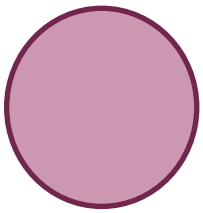
Energy Production & Use

Alternatives to fossil fuel energy come in different forms, and all have some environmental cost. Improving energy efficiency, reliability, and diversity of sources at a local level will build resilience.



Economics & Community

Global and local extreme weather events threaten economic and community safety and stability. Availability of goods and services will be challenged by long and short term climatic changes.



Sovereignty & Treaty Rights

Tribal self-determination and reciprocal systems of responsibility to First Foods are opportunities for Tribes to be climate leaders, and Tribes have specific tools to enact standards and practices that impact the entire region.

Climate Impacts for **Surface Waters**

"Like the First Foods table settings, a functional Umatilla River would be dynamic throughout the annual cycle, yet consistent and reliable across decades. During winter, snowmelt water fills the main channel, causing the river to fill dry channels, inundate the floodplain, scour fine sediments from the streambed, and cut new channels with its high-energy flows.

During summer, flows recede and the river abandons some old channels for new channels. These seasonal patterns vary between wet and dry years. The native riverine and riparian communities are adapted to and depend upon these dynamic physical conditions for their growth and survival.

Thus, maintaining a functional Umatilla River for First Foods requires managing for the range of dynamic river conditions (and not simply static levels) throughout the year (Umatilla River Vision, 2011)." This chapter examines those impacts to waters above and below.

"Water is the alpha, and it is the omega, the first and the last, beginning and end."

~Thomas Morning Owl, Umatilla Language Master Speaker

1. Unpredictable Snowfall

Warming winters will reduce the reliability of snowfall, and increase the percent of precipitation that falls as rain and as rain-on-snow events.

75-100% reduction in SWE into the 2080s over much of ceded lands (Clifton et al, 2018) as seen in Figure 3A.1 (page 45).

2. Faster Melt of Winter Water

Unlike snow, warm winter rain increases runoff into rivers and streams immediately, resulting in winter flooding.

Increasing frequency of heavy precipitation events, measured as estimated 12% increase in the maximum daily precipitation into 2050 (Salathe et al, 2014) as seen in Figure 3A.2 (page 46).

3. Shifted Seasonal Hydrology

Peak flows of rivers and streams will shift from late spring to mid-winter, and increase chances of winter flooding. This can create a disconnection with aquatic ecosystem seasonal cycles.

15-30 day peak flow shift by 2050, 40-50 day peak flow shift by 2100 (Dalton, 2020) as seen in Figure 3A.3 (page 47).

4. Lower Summer Base Flows

Reduced opportunity for water infiltration reduces summer base flow in river and streams, creating ecological drought and higher water temperatures in summer months.

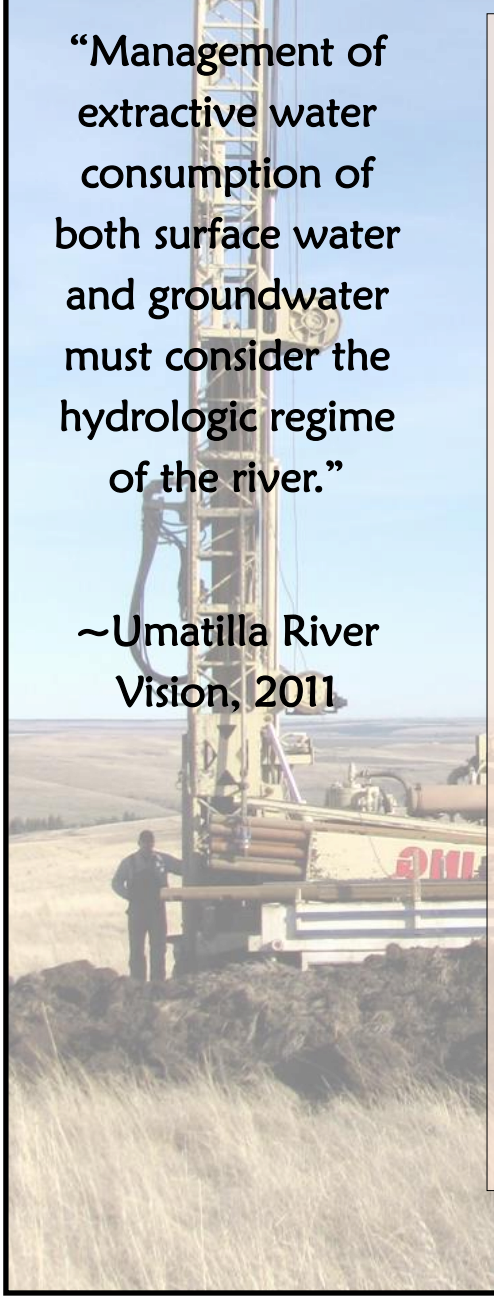
Small decreases of less than 10% for perennial streams , but some more sensitive regions are likely to experience a decrease of up to 30% by 2080 (Clifton et al, 2018) with **most severe impacts to Lostine, Minam, Imnaha, John Day, Grand Ronde, and Wenaha Rivers,** as seen in in Figure 3A.4 (page 48).

Climate Impacts for Groundwaters

"Levels of groundwater and surface water are intricately linked as reductions in surface water levels may diminish groundwater levels (and vice versa)… Thus, management of extractive water consumption of both surface water and groundwater must consider the hydrologic regime of the river (Umatilla River Vision, 2011)."

Water stored in shallow aquifers is critical for summer base flow in streams, and many people rely on clean groundwater for household and drinking water needs.

Roughly 60% of surface waters in the Blue Mountains and 100% of UIR residential water supplies are fed by groundwater sources. Impacts to these vital contributions to future regional hydrology must be considered. In modern times, CTUIR has been able to maintain its groundwater supply, but more information is necessary to know how changes in climate will affect the recharge of these unique and essential systems.



"Management of extractive water consumption of both surface water and groundwater must consider the hydrologic regime of the river."

~Umatilla River Vision, 2011

5. Changing Potential for Storage

Wetter winters shift from snow to rain, reducing the potential for groundwater sources to be recharged in current quantities and strategies.

In the Columbia River basin, roughly 72% of the groundwater recharge occurs from diffuse mechanisms as permeability of precipitation, with 28% from irrigation recharge (Meixner, 2016) as seen in Figure 3A.5 (page 57).

6. Depletion of Groundwater & Surface Waters

Residential and municipal demands on freshwater will continue to draw from groundwater. If not managed in accordance with recharge capacity, groundwater sources will be depleted, and can have negative impacts on surface-water base flows.

Overall, the study found that total Columbia Plateau groundwater recharge decreased, because the decrease in irrigation recharge (-37 mm) was larger than the increase in diffuse recharge (+6 mm) (Meixner, 2016) as seen in Figure 3A.6 (page 58).

7. Increased Potential for Contamination

Agriculture is a contributor to chemical groundwater contamination, as pesticides and fertilizer can be leached into groundwater with heavy precipitation events. This increases potential for contamination.

Currently the Walla Walla River basin in Milton-Freewater experiences a 20% groundwater well contamination rate (ODEQ 2020) as seen in Figure 3A.7 (page 60). Rough projections anticipate this could **increase by 214 - 377% by 2050** (Li and Merchant 2017).

Water Adaptation Summary

Surface Water Adaptations

A. Conservation of Water in River Systems

B. Expand Umatilla River Vision

C. Collaborate for Floodplain Reconnection & Restoration

D. Water Quality & Quantity Monitoring and Data Collection

E. Water Administration, Modeling, and Management Strategies

Creating conditions for water conservation and storage buffer for water temperature and low flow impacts, and provide habitat for floodplain connection. Addressing opportunities for water recapture and understanding of unique hydrology will help develop adaptations that provide cold and clean water for all needs.

Measures of Success:

- Umatilla River Vision Touchstones (2011)
- CTUIR Comprehensive Plan (2010) Objective 5.6.3
- CTUIR Water Code (2005) Section 1.05 B, D, and E; and Section 3.07 for benchmarks.
- CTUIR Hazard Mitigation Plan (2021) Section 3: Drought (page 74-78), Flooding (page 95-107)
- Tribal Water Commission annual reports
- WRP Annual Work Plans and activities.
- Umatilla Basin Water Rights Settlements

Groundwater Adaptations

F. Create Opportunities for Infiltration

G. Expand Groundwater Data Collection & Modeling

H. Opportunities for Regional Collaboration and Engagement

Groundwater and surface waters are connected, and must be monitored and managed as such. Columbia basalts are unique in their groundwater behavior, and diverse locations have different recharge capacities. Understanding how these groundwater sources are affected at a local level is essential, and infiltration of high flows into shallow aquifers buffer for flood and drought.

Measures of Success:

- CTUIR Comprehensive Plan (2010) Objectives 5.6.1, and 5.8.2
- CTUIR Water Code Section 1.05 Statement of Policy F, and G; and Section 3.07 for benchmarks
- CTUIR Hazard Mitigation Plan (2021) Section 3: Drought (page 74-78), Flooding (page 95-107)
- Tribal Water Commission annual reports
- Reduce groundwater pumping in vulnerable

Climate Impacts for First Foods Availability

"The availability and long-term production of First Foods in the uplands throughout the Ceded lands requires healthy, functional ecosystems. Healthy ecosystems maintain their full array of ecosystem services, which are the benefits supplied to society by natural ecosystems."

(First Foods Upland Vision, 2019)

First Foods availability is challenged by climate change as a multiplier of existing threats to the success of these crucial species. There are many social, political, and economic barriers that threaten the health and abundance of First Foods. These complications interact with climate change impacts in ways that often make conditions worse for First Foods and for Tribal people who depend on them.

1. Warming Surface Water Temperatures

Peak winter stream flows will shift earlier into the year, and cause a reduction in water available in the summer season. Warmer air temperatures will also contribute to warming river systems, impacting aquatic species directly through potentially lethal temperatures and lower oxygen content, and terrestrial species through an increase in algal contamination.

17-20% increase in August stream temperatures at lower elevations and a 14-17% increase in higher mountain levels by the end of the century in 2100 (Clifton USFS 2018) in Figure 3B.1 (page 70)**.**

2. Plant Habitat Suitability Migration

Habitat suitability depends on many factors such as stream temperature, vegetation type, topsoil erosion, and connection with environmental reciprocal relationships, such as with pollinators and host fish. As seasonal precipitation and temperatures change, suitable habitat for First Food species will shift as a result.

10—40% reduction in habitat suitability for huckleberries across much of CTUIR Ceded and traditional use lands, with some modest 15-30% increases in the Eagle Cap Wilderness, as in Figure 3B.2 (page 71). Timing of harvests may shift **1–2 months earlier** (Prevey et al 2019).

3. Impacts to Pollinators and Other Insects

Pollinators have complex plant-insect interactions that will be challenged by change, and First Foods ecosystems depend on native insects for heath and abundance.

Reduction in suitable habitat of 30% for Black-Notched Bumblebee (*Bombus bifarius*) and of 6% for the Fuzzy Horned Bumblebee (*Bombus mixtus*) by mid-century as in Figure 3B.3 (Koch et al 2019) (page 73). Other pollinators to prioritize include **Narrow-Legged Miner Bee (*Andrena angustitarsata),* Blue-and-Black Miner Bee (*Andrena nigrocaerulea*), Small Green Miner Bee (*Andrena microchlora*),** and **Sweat Bees (*Lasioglossum)*** (Gardner 2019 and 2020).

4. Increased Invasive Species Pressure

Within aquatic systems, invasive mussel and predatory fish species thrive in hotter water temperatures which stress native fish. In terrestrial landscapes, invasive grasses are better suited to summer drought than native shrubs and trees. Additional atmospheric stress could increase invasive species competitive advantage over desired native First Foods and habitat species.

Aquatic Invertebrates (+59%) and Plants (+12%), and Terrestrial insects (+18%) will experience the largest Increase (Bellard et al 2013) in Figure 3B.3 (page 75). Specific weeds expected to increase include **Cheatgrass, Yellow starthistle, and Saltcedar** (Gervais et al 2020).

Climate Impacts for **First Foods Availability** (cont.)

"From this land in which the people lived and its incumbent seasons came the diet, the languages, and the customs that are distinctly appropriate and associated with the homeland. The traditional diet of fishes, meats, roots, greens, and fruits defined when and where the people traveled to harvest and process foods."

~ Wiyaxayxt| Wiyaakaa'awn: As Days Go By
(Conner and Lang, 2006)

5. Increased Riparian and Topsoil Erosion

Topsoil erosion is more likely to occur with climate change as a risk multiplier. As the seasonal hydrology shifts, opportunity for water infiltration into the soil will decrease, creating more potential for sediment to enter waterways. While conservation farming practices mitigate some impacts, erosion potential still increases.

Future erosion under conventional tillage experience 192% increase in soil loss, and roughly 115% increase under conservation tillage/no-till, for 4˚F (2.2˚C) scenario (Farrell et al, 2015) as seen in Figure 3B.4 (page77).

6. Disconnect Between Vegetation Growth and Big Game Nutritional Needs

Native plant forage will be impacted by changing precipitation patterns; this is likely to result in a disconnection in the seasonal window big game reproductive females have to produce calves and milk they will need. This could reduce fitness in some herds and could alter the frequency of seasonal calving.

Large data gaps exist; rough estimates anticipate peak forage growth will shift earlier in the year, affecting fat accumulation and milk production in female elk, and is likely to negatively impact elk calf success and frequency of birth (Wisdom et al, 2017) as seen in Figure 3B.5 (page 79).

7. Changes in Plant and Animal Pathogen Potential

Animals and plants are susceptible to disease and pathogens, which are likely to have an altered distribution and virulence under warmer conditions. New strains or changed relationships with existing illnesses are likely to cause impacts to First Foods success.

Many data gaps exist. **5°C (9°F) winter temperature increase results in a 15% increase in infection of one-year old conifer needles, and a 30% increase in infection for two-year old needles** (Stone et al 2008) as seen in Figure 3B.6 (page 80). Other diseases of note include: Big Game illnesses like **M. ovi**, and **Epizootic Hemorrhagic Disease (EHD)**; fish illnesses like **Ich and Furunculosis**; and conifer pests like **Western Pine Beetle, Mountain Pine Beetle, and Pine Engraver.**

Climate Impacts for **First Foods Access**

"Privatization of land and agricultural development beyond reservation boundaries have also further reduced the CTUIR's ability to access its traditional foods. Today, just 24% of the Ceded territory are public lands where Tribal Members can exercise their Treaty Rights.

While the CTUIR's Treaty guarantees the Right of access, there is no guarantee that the Tribe's First Foods and other culturally important resources will be present for them to harvest. Moreover, because the goals of state and federal land management agencies do not explicitly include management or stewardship for First Foods, it is the responsibility of the CTUIR to speak on behalf of the First Foods and engage public lands managers (First Foods Upland Vision, 2019)."

Many effects of climate change will threaten not only the abundance of First Foods, but also how readily they can be accessed. Access barriers can be tangible impacts, such as flooding that damages roadways necessary to access public lands, as well as intangible, like heavy smoke inundation events that create poor air quality conditions over large areas. These impacts reduce how easily Tribal Members and families are able to reach known and new locations for First Foods harvest.

"To Tribes all over the land, the earth was their Mother, wise and loving in her care for her children. Our love, therefore, is a kind of mystical devotion, for this wise Mother has cradled our race since the beginning of time.

~Maudie C. Antoine, CTUIR BOT Chair (1955)

8. Seasonal Flooding Magnitude

Precipitation will become unpredictable, and heavy rainfall causes flooding that can devastate roadways necessary to access First Foods.

Higher elevations are likely to experience an increase of 20-30%; greatest impact will be to the Eagle Cap Wilderness and Hells Canyon area, which will see 30% and greater increase (Clifton USFS, 2018) as seen in Figure 3B.8 (page 93).

9. Increased Frequency & Severity of Wildfire Risk

Land management and climate impacts increase the possibility of experiencing a catastrophic wildfire.

2-3 times increase in risk along the Columbia River, with the Blue Mountains likely to experience 6 times greater risk of fire for a 1˚C (1.8˚F) increase (USFS, 2017) as shown in Figure 3B.9 (page 94).

10. Poor Air Quality over Large Areas

With conditions for wildfire increasing, smoke from near and distant fires will create poor air quality conditions that restrict the ability for Tribal Members to safely exercise Treaty Rights.

7.6% per day increase in exposure to particle pollution during smoke events if outdoors without respiratory protection (Henderson et al 2005)**.** This can be calculated to be **15-45% increase in smoke exposure potential during future fire seasons,** as seen in Figure 3B.10 (page 95).

First Foods Adaptation Summary

First Foods Availability Adaptation

A. Anticipate Habitat Shift and Migration

B. Invasive & Displaced Species Management and Monitoring

C. Proactively Address Wildfire Risk

D. Species Migration Information and Practices

E. Research and Regulatory Understanding for First Foods Harvest

Details of how conditions will change are currently lacking, and would facilitate First Foods adaptation. Changes in vegetation, pest, pathogen, and drought stress are likely to impact habitat suitability and availability of First Foods. Community-led facilitated migration and regulation could ease these impacts.

Measures of Success:

- First Foods Upland Vision touchstones provide technical metrics that can be measured.
- CTUIR Comprehensive Plan Objectives 5.6.2, 5.6.4, 5.8.1, and 5.14.7, and their associated benchmarks.
- CTUIR Water Code (2005) Section 1.05. Statement of Policy K, L, and M.
- CTUIR Hazard Mitigation Plan (2021) Section 3 and 4
- Fish and Wildlife Commission (FWC) Annual Reports
- DNR annual work plans and activities

First Foods Access Adaptation

F. Anticipate Health Impacts for Tribal Harvesters

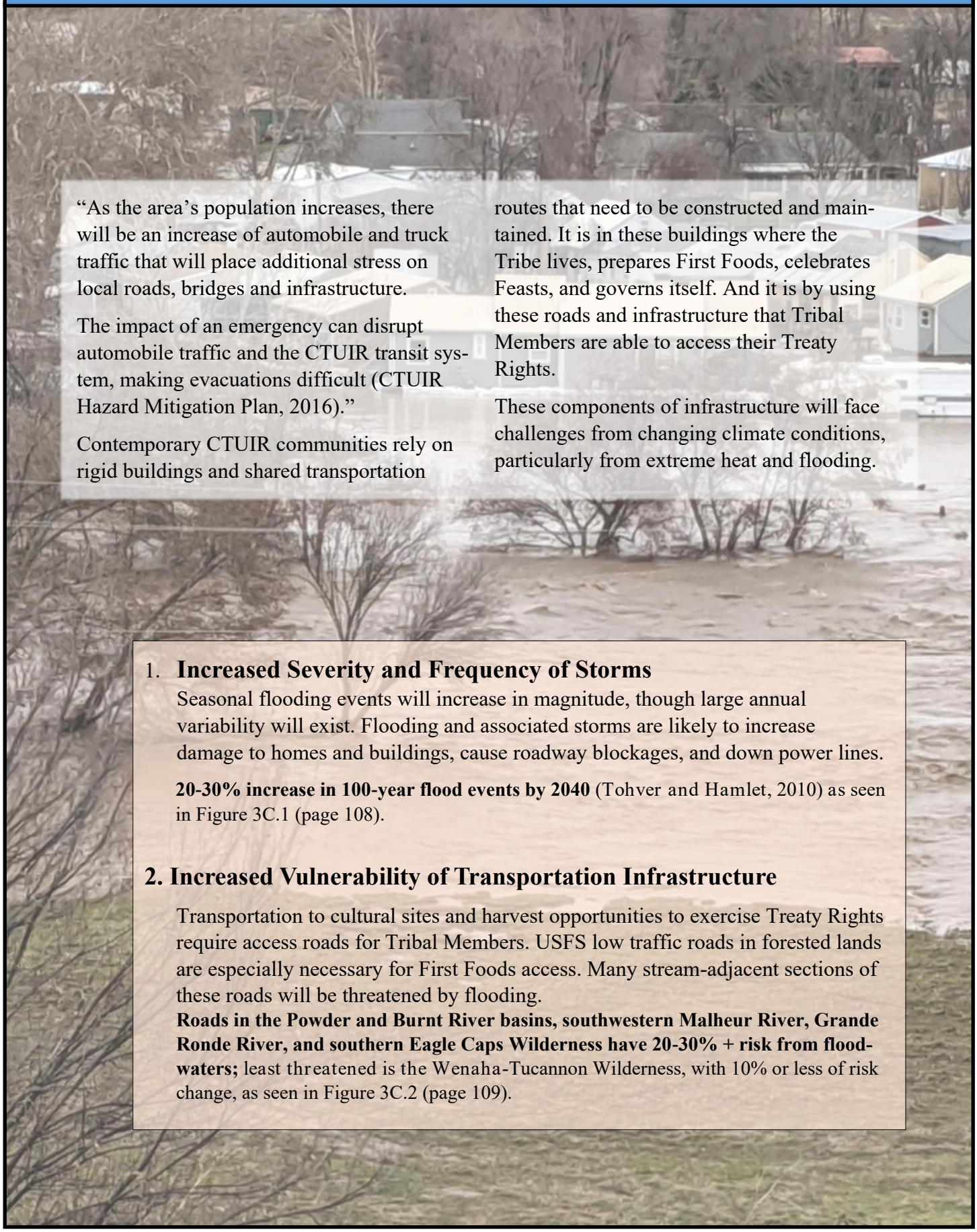
G. Engage in Policy and Agency Land Management Discussions

Tribes often do not have direct control over lands that sustain First Foods, and land use and management is inextricably linked with climate impacts. Working with private, public, and industry collaborators on returning Indigenous knowledge and stewardship to CTUIR Ceded and traditional use lands is essential.

Measures of Success:

- CTUIR Comprehensive Plan Objectives 5.6.5, 5.6.6, 5.7.9, and 5.14.8 and their associated benchmarks.
- CTUIR Water Code (2005) Section 1.05. Statement of Policy N, O, and Q.
- Harvest restrictions or prohibitions set by FWC, DNR Fisheries, CRITFC and other regulating entities.
- CTUIR Hazard Mitigation Plan (2021) Section 5
- Adaptive Big Game hunting seasonal windows, locations, and regulations responsive to conditions over static annual dates.

Climate Impacts for **Physical Infrastructure**



"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 (CTUIR Hazard Mitigation Plan, 2016)."

Contemporary CTUIR communities rely on rigid buildings and shared transportation routes that need to be constructed and maintained. It is in these buildings where the Tribe lives, prepares First Foods, celebrates Feasts, and governs itself. And it is by using these roads and infrastructure that Tribal Members are able to access their Treaty Rights.

These components of infrastructure will face challenges from changing climate conditions, particularly from extreme heat and flooding.

1. **Increased Severity and Frequency of Storms**

   Seasonal flooding events will increase in magnitude, though large annual variability will exist. Flooding and associated storms are likely to increase damage to homes and buildings, cause roadway blockages, and down power lines.

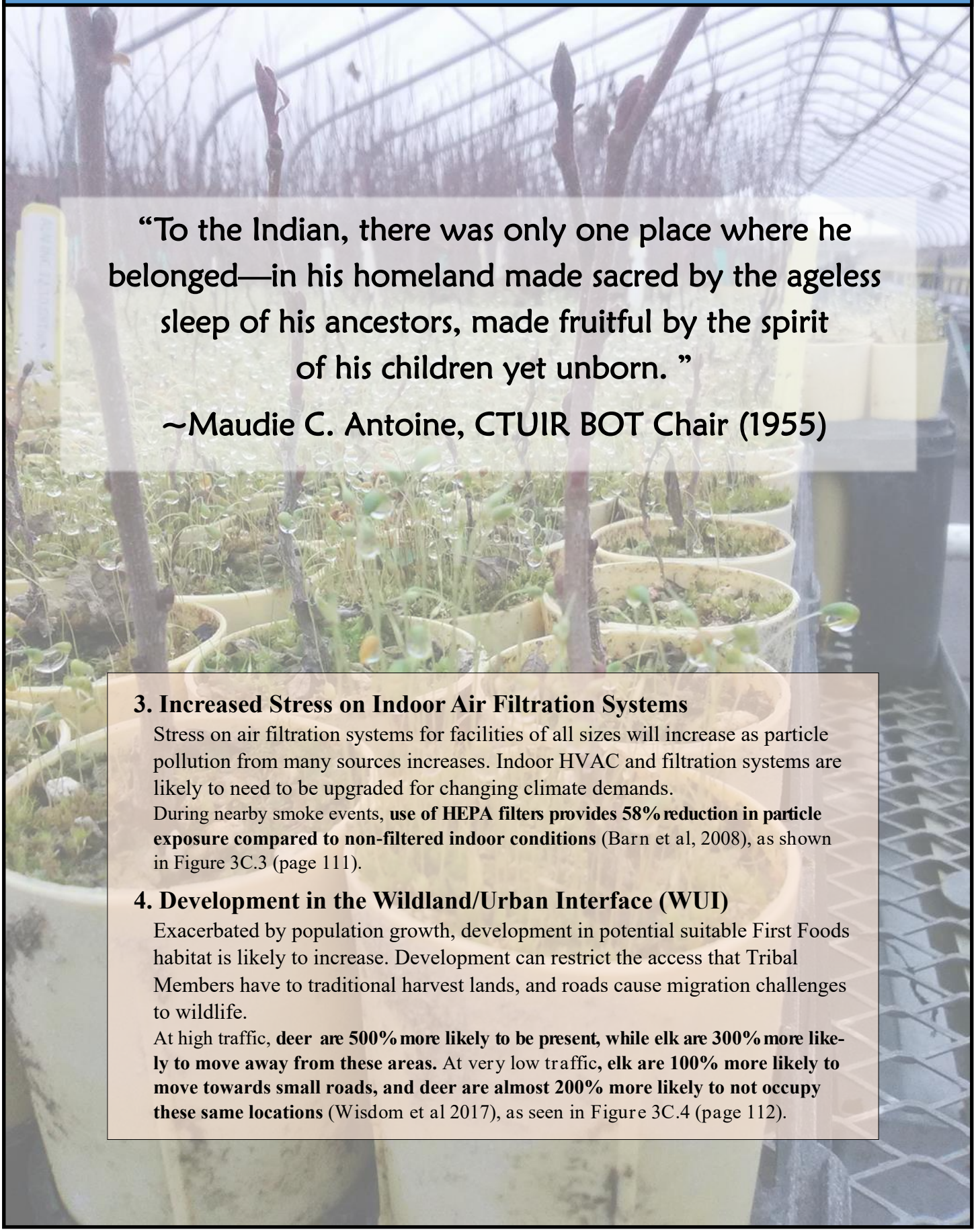
   20-30% increase in 100-year flood events by 2040 (Tohver and Hamlet, 2010) as seen in Figure 3C.1 (page 108).

2. Increased Vulnerability of Transportation Infrastructure

Transportation to cultural sites and harvest opportunities to exercise Treaty Rights require access roads for Tribal Members. USFS low traffic roads in forested lands are especially necessary for First Foods access. Many stream-adjacent sections of these roads will be threatened by flooding.

Roads in the Powder and Burnt River basins, southwestern Malheur River, Grande Ronde River, and southern Eagle Caps Wilderness have 20-30% + risk from floodwaters; least threatened is the Wenaha-Tucannon Wilderness, with 10% or less of risk change, as seen in Figure 3C.2 (page 109).

Climate Impacts for **Physical Infrastructure** (cont.)



"To the Indian, there was only one place where he belonged—in his homeland made sacred by the ageless sleep of his ancestors, made fruitful by the spirit of his children yet unborn. "

~Maudie C. Antoine, CTUIR BOT Chair (1955)

3. Increased Stress on Indoor Air Filtration Systems

Stress on air filtration systems for facilities of all sizes will increase as particle pollution from many sources increases. Indoor HVAC and filtration systems are likely to need to be upgraded for changing climate demands.

During nearby smoke events, **use of HEPA filters provides 58% reduction in particle exposure compared to non-filtered indoor conditions** (Barn et al, 2008), as shown in Figure 3C.3 (page 111).

4. Development in the Wildland/Urban Interface (WUI)

Exacerbated by population growth, development in potential suitable First Foods habitat is likely to increase. Development can restrict the access that Tribal Members have to traditional harvest lands, and roads cause migration challenges to wildlife.

At high traffic, **deer are 500% more likely to be present, while elk are 300% more likely to move away from these areas.** At very low traffic**, elk are 100% more likely to move towards small roads, and deer are almost 200% more likely to not occupy these same locations** (Wisdom et al 2017), as seen in Figure 3C.4 (page 112).

Climate Impacts for **Built Systems**

"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. (CTUIR Hazard Mitigation Plan, 2016)."

Public transit and communications networks are built systems that are often spread out over a large region and serve different customer demographic groups.

These networks will also experience adverse effects from climate change, and anticipating changes can help early planning to mitigate for future harm to these systems.

5. Potential Disruption of Communication Networks

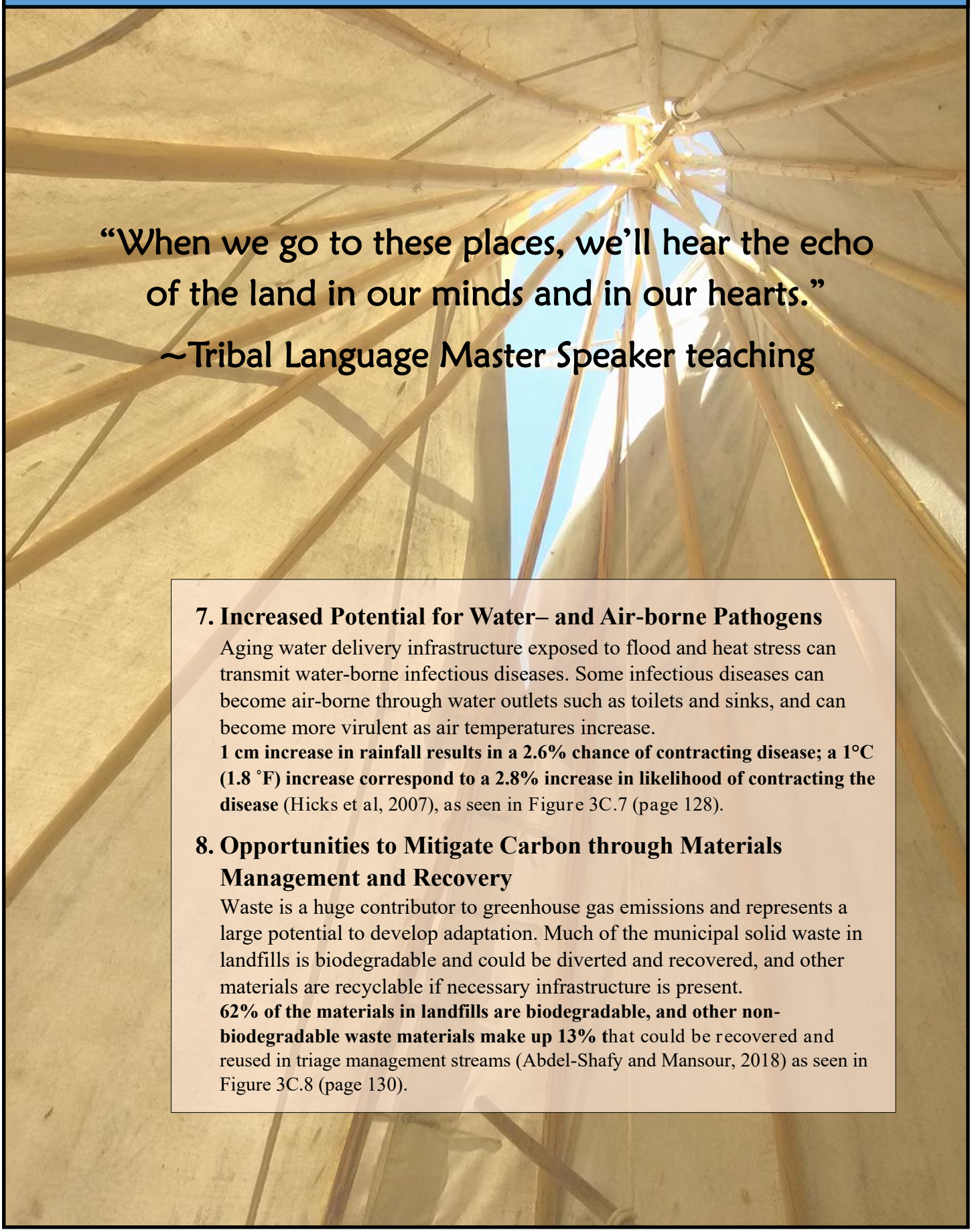
Telecommunications networks have physical infrastructure that spans large areas of the Pacific Northwest region to bring telephone and internet access to residents of Oregon, Washington and Idaho. These networks have cables and connection hubs that are threatened by climate change impacts and extreme events.

Estimated **236 miles (23%) of fiber optic line in the region is at risk of seawater inundation** (Durairajan et al, 2018) as seen in Figure 3C.5 (page 125).

6. Potential Complications for Public Transit

Public transportation services face additional challenges through exposure to severe weather events. Extreme heat and smoke events create access issues for those who patron and operate public transit, and effects are likely to be seen across public transit service areas.

Impacts are expected to transportation connections to **water, electrical, information communication technology, and petroleum systems** (Markolf et al 2019), as seen in Figure 3C.6 (page 127).



"When we go to these places, we'll hear the echo of the land in our minds and in our hearts."

~Tribal Language Master Speaker teaching

7. Increased Potential for Water– and Air-borne Pathogens

Aging water delivery infrastructure exposed to flood and heat stress can transmit water-borne infectious diseases. Some infectious diseases can become air-borne through water outlets such as toilets and sinks, and can become more virulent as air temperatures increase.

1 cm increase in rainfall results in a 2.6% chance of contracting disease; a 1°C (1.8 ˚F) increase correspond to a 2.8% increase in likelihood of contracting the disease (Hicks et al, 2007), as seen in Figure 3C.7 (page 128).

8. Opportunities to Mitigate Carbon through Materials Management and Recovery

Waste is a huge contributor to greenhouse gas emissions and represents a large potential to develop adaptation. Much of the municipal solid waste in landfills is biodegradable and could be diverted and recovered, and other materials are recyclable if necessary infrastructure is present.

62% of the materials in landfills are biodegradable, and other non-biodegradable waste materials make up 13% that could be recovered and reused in triage management streams (Abdel-Shafy and Mansour, 2018) as seen in Figure 3C.8 (page 130).

Infrastructure and Built Systems Summary

Physical Infrastructure Adaptation

A. Identify Ongoing and Emerging Hazards and Opportunities on the UIR and CTUIR Ceded Lands.

B. Anticipate Changing Community and Climate Demand on Facilities for Investment Planning

C. Develop Sustainable Housing and Walkable Communities

Extreme weather events and long term chronic stress from multiple sources will challenge effectiveness and longevity of facilities and systems. Infrastructure that supports Tribal Rights, ecosystem restoration, and First Foods access should be prioritized.

Measures of Success:

- Land Development Codes maintained and updated by TPO to provide guidance.
- CTUIR Comprehensive Plan Objectives 5.5.1, 5.5.2, 5.9.7, 5.13.5, 5.13.6, and 5.13.10 and their associated benchmarks.
- CTUIR Hazard Mitigation Plan (2021) Section 3 and 4
- Appropriate and energy efficient housing availability.
- Multi-use development zoning for carbon-free commutable neighborhoods

Built Systems Adaptation

D. Resident and Community Preparedness, Response, and Services

E. Strengthen Opportunities to Divert Materials from Landfills

Systems that support transportation and communication are vulnerable to short and long term climate impacts that have transit and public safety implications.

Measures of Success:

- CTUIR Special Transportation Plan and update provides specific guidance and benchmarks;
- CTUIR Comprehensive Plan Objectives 5.12.1, 5.13.4, 5.13.7, 5.13.9, and 5.13.2 and their associated benchmarks.
- CTUIR Hazard Mitigation Plan (2021) Section 5
- Improve utilization of TERF materials recapture services, including waste disposal and recycling.
- Implement TERF composting capacity.
- Maintain and expand Kayak Public Transit services.
- Invest in broadband and community-scale communication networks.

Climate Impacts for **Physical Health**

"Loss of traditional food resources exacerbates Tribal health issues including poor fitness, diabetes, and other health challenges. Research has shown that loss of traditional food resources is associated with lifestyle changes (e.g., increasing sedentary lifestyle while decreasing cultural-specific activities and food diversity) and health problems (increased diabetes, obesity, heart disease etc).

Thus, ensuring abundant First Foods across the landscape and restoring Tribal food resources is likely to benefit the health and culture of the Tribal community by providing traditional food choices and promoting activities (e.g. hunting, digging, gathering, and fishing) that draw on tribal knowledge and skills (First Foods Upland Vision, 2019)."

Impacts from climate change create challenges for Tribal people from exposure and chronic events, as well as from complicating factors to negative health outcomes that currently exist.

1. Complications from Extreme Heat

Heat is an incredibly dangerous form of storm, and can take a devastating toll on both healthy and vulnerable community members. As extreme heat worsens health complications, especially for those chronically exposed such as outdoor workers and unsheltered persons, and those with existing health issues.

Extreme heat (at or above 90˚F) has potential to cause health complications within humans in at least 27 different ways (Mora et al 2017)**,** as seen in Figure 3D.1 (page 141).

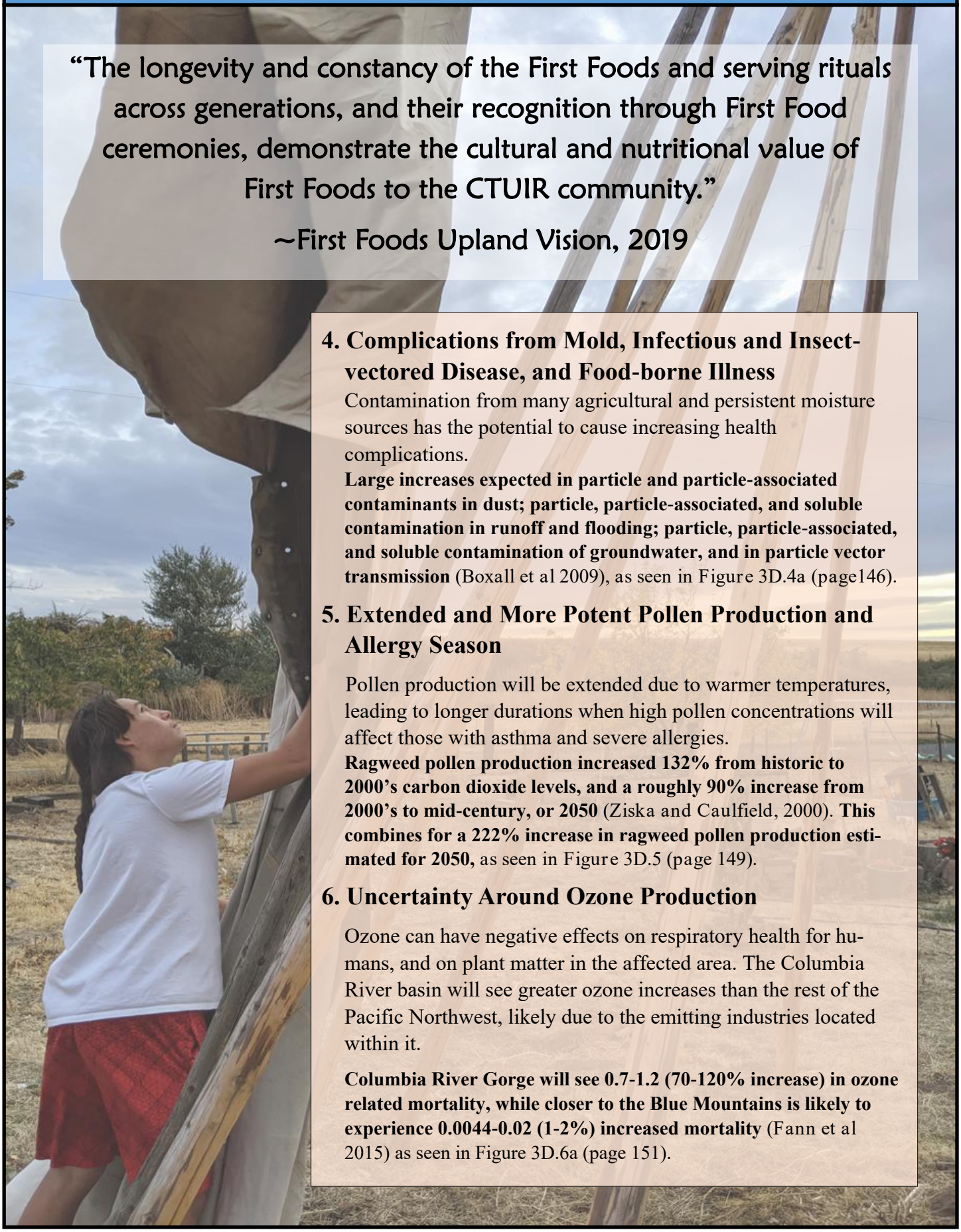
2. Complications From Wildfire Smoke

Particle pollution has a very negative effect on health, especially for those who are chronically exposed, and who live with pre-existing illness. Complications from smoke will increase morbidity and mortality around each event.

Heavy smoke events result in a **9.0% increase in the odds of same-day respiratory mortality, and a 14.0% increase in the odds of same day COPD mortality. Cardiac arrest risk increased 70%** as seen in Figure 3D.2 (page 142)**. There was also a 4.9% increase in lung cancer and 10% increase in brain cancer associated with smoke exposure** (Jones et al 2020).

3. Higher Potential for Biological Contamination of Surface Waters, Residential Wells, and Groundwater

Both fresh water and salt water bodies are at risk of contamination from different sources, as potential for harmful algal blooms (HABs) increases with temperature. A **2°C air temperature increase** results in an expanded HAB window of **almost 70 days; a 4°C increase expands this window by 127 additional days; and 6°C increase expands these seasonal conditions by 191 more days (**Moore et al 2008) as seen in Figure 3D.3 (page 144) .



"The longevity and constancy of the First Foods and serving rituals across generations, and their recognition through First Food ceremonies, demonstrate the cultural and nutritional value of First Foods to the CTUIR community."

~First Foods Upland Vision, 2019

4. Complications from Mold, Infectious and Insect-vectored Disease, and Food-borne Illness

Contamination from many agricultural and persistent moisture sources has the potential to cause increasing health complications.

Large increases expected in particle and particle-associated contaminants in dust; particle, particle-associated, and soluble contamination in runoff and flooding; particle, particle-associated, and soluble contamination of groundwater, and in particle vector transmission (Boxall et al 2009), as seen in Figure 3D.4a (page146).

5. Extended and More Potent Pollen Production and Allergy Season

Pollen production will be extended due to warmer temperatures, leading to longer durations when high pollen concentrations will affect those with asthma and severe allergies.

Ragweed pollen production increased 132% from historic to 2000's carbon dioxide levels, and a roughly 90% increase from 2000's to mid-century, or 2050 (Ziska and Caulfield, 2000). **This combines for a 222% increase in ragweed pollen production estimated for 2050,** as seen in Figure 3D.5 (page 149).

6. Uncertainty Around Ozone Production

Ozone can have negative effects on respiratory health for humans, and on plant matter in the affected area. The Columbia River basin will see greater ozone increases than the rest of the Pacific Northwest, likely due to the emitting industries located within it.

Columbia River Gorge will see 0.7-1.2 (70-120% increase) in ozone related mortality, while closer to the Blue Mountains is likely to experience 0.0044-0.02 (1-2%) increased mortality (Fann et al 2015) as seen in Figure 3D.6a (page 151).

Climate Impacts for **Emotional Wellbeing**

"Hundreds of generations of ancestors have known this land intimately from living on it for thousands of years. Every creek, spring, pond, swale, saddle, box canyon, draw, and peak witnessed people's long history here, and our people knew all the features of this land. Our children also must know this land if they are going to take care of it when they inherit this responsibility (Morning Owl et al 2015)."

Disconnection from the seasonal and cultural indicators is already creating anxiety and sense of loss when First Foods are inaccessible. Community connections are also negatively impacted, as extreme events require emergency preparedness, and shelter-in-place recommendations reduce access to social engagement for those with chronic illness and other health and mobility considerations.

7. Potential Disconnection from First Foods, Indigenous Culture, and Spiritual Connection

First Foods historic migration routes and timing are likely to shift and increasing frequency of natural disasters can trigger existing emotional health issues and potentially create new ones. Indigenous health is integrally tied to land, First Foods, community, and culture.

Environmental climate impacts create challenges to traditional foods access, which in turn affect the Indigenous Health Indicators: **Natural Resources Security, Self Determination, Cultural Use, Community Connection, Well-Being, and Education.** These are used to inform needs, health policy, and resource planning (Donatuto et al 2016) as seen in Figure 3D.7a (page 163).

8. Exacerbated Climate Grief, Eco-anxiety, and Solastalgia

Indigenous communities' concept of health is woven with land management practices and religious ceremony. Health outcomes are greatly improved for Tribal people who are able to continue access to subsistence foods and cultural practice.

Vicarious distress for those experiencing intense weather or environmental hardship; access to, and time spent on, the land linked to fulfilling psychological needs; altered or loss of place results in negative consequences for livelihoods, cultural practices, and social networks, as well as to alterations in personal and collective identities (Middleton et al 2020) as seen in Figure 3D.8 (page 165).

Health Adaptation Summary

Physical Health Adaptations

A. Support and Expand Community Health Capacity and Education

B. Approach Public Health Holistically with Cultural Connection

C. Expand Organizational Cooperation on Health Needs of Tribal Community

Health for Indigenous communities is much more complex than conventional public health frameworks understand, and increasing capacity for tribal members and community to direct their own research and wellness creates climate resilience in public health.

Measures of Success:

- Yellowhawk Tribal Health Center Annual Work Plans, and Community Health Assessments
- Comprehensive Plan Objectives 5.4.3, 5.5.7, 5.7.9, 5.11.3, 5.11.6, 5.11.11, 5.13.1, and 5.12.3
- CTUIR Hazard Mitigation Plan (2021) Sections 3 and 4
- Good Health and Wellness in Indian Country (GWIC) Grant Objectives 1,2, and 3 and sub-objectives and benchmarks.
- Chronic health prevalence in communities

Emotional Wellbeing Adaptations

D. Create Opportunities to Gather, Learn, and Share Stories Together

E. Continue to Revitalize Cultural First Foods Harvest, Processing, and Connection

Emotional wellbeing is closely tied with land and cultural wellbeing, and the two must be treated simultaneously in climate adaptation. Opportunities to connect with land, community, culture, and intergenerational knowledge create psychosocial wellbeing for Indigenous people.

Measures of Success:

- Yellowhawk Tribal Health Center Annual Work Plans, and Community Health Assessments (2016 and 2022)
- Comprehensive Plan Objectives 5.4.8, 5.5.10, 5.7.4, 5.11.8, and 5.11.9
- CTUIR Hazard Mitigation Plan (2021) Sections 3 and 5
- Family connection in learning and knowledge-sharing.
- Flexibility in self, family, community, and governance.
- Continued reciprocity with First Foods.

Climate Impacts for **Energy Generation & Transmission**

"Dams were constructed on the Columbia River during the Depression era, creating jobs for non-Indians and promising to provide cheap electricity. Promises were made to the Columbia River Tribes that the concrete walls across the Columbia River would not have a negative impact on the salmon, and, if they did, that hatcheries would be built to mitigate for those impacts (Tovey et al, 2006)."

Modern Indigenous food systems are largely reliant on modern energy, but also suffer harm, as generating facilities invariably cause incidental damage to First Foods. Transmission lines bisect Tribal lands, often restricting Treaty Rights access and creating challenges for migrating wildlife. Energy networks are vulnerable to multiple climate impacts, and are linked to wildfire ignition. Electricity interruptions threaten community safety and stability, amid reductions in generating capacity, and increased maintenance costs to public infrastructure.

1. Shifted Hydropower Generation Potential Due to Changing Hydrology

Energy generated from hydroelectric facilities will face a constriction in the amount of power they are able to generate from seasonal water supplies due to shifting hydrologic patterns.

By 2040s hydropower production in summer decreases 13-16% (2.5-4.0% annually); by 2080s hydropower production in summer decreases 18-21% (3.0-3.5% annually) (Hamlet et al 2010) as seen in Figure 3E.1a (page 180).

2. Transmission Interruptions Become More Frequent

Energy transportation will see impacts from aging infrastructure as well as climate change. Moving energy from generation sites to end users depends on a highly integrated network of transmission infrastructure that will be threatened.

Storms and severe weather cause 59% of weather-related outages, 19% by cold weather and ice storms, and **2% by a combination of extreme heat events and wildfires (**Kenward and Raja 2014) **with roughly 800% increase in interruption over the past 26 years,** as seen in Figure 3E.2 (page 183).

3. Energy Facility Operating Costs Increase

Increasing intensity of extreme weather events creates challenges for energy generation facilities, and cost to operate facilities is likely to increase as routine and emergency maintenance is required. These costs are likely to be passed on to taxpayers and utilities customers.

State of Oregon may experience a projected 2-4$/MWh for a Proactive response, 3-4 $/MWh increase for a Reactive response, and a 4-6 $/MWh for No Adaptation response by the end of the century (Fant et al 2018) as seen in Figure 3E.3 (page 185).

Climate Impacts for **Energy Use & Cost**

"Climate change and rising energy costs are creating economic opportunities in developing more efficient appliances, vehicles and buildings, increasing energy conservation, alternative fuels development, and renewable energy, especially wind and solar.

CTUIR must continue its efforts to maximize such economic development opportunities and help Tribal members gain access to related job training opportunities. To expand on such opportunities, we must reach out to potential partners, work closely with the area's leaders in attracting such businesses to the Reservation or our neighboring communities, and work closely with the State legislature and Congress to ensure that Tribal governments can benefit from tax incentives and bond financing available to private individuals and state and local governments.

CTUIR must focus on upgrading its workforce, improving its infrastructure and creating efficient business organizations if it is to capitalize on new development opportunities, as well as improving the necessary coordination between our departments to achieve such goals (CTUIR Energy Policy, 2009)."

4. Increased Demand for Summer Cooling

As summer temperatures rise, the Pacific Northwest will experience a shift in energy demand from winter heating to summer cooling, and the usage of air conditioners as a life-saving necessity.

Cooling demand during summer months is estimated to increase 363 - 555% by 2040, and 981-1,845% by 2080 in the Columbia River region (Hamlet et al 2010), as seen in Figure 3E.4 (page 200).

5. Energy Prices Likely to Increase

Increasing costs to generate and transmit energy will likely be passed to utility customers, though in some places adaptation and energy efficiency could mitigate for these increases.

Energy costs to utilities customers are estimated to increase $100-$400 billion dollars by 2100 regardless of energy adaptation (Larsen et al 2018), as seen in Figure 3E.5 (page 201).

6. Opportunities for Energy Efficiency to Reduce Carbon Demand

Losses of energy are a source of unnecessary greenhouse gases releases into the atmosphere, and represent points of diversion where carbon emissions can be reduced.

42.4% of Oregon's energy consumption is in the form of electricity; 25.5% as "direct use fuels;" and 32.1% as transportation fuels (Oregon Biennial Energy Report 2020) as seen in Figure 3E.6 (page 203).

Energy Adaptation Summary

Energy Generation and Transmission Adaptation

A. Support and Expand CTUIR Renewable Energy Generation Potential

B. Implement Tribal Sovereignty in Regional Energy Planning

C. Continue to Monitor and Engage with Hanford Nuclear Reservation

Transitioning away from carbon-intensive fossil fuel based systems requires implementation of renewable energy generation. Various sources of energy are potentially feasible for CTUIR, following community visioning and resource assessments.

Measures of Success:

- CTUIR Energy Policy (2009) Energy Goals (pages 20-24)
- CTUIR Strategic Energy Plan (2022) Part 3: Energy Vision Qualitative Performance Measures (Table 6, page 22) and Targets and Tracking Measures (Table 7, page 23)
- Comprehensive Plan (2010) Objectives 5.15.1, 5.15.3, and 5.15.7
- CTUIR Hazard Mitigation Plan (2021) Section 3
- Geothermal generation potential feasibility study (2018)

Energy Use and Cost Adaptation

D. Pursue Energy Efficiency for Tribal Homes, Businesses, and Facilities

E. Improve Access to Energy Training, Education, Financial, and Technical Assistance

Reducing energy waste has enabled Oregon to meet growing energy demand without the need to create new generation sources. There are still many opportunities to improve energy transfer efficiency, and to reduce demand for energy, especially from carbon-intensive sources.

Measures of Success:

- CTUIR Energy Policy (2009) Energy Goals (pages 20-24)
- CTUIR Strategic Energy Plan (2022) Part 3: Energy Vision Qualitative Performance Measures (Table 6, page 22) and Targets and Tracking Measures (Table 7, page 23)
- CTUIR Comprehensive Plan (2010) Objectives 5.5.7, 5.12.2, 5.15.2, 5.15.4, 5.15.5, 5.15.6, and 5.15.8
- Energy affordability and reliability for UIR

Climate Impacts for Economic Development

"Trade and barter was a significant aspect of Indian life on the Plateau, and essential for the survival of Indian people. Indians relied on other Indians to provide goods they themselves were not able to obtain. Often, groups from a single village community would travel different directions as part of their seasonal round. Through years of trade relationships, Elders knew exactly what other Indians needed in exchange for goods they needed (CTUIR Comprehensive Plan, 2010)."

While many current metrics of economies don't capture a number of different elements that make life worth living, economies are important for maintaining trade and the ability to fund different adaptation strategies. Indigenous people in North America have had thriving trade and commerce routes that pre-date European contact, and many of these economies are still thriving today. Diversified sources of income that can help buffer changes and losses that might occur in one or a few sectors, and training, education, and certification, can build resilient families and economies. A robust economy is one that is prepared for change, and one that supports the community in building equitable access to strategies that improve economic and income diversity.

1. Increased Household, Governance, and Emergency Expense

Acute and chronic climate impacts to health and emotional wellbeing will increase costs for healthcare, emergency treatment, insurance compensation, and cost of doing business for all sectors and communities.

Heat exposure related emergency department visits alone will cost an additional $21.9-30.2 million dollars by 2050, and $30.1-69.2 million dollars by 2090 per year across the U.S. (Lay et al 2018) as seen in Figure 3F.1 (page 216).

2. Impacts to Tourism from Disaster and Displacement

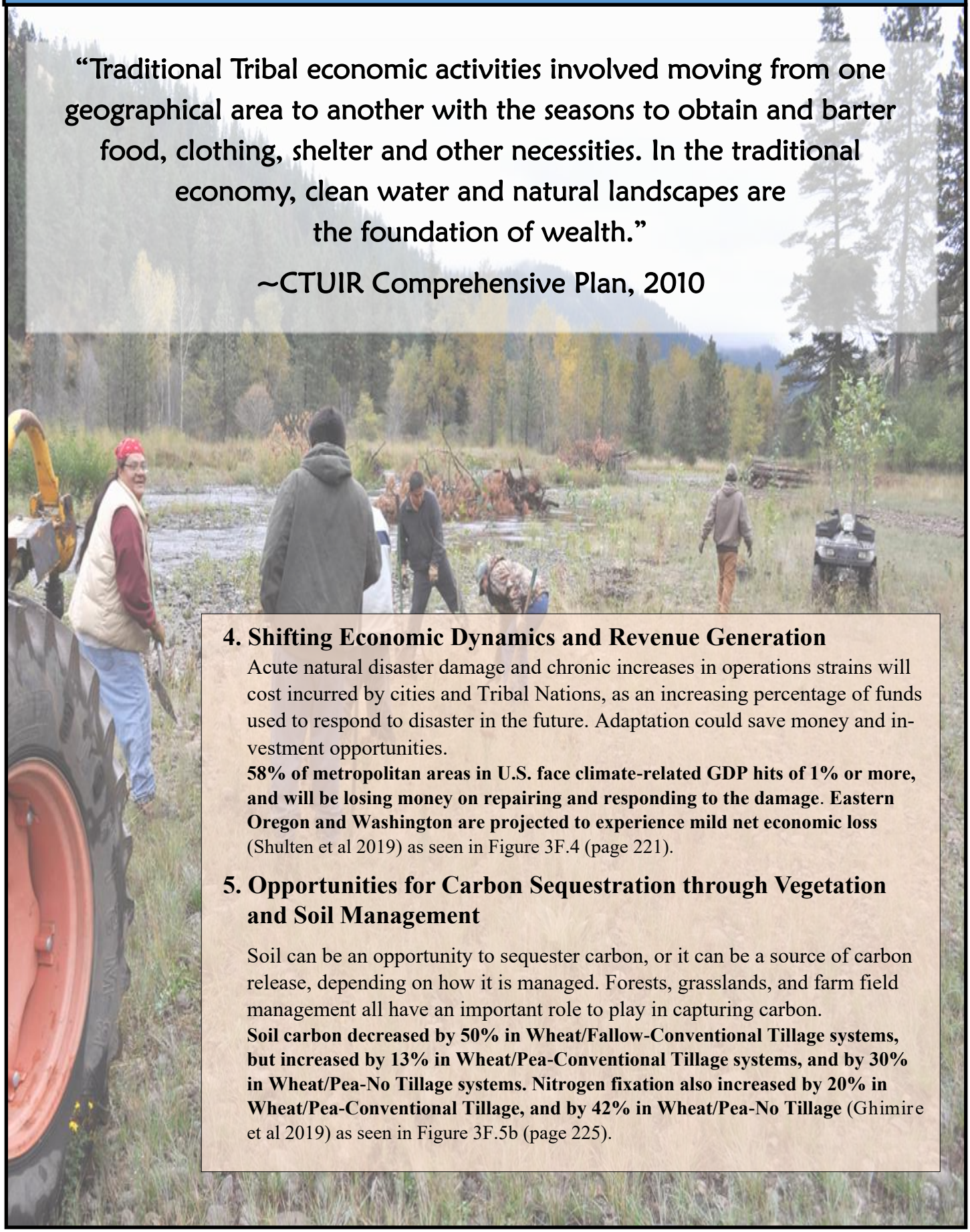
Tourism has a role to play in responding to climate impacts, but is also likely to see changes, due to increasing natural disasters locally and regionally.

Hotel occupancy increased 43.3% in the directly affected area during the Camp Fire (CA 2018), but decreased by 13.4% during the wildfire event, and by 15.8% post-fire in nearby metropolises (Ward and Mattern 2020) as seen in Figure 3F.2 (page 218).

3. Increased Potential Disruption of Businesses and Supply Chains

Dependence on globally-integrated supply chains leaves communities vulnerable to climate impacts around the world, and even small events can cause direct and indirect risk to production and goods available.

One single natural disaster event, Typhoon Haiyan in the Philippines in 2013, disrupted 6% of U.S. goods production directly, and posed a risk to 21% of all U.S. production indirectly (Levermann 2014) as seen in Figure 3F.3 (page 220).



"Traditional Tribal economic activities involved moving from one geographical area to another with the seasons to obtain and barter food, clothing, shelter and other necessities. In the traditional economy, clean water and natural landscapes are the foundation of wealth."

~CTUIR Comprehensive Plan, 2010

4. Shifting Economic Dynamics and Revenue Generation

Acute natural disaster damage and chronic increases in operations strains will cost incurred by cities and Tribal Nations, as an increasing percentage of funds used to respond to disaster in the future. Adaptation could save money and investment opportunities.

58% of metropolitan areas in U.S. face climate-related GDP hits of 1% or more, and will be losing money on repairing and responding to the damage. Eastern Oregon and Washington are projected to experience mild net economic loss (Shulten et al 2019) as seen in Figure 3F.4 (page 221).

5. Opportunities for Carbon Sequestration through Vegetation and Soil Management

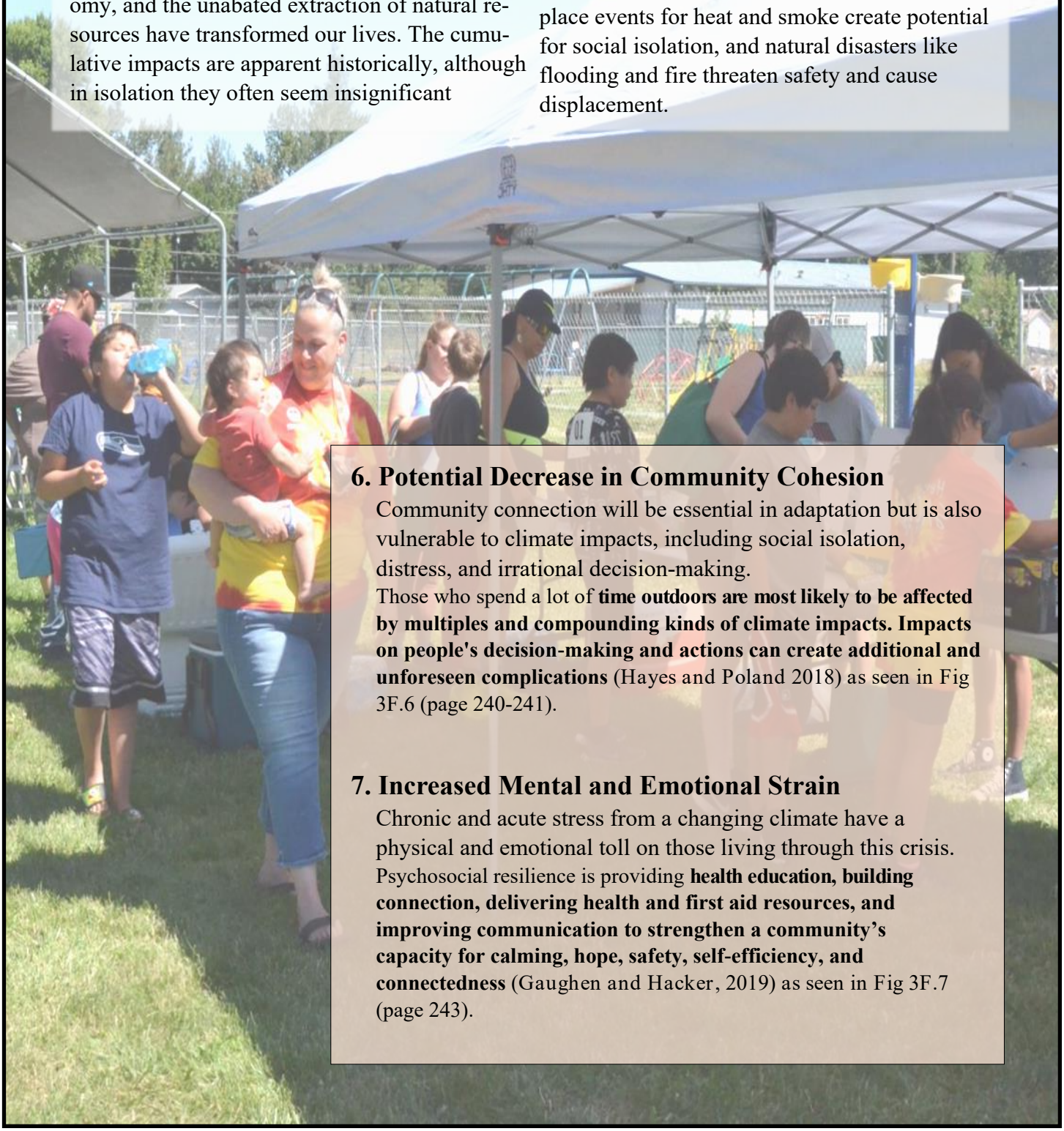
Soil can be an opportunity to sequester carbon, or it can be a source of carbon release, depending on how it is managed. Forests, grasslands, and farm field management all have an important role to play in capturing carbon.

Soil carbon decreased by 50% in Wheat/Fallow-Conventional Tillage systems, but increased by 13% in Wheat/Pea-Conventional Tillage systems, and by 30% in Wheat/Pea-No Tillage systems. Nitrogen fixation also increased by 20% in Wheat/Pea-Conventional Tillage, and by 42% in Wheat/Pea-No Tillage (Ghimire et al 2019) as seen in Figure 3F.5b (page 225).

Climate Impacts to **Community Support**

"Just as knowledge is a way of seeing the world, the earth transformed bears witness to the changes of the past millennia. The impact of colonization, the removal of peoples from ancestral lands, the dispossession or reduction of lands, population decline, a shift to a cash economy, and the unabated extraction of natural resources have transformed our lives. The cumulative impacts are apparent historically, although in isolation they often seem insignificant (Phillip E, Cash Cash, 2015)."

Tribal communities are integrally connected between families and through generations, and prioritize family, culture, connection, and First Foods. Climate disruptions may threaten deeply held connections with community: shelter-in-place events for heat and smoke create potential for social isolation, and natural disasters like flooding and fire threaten safety and cause displacement.



6. Potential Decrease in Community Cohesion

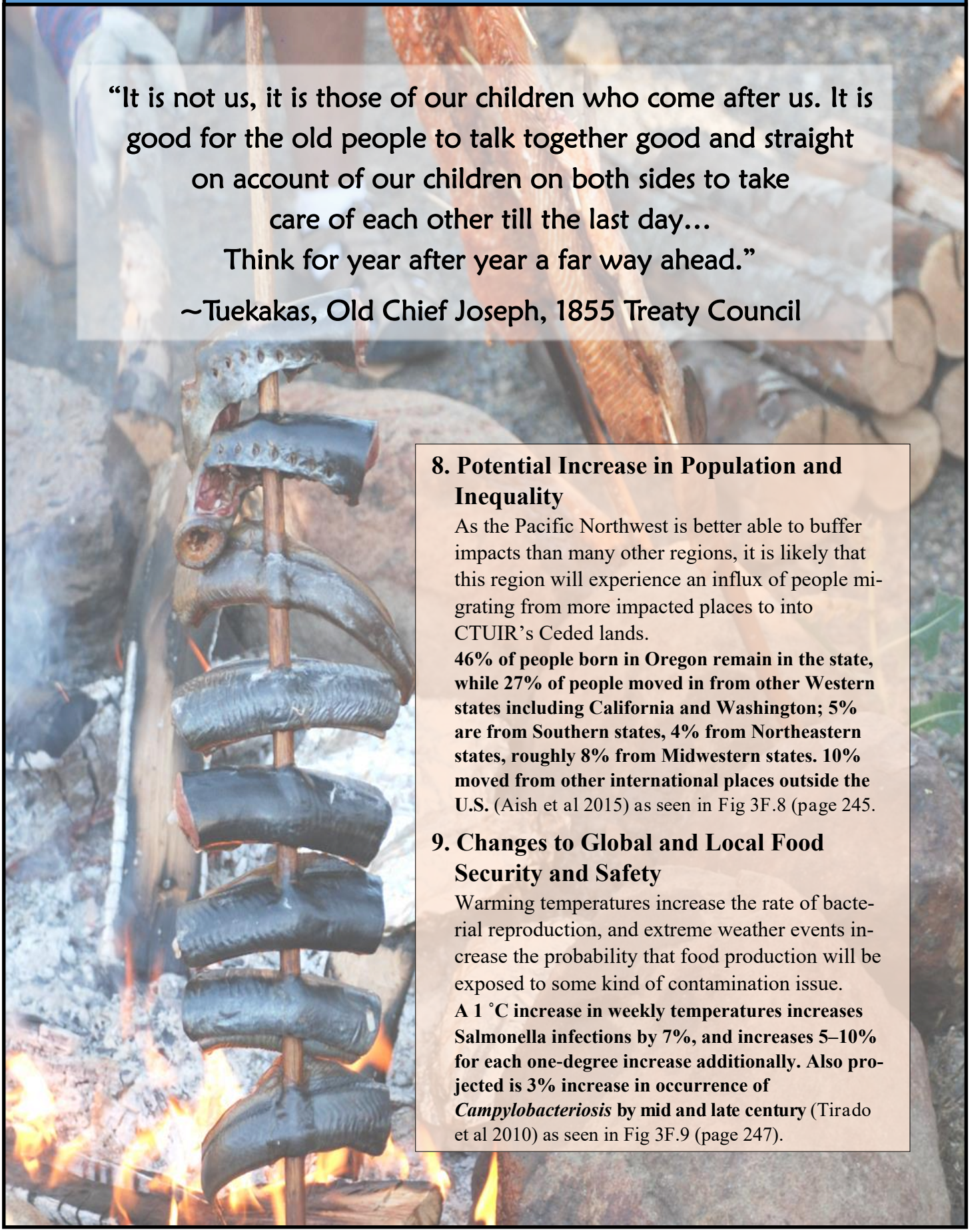
Community connection will be essential in adaptation but is also vulnerable to climate impacts, including social isolation, distress, and irrational decision-making.

Those who spend a lot of **time outdoors are most likely to be affected by multiples and compounding kinds of climate impacts. Impacts on people's decision-making and actions can create additional and unforeseen complications** (Hayes and Poland 2018) as seen in Fig 3F.6 (page 240-241).

7. Increased Mental and Emotional Strain

Chronic and acute stress from a changing climate have a physical and emotional toll on those living through this crisis.

Psychosocial resilience is providing **health education, building connection, delivering health and first aid resources, and improving communication to strengthen a community's capacity for calming, hope, safety, self-efficiency, and connectedness** (Gaughen and Hacker, 2019) as seen in Fig 3F.7 (page 243).



"It is not us, it is those of our children who come after us. It is good for the old people to talk together good and straight on account of our children on both sides to take care of each other till the last day…
Think for year after year a far way ahead."

~Tuekakas, Old Chief Joseph, 1855 Treaty Council

8. Potential Increase in Population and Inequality

As the Pacific Northwest is better able to buffer impacts than many other regions, it is likely that this region will experience an influx of people migrating from more impacted places to into CTUIR's Ceded lands.

46% of people born in Oregon remain in the state, while 27% of people moved in from other Western states including California and Washington; 5% are from Southern states, 4% from Northeastern states, roughly 8% from Midwestern states. 10% moved from other international places outside the U.S. (Aish et al 2015) as seen in Fig 3F.8 (page 245.

9. Changes to Global and Local Food Security and Safety

Warming temperatures increase the rate of bacterial reproduction, and extreme weather events increase the probability that food production will be exposed to some kind of contamination issue.

A 1 ˚C increase in weekly temperatures increases Salmonella infections by 7%, and increases 5–10% for each one-degree increase additionally. Also projected is 3% increase in occurrence of *Campylobacteriosis* by mid and late century (Tirado et al 2010) as seen in Fig 3F.9 (page 247).

Economics & Community Summary

Economic Development Adaptations

A. Diversify Economic Opportunities, Trainings, and Options

B. Build Capacity to Address Economic Challenges

C. Expand NCFS to Provide Small Business Support

D. Build Interest and Capacity in First Foods Stewardship, Procurement, and Processing

E. Develop Land Acquisition Plan and Implement Strategies

Economic resilience means having access to flexible credit opportunities, being financially knowledgeable, and able to buffer impacts through diversification of revenue and capital sources.

Measures of Success:

- CTUIR Comprehensive Economic Development Strategies (CEDS) (2017) Objectives 2, 5, 6, 9, 10, and 11
- DECD and DCFS Annual Work Plans and Benchmarks
- CTUIR Comprehensive Plan Objectives 5.2.1, 5.2.2, 5.2.3, 5.2.5, 5.4.2, 5.4.6, 5.3.1, 5.3.5, 5.15.9
- Tribal family and community financial prosperity

Community Support Adaptations

F. Expand and Support Tribal Stewardship Training and Education Opportunities

G. Continue to Develop and Implement Safe and Energy Efficient Tribal Housing and Community

H. Support Use of Tutuilla Food Sovereignty Center for Community Need

I. Provide for Needs of Community in Crisis and Non-Crisis

A connected and interdependent community is a resilient one. Networks and support systems that strengthen existing mutual aid initiatives should be pursued in crisis and non-crisis.

Measures of Success:

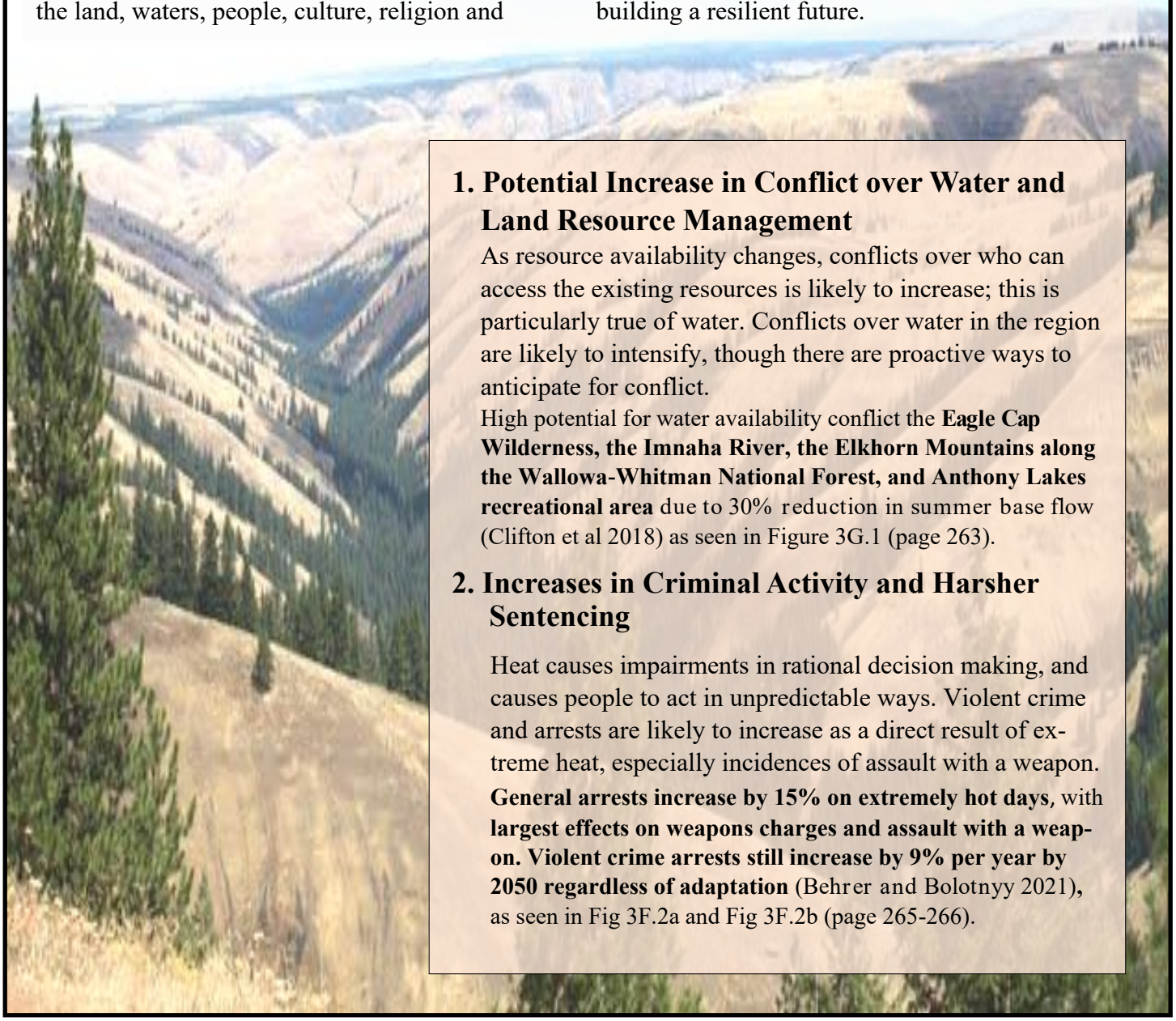
- CTUIR Comprehensive Economic Development Strategies (CEDS) (2017) Objective 21
- CTUIR Comprehensive Plan Objectives 5.5.5, 5.5.6, 5.10.2, 5.10.4, 5.13.3, 5.14.6, 5.14.11, 5.14.14
- CTUIR Hazard Mitigation Plan (2021) Section 3
- Mission Community Plan (1993) Parts C: Land Use and Part D; Tribal Services
- DECD and DCFS Annual Work Plans and Benchmarks

Climate Impacts for **Tribal Sovereignty**

"The Tribes will always exercise our national sovereignty and preserve our traditional cultural ways in harmonious existence with our homeland. We will always provide for the well-being of our people in the future. We will live in balance with the land and use our natural resources only when traditional and cultural teachings dictate use.

We will respect all persons; acknowledge the wisdom of our elders and religious leaders; sustain the hopes of our people; and accept responsibility for our actions realizing that we are accountable to the Creator. The Creator's spirit lives in our homeland and our national sovereignty protects the spirit with the land, waters, people, culture, religion and language (CTUIR Comprehensive Plan, 2010)."

There are many mechanisms that federally-recognized Tribes like CTUIR can use to assert sovereignty over land and jurisdiction issues, at local, regional, national, and international levels. Issues of climate change become inseparably tangled with the history of Tribal recognition and respect. The history of Tribal dispossession of land, culture, language, and community cannot be ignored in the adaptation process. Tribes can utilize their sovereignty to impact land and resource management strategies, and returning Indigenous knowledge and cultural practices to lands dispossessed of them is essential in building a resilient future.



1. Potential Increase in Conflict over Water and Land Resource Management

As resource availability changes, conflicts over who can access the existing resources is likely to increase; this is particularly true of water. Conflicts over water in the region are likely to intensify, though there are proactive ways to anticipate for conflict.

High potential for water availability conflict the **Eagle Cap Wilderness, the Imnaha River, the Elkhorn Mountains along the Wallowa-Whitman National Forest, and Anthony Lakes recreational area** due to 30% reduction in summer base flow (Clifton et al 2018) as seen in Figure 3G.1 (page 263).

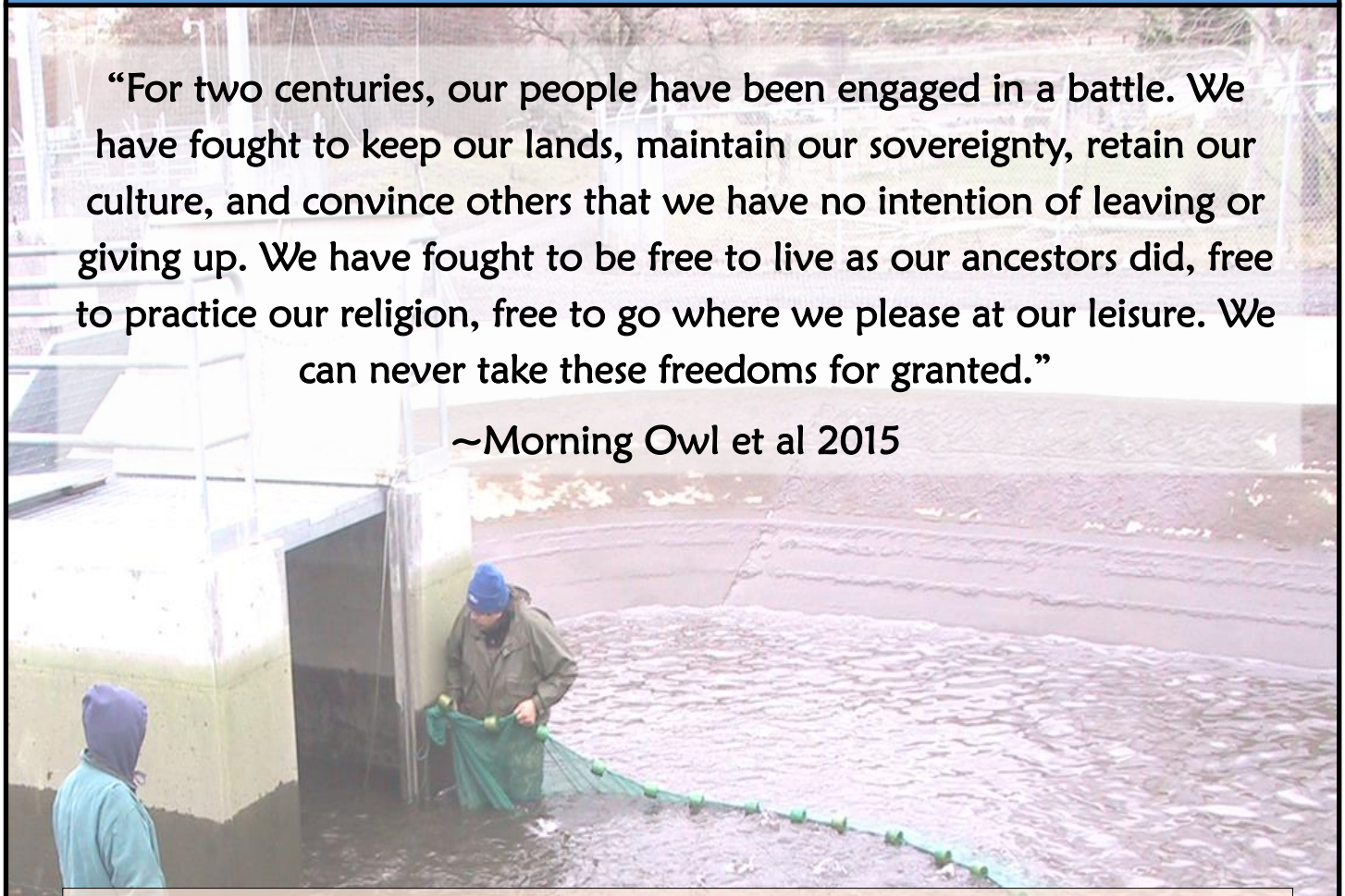
2. Increases in Criminal Activity and Harsher Sentencing

Heat causes impairments in rational decision making, and causes people to act in unpredictable ways. Violent crime and arrests are likely to increase as a direct result of extreme heat, especially incidences of assault with a weapon. **General arrests increase by 15% on extremely hot days**, with **largest effects on weapons charges and assault with a weapon. Violent crime arrests still increase by 9% per year by 2050 regardless of adaptation** (Behrer and Bolotnyy 2021), as seen in Fig 3F.2a and Fig 3F.2b (page 265-266).

Climate Impacts for **Tribal Sovereignty** (cont.)

"For two centuries, our people have been engaged in a battle. We have fought to keep our lands, maintain our sovereignty, retain our culture, and convince others that we have no intention of leaving or giving up. We have fought to be free to live as our ancestors did, free to practice our religion, free to go where we please at our leisure. We can never take these freedoms for granted."

~Morning Owl et al 2015



3. Potential Interruptions in Collective Continuance for Tribes and First Foods

Indigenous knowledge, or "traditional ecological knowledge (TEK)" is a description of the way that Tribes live according to Tamanwit, and includes concepts of reciprocal responsibilities between individuals, communities, and the natural world. Leaders and scientists are beginning to realize the breadth and depth of this knowledge, and Tribes can be an integral part of climate adaptation that prioritizes the cultural continuity of these relationships.

Intrinsic value of Indigenous knowledge from **close connections with community, water, land, and First Foods;** instrumental value from **adaptive management that CTUIR creates with the First Foods Mission** (Whyte et al 2013) as seen in Figure 3G.3 (page 267).

4. Opportunities for Tribes to Be State, Federal, and International Leaders on Climate Adaptation

As governments prepare to implement climate adaptation strategies, consideration for existing and potential Tribal leadership in these efforts would ensure a more inclusive and robust outcome, with a focus on environmental justice for First Foods and CTUIR community.

Expertise in Tribal management organizations highlights the sophistication of Tribal governments and their **responsiveness, cooperative agreements, partnerships, and Treatment-As-States (TAS)** are all ways to expand Tribal sovereignty (Hopkins 2012) as seen in Figure 3G.4 (page 270-271).

Climate Impacts for **Treaty Rights**

"That struggle is not yet ended. Deeds of such magnitude cannot be undone and over with, as many of you believe. They cannot stand alone in a period of time. Their tentacles reach out to oncoming generations and touch the lives of our people. We live centuries after the deeds themselves seem only echoes in history.

I am an Indian living in the present now, but I, like all my people, carry the burden of those distant years. So do you, whether Indian or white. We cannot be understood separate from the past for what happened to our ancestors over the past centuries has had its large share in molding the character that is ours today (Maudie C. Antoine, CTUIR BOT Chairwoman, Walla Walla June 11 1955)."

As Tribal Members exercise rights guaranteed by the Treaty of 1855, there is connection to lands and practices that has sustained Tribal people since time immemorial. These rights have legal protections, but are also constantly being questioned through court cases and litigation nationally. Access to Treaty Rights requires strong legal frameworks to ensure Tribal Members are protected as they practice these relationships, and have safe conditions under which to do so.

"Over millennia, our oral traditions have given us an understanding of the natural world, the capacity of life, and the fundamental human relationships that are bound by it."

~Phillip Cash Cash, 2006

5. Opportunities to Reduce Climate Impacts Risk through Cultural Practices

For Indigenous people, cultural and religious practices are integrally tied with sustainable land management practices. Traditional burning is an excellent example of the diverse benefits of returning cultural practices to the land, especially out in the relatively rural areas of CTUIR Ceded and traditional use lands.

Returning **cultural burning to the Eastern Oregon and Washington region** is least risky and has potential for great benefits (Gilbertson et al 2018) as seen in Figure 3G.5 (page 282).

6. Challenges to Healthy Conditions to Exercise Treaty Rights Safely

Intangible access barriers to Treaty Rights exist and should not be treated lightly. These kinds of barriers can be thought of as conditions that reduce the ability of Tribal Members to maintain physical and emotional health while exercising Treaty Rights. Exposure can have a lingering effect on Tribal Member health and desire to continue to participate in harvest and processing opportunities.

Roughly **20% improvement in seasonal air quality can be maintained through use of intentional burning** (Long et al 2017) as seen in Figure 3G.6 (page 284).

Tribal Sovereignty and Rights **Summary**

Tribal Sovereignty Adaptation Goals

A. Capacity Building and Expansion of Tribal Self Determination

B. Cooperative Partnerships and Agreements

C. Support Tribal Policy, Frameworks, and Services

Tribal sovereignty has many strong mechanisms that can be used to pursue and protect climate adaptation strategies. These mechanisms strengthen connection to the land, and can benefit Tribal and non-Tribal communities and priorities.

Measures of Success:

- Confederated Tribes of Umatilla Treaty of 1855 Article One
- CTUIR Comprehensive Plan 5.7. 2, 5.7.8, 5.8.4, and 5.8.5
- Mission Community Plan (1995) and Water Code (2005)
- CTUIR Emergency Operations Plan (2016) Section 3
- CTUIR Hazard Mitigation Plan (2016, 2021) Section 5
- Coordination with agencies and landowners on cultural and prescribed burning.

Treaty Rights Adaptation Goals

D. Engage with Tribal Rights and Other Legal and Legislative Mechanisms

E. Strengthen Education and Communication

F. Fortify First Foods in Systems of Responsibility

Responsible and regular exercise of Treaty Rights is essential for maintaining and expanding Indigenous knowledge on CTUIR lands. These include traditional land management techniques like cultural burning, as well as the revitalization of dormant practices, and understanding of reciprocal responsibility.

Measures of Success:

- Confederated Tribes of Umatilla Treaty of 1855 Article One
- CTUIR Comprehensive Plan (2010) Objectives 5.2.2, 5.8.3, and 5.10.7
- CTUIR Emergency Operations Plan (2016) Sections 3.3.3, 4.5, and 6.5
- Annual/seasonal exercise of Treaty Rights by CTUIR Tribal community.
- Engagement with legal and legislative efforts on carbon accounting
- Partnerships with agencies and landowners on Treaty Rights opportunities.

Conclusions for Adaptation Across all Areas of Focus

1. First Foods Knowledge, Access, Processing, and Safe Harvest

- Secure and expand Tribal Member ability to uphold these reciprocal relationships.
- Build understanding of First Foods life cycles, appropriate harvest information, and processing.
- Gain a better understanding of sentiments and strategies around displaced species, species migration, and other facilitated migration opportunities.
- Develop strategies to address displaced species that threaten First Foods. These may be native species that are outside their range, that increase risk, or that predate on First Foods in their life stages.

2. Information Collection, Sharing, and Networks for Tribal Sovereignty

- Develop knowledge and observation sharing platforms and protocols for community.
- Information collection and analysis should center Indigenous knowledge and empowerment of Treaty Rights and cultural practices.
- Develop education and infrastructure to support local access to First Foods and safe opportunities for mutual aid and exchange.

3. Training, Education, and Opportunity for Tribal Community

- Tribal Youth and Students – who are future leaders and are most impacted by future changes.
- Tribal Harvesters and Entrepreneurs – who spend much of their time outdoors and will experience disproportionate mental and physical health impacts.
- Expand access to financial services through mechanisms that improve quality of life, empowerment around decision-making, and flexible financing for those in the Tribal community.

4. Flexibility/Adaptability in Governance, Economy, Community, and Self

- Build capacity to anticipate variability by implementing flexible and adaptive strategies for all services and events.
- This will include developing policy, infrastructure, and social protocols that facilitate flexible living.
- Provide opportunities to listen to the Tribal community around issues being experienced, and develop protocols to respond to these concerns.

5. Build Capacity to Implement Adaptation

- Support Tribal governments, and community knowledge and enthusiasm to tackle emerging problems, using capacity to fund, administer, and implement these strategies.
- Securing programmatic funding for adaptation strategies, expand Tribal community capacity to implement adaptations, and prioritize solutions with an interdisciplinary approaches.
- Maintain, improve, and expand every opportunity for Treatment-as-State, Land Back, Treaty Rights, litigation, partnerships, and other sovereignty mechanisms.

Next Steps

Future efforts will need to focus on building capacity and knowledge of climate impacts being experienced, and will need to involve both the CTUIR government and community.

1. Incorporate climate projections into the forthcoming update to the CTUIR Comprehensive Plan, set to occur in 2025.
2. Organize and facilitate community knowledge-sharing and gathering opportunities with the Sapatunxwit Community Curriculum.
3. Organize a process and relevant CTUIR staff and community members to develop department-specific CAP implementation plans.

Climate Adaptation Planning Timeline

Pre-Plan

(2018-2019)

- Synthesis of Data from Scientific Literature
  - ◊ Literature Review for regional, relevant, and recent Climate Projections and downscaled data modeling.
- Investigation of other Tribal Plans and Strategies
  - ◊ Engage with other Columbia River Plateau Tribes doing climate adaptation (Nez Perce, Yakama, CRITFC)
- Regional climate adaptation planning workshops and planning cohorts. This included workshops on health, native wildlife, smoke management, and Tribal climate planning, with various inter-Tribal partner organizations.

Drafting & Community Engagement

(2019-2022)

- Draft Plan Released June 2nd 2021– published in draft form on the CTUIR Climate Adaptation webpages on the CTUIR website.
- Engagement included mailing requested prints of drafts, providing printed drafts to DCFS Food Distribution participants, and at the CTUIR Seniors Center.
- Additional outreach and draft documents available at community events such as the Elders Lunch, Community Picnic, DNR Open House, and others.
- Climate Adaptation Webinar Series (Nov 2020—June 2021) - virtual community engagement highlighting Tribal knowledge keepers, staff, and partners.

Revisions and BOT Resolution

(2022)

- Incorporate feedback and revise draft accordingly. Community, leader, and staff engagement was tremendous and incorporating excellent feedback throughout the document took some time. Patience shown by community was greatly appreciated.
- Review of draft plan by CTUIR commissions and committees; multiple entities views different sections of the plan by relevance to area of focus, and vote on support for full document was done by polling.
- CTUIR Board of Trustees review sessions—BOT reviewed the revised final document as an overview of the Executive Summary, and a resolution to adopt.
- Resolution No. 22-103 to Adopt accepted on 19, December, 2022.

Next Steps

(2023 and beyond)

- Sapatunxwit Community Curriculum—establish a standardization of understanding climate impacts. Talking circles and discussion groups to guide engagement.
- CTUIR Comprehensive Plan Update in 2025— this scheduled update to the CTUIR guiding document will incorporate climate projections in benchmarks.
- Community Survey—improvements, updates, and revisions to future Climate Adaptation Plan revisions. Assess document accuracy and relevance to need.

C E R T I F I C A T E

The undersigned, N. Kathryn Brigham, and Sally Kosey hereby certify that they are the Chair and Secretary, respectively, of the Board of Trustees of the Confederated Tribes of the Umatilla Indian Reservation, and at a regular meeting of said Board of Trustees at the Board Chambers of the Nixyáawii Governance Center, Mission, Oregon, on the 19th day of December, 2022, a quorum of said Board was present and the following Resolution was regularly moved, seconded, and adopted by a vote of for, against, and abstaining.

R E S O L U T I O N

WHEREAS, the Board of Trustees is the governing body of the Confederated Tribes of the Umatilla Indian Reservation (Confederated Tribes) by the authority of Article VI, Section 1 of the Constitution and Bylaws of the Confederated Tribes, adopted on November 4, 1949 and approved on December 7, 1949, as amended; **AND**

WHEREAS, pursuant to Article VI, Section 1(e) of the Constitution and Bylaws, the powers of the Board of Trustees include the authority "to exercise any rights and powers heretofore vested in the Confederated Tribes, but not expressly referred to in this Constitution, or any powers that may in the future be delegated by an agency of local, state or Federal government"; **AND**

WHEREAS, the Confederated Tribes provides annual financial support to the Department of Natural Resources, to preserve, protect and enhance the First Foods for the perpetual cultural, economic and sovereign benefit of Confederated Tribes; **AND**

WHEREAS, the Confederated Tribes, through its Department of Natural Resources, has developed a Climate Adaptation Plan, conducted extensive community outreach, and has produced an archived Climate Adaptation webinar series that informs the plan; **AND**

WHEREAS, the Confederated Tribes, through its Department of Natural Resources, provides coordination and communication with other CTUIR Departments through the Climate Adaptation Planner and through CTUIR regulatory commissions and advisory committees, and a record of the committee and commission meetings and recommendations, and additional public outreach efforts regarding the Climate Adaptation Plan are outlined in Exhibit 3 to this resolution; **AND**

WHEREAS, the Confederated Tribes, since time immemorial, has prepared for changes in climate, and now is prepared to do the same in the face of the anthropogenic climate crisis caused by global colonization and the burning of fossil fuels, though the magnitude of these changes is still to be determined; **AND**

WHEREAS, the Confederated Tribes understands and is aware that the Umatilla Indian Reservation, its Ceded Lands, and its larger Traditional Use Area are likely to experience a suite of climate impacts that include an increased but variable magnitude of flooding; ecological drought causing stress to plants, animals, and water supply; increased frequency of extreme heat events that threaten health; frequent smoke inundation from wildfires burning near and far; increased risk of wildfire; and changes in the range and severity of many pathogens and pests that threaten economic and human prosperity; **AND**

WHEREAS, the Confederated Tribes recognizes and understands that climate impacts fundamentally alter the way water will be available, and affects all that depends on water, including First Foods, Tribal people, and future generations, as well as the abundance, health, and access of First Foods harvest opportunities to the Tribal community; **AND**

WHEREAS, the Confederated Tribes recognizes and understands that without coordinated and sustained adaptation, anticipated climate impacts could disrupt and destabilize the Confederated Tribes' exercise of self-determination and Tribal Sovereignty through the disruption of First Foods and cultural connection, increased strain on governance and community facilities, migration of First Foods out of Tribal jurisdiction, and increase mental and emotional strain on the Tribal community; **AND**

WHEREAS, the Confederated Tribes intends to exercise tribal sovereignty and resilience through the creation and adoption of a Climate Adaptation Plan that examines climate-shifted projections of future conditions for the purposes of long-term planning; **AND**

WHEREAS, the current Board of Trustees identified Climate Change Plan Implementation as the second highest priority for the 2022-2023 Board of Trustees priorities including the finalization and adoption of the CTUIR Climate Adaptation Plan, establishing greenhouse gas reduction goals, renewable energy development, and incorporating climate change actions for all CTUIR departments and entities/enterprises; **AND**

WHEREAS, the Confederated Tribes intends, by adoption of the Climate Adaptation Plan, to connect other existing plans and future updates to the Comprehensive Plan with climate change-associated planning; **AND**

WHEREAS, the Confederated Tribes intends, by the adoption of the Climate Adaptation Plan, to advance frameworks for climate adaptation implementation within its departments and enterprises, and in support of community initiatives; **AND**

WHEREAS, the Confederated Tribes, in adopting this Climate Adaptation Plan, demonstrates that it has developed a legally defensible and community-identified suite of possible

climate adaptation strategies, including services provided to the community, implementation of project objectives, and documentation of successful project implementation and lessons learned; **AND**

WHEREAS, revisions and updates to this Climate Adaptation Plan should be revisited at least every five (5) years to provide for the most recent and relevant information, or more frequently as it is necessary, and as capacity allows; **AND**

WHEREAS, at a work session held December 16th, 2022, the Confederated Tribes' Board of Trustees reviewed the revised final draft of the Climate Adaptation Plan, as outlined in Exhibit 1, Executive Summary, as outlined in Exhibit 2, and Record of Committee/Commission and Engagement and Public Outreach Efforts, as outlined in Exhibit 3; **NOW, THEREFORE, BE IT;**

RESOLVED, that the Board of Trustees hereby adopts the Confederated Tribes' Climate Adaptation Plan, attached hereto as Exhibit 1; **AND BE IT FINALLY**

RESOLVED, that the Board of Trustees hereby directs the Executive Director to implement the Climate Adaptation Plan where appropriate in CTUIR Department and Program work plans, funding proposals, and progress reports, as well as coordinating its implementation with CTUIR entities including Wildhorse Resort and Casino, Wildhorse Foundation, Cayuse Holdings, Nixyaawii Community Financial Services, Yellowhawk Tribal Health Center, and future enterprises.

AND, that said Resolution has not been modified amended or repealed and is still in full force and effect.

DATED this 19th day of December, 2022.

N. Kathryn Brigham, Chair
Board of Trustees

A T T E S T:

Sally Kosey, Secretary
Board of Trustees

Exhibit 1: **Climate Adaptation Plan**
Exhibit 2: **Executive Summary**
Exhibit 3: **Record of Committee/Commission Engagement and Public Outreach Efforts**

Name	Yes	No	Abstain	Leave
N. Kathryn Brigham, BOT Chair				
Aaron Ashley, BOT Vice Chair				
Sandra Sampson, BOT Treasurer				
Sally Kosey, BOT Secretary				
Corinne Sams, BOT Member				
Toby Patrick, BOT Member				
Lisa Ganuelas, BOT Member				
Boots Pond, BOT Member				
Lindsey X. Watchman, General Council Chair				