

Upper Snake River Tribes Foundation Climate Change Vulnerability Assessment

Executive Summary

February 2017

A collaborative project of the USRT Foundation and its member Tribes: *Burns Paiute Tribe; Fort McDermitt Paiute-Shoshone Tribe; Shoshone-Bannock Tribes; Shoshone-Paiute Tribes*, Adaptation International, the University of Washington, and Oregon State University.



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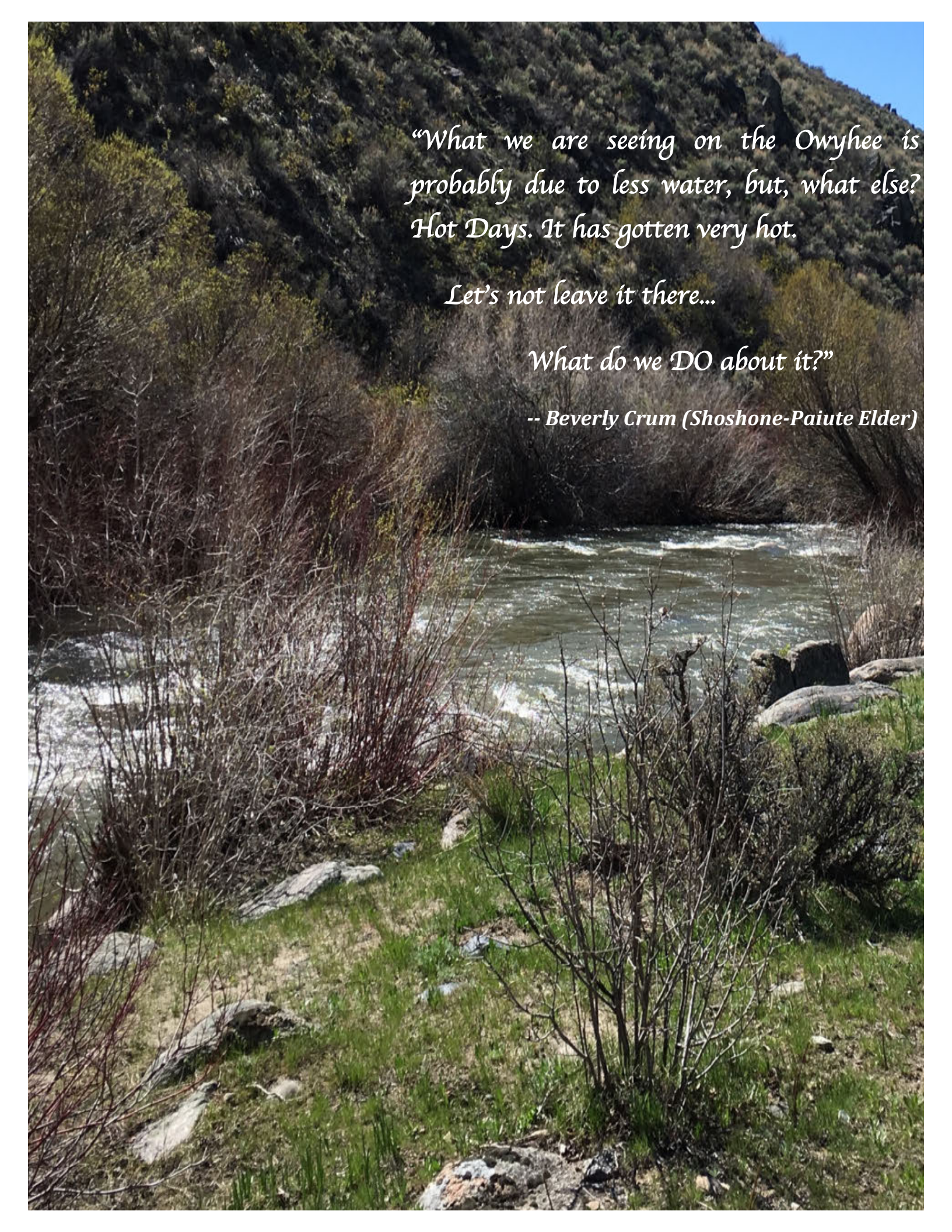
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Thank you, Alexis and Jennifer!

Cover Photo: Upper Snake River at Massacre Rocks. Scott Hauser. 2016

Third Page Photo: The Owyhee River on the Shoshone-Paiute Tribes of the Duck Valley Reservation. Sascha Petersen. 2016

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“What we are seeing on the Owyhee is probably due to less water, but, what else? Hot Days. It has gotten very hot.

Let's not leave it there...

What do we DO about it?”

-- Beverly Crum (Shoshone-Paiute Elder)

THANK YOU to the tribes involved in this project. They graciously hosted workshops and shared knowledge throughout the project.



Special thanks to the members of our project Core Team who identified Shared Concerns across the Upper Snake River Watershed, reviewed climate projections, and offered their expertise on local climate vulnerabilities.

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I. Executive Summary

The Upper Snake River Watershed has been home to humans for more than 10,000 years. Many of their ancestors still reside on the landscape and are members of the Burns Paiute Tribe, Fort McDermitt Paiute-Shoshone Tribe, Shoshone-Bannock Tribes of the Fort Hall Reservation, and Shoshone-Paiute Tribes of the Duck Valley Reservation. Together, these four member tribes comprise the Upper Snake River Tribes (USRT) Foundation.

The climate around the Upper Snake River is changing. USRT member tribes have already noticed shifts in species and habitats driven by increasing temperatures and changing precipitation patterns. Such changes in temperature and precipitation have resulted in drying sagebrush steppe habitat, extended wildfire seasons, less winter precipitation falling as snow, earlier spring run-off, low summer river flows, higher water temperatures, reduced flow from springs/seeps, proliferation of invasive weeds, and the decreasing productivity of rangelands. The project area is shown in Figure 1.

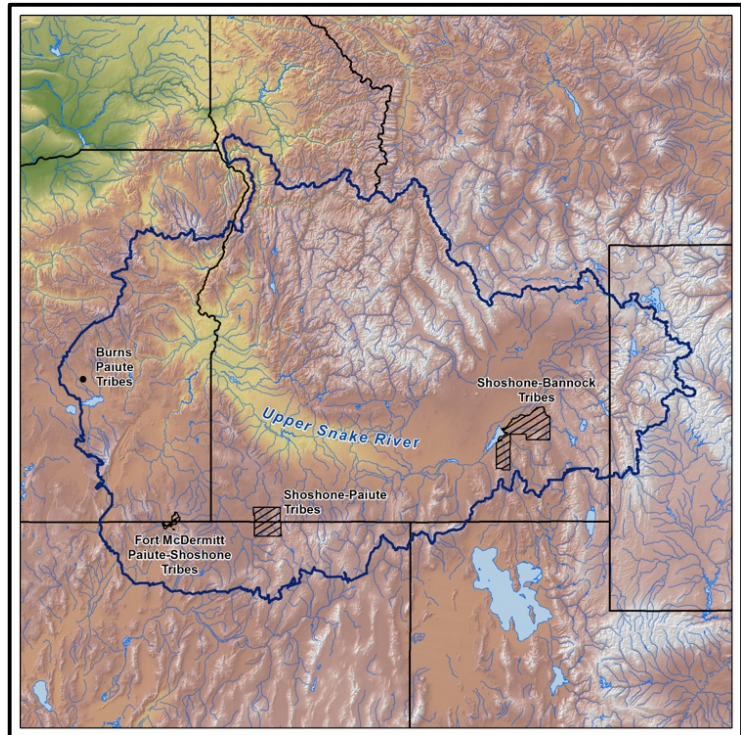


Figure 1: The Upper Snake River Watershed project area for this assessment, an area of more than 97,000 square miles.

A. Collaborative Process

This collaborative vulnerability assessment expressly considered the species, habitats, and resources that are important and valuable to USRT member tribes. Climate change impacts on these resources have the potential to affect tribal members' culture, spirituality, and lifeways.

The collaboration involved the direct and ongoing participation of USRT staff and the leadership, staff, and membership of the four member tribes. Combining the best available localized climate projections with traditional knowledge, tribal priorities, and local observations was central to the success of this assessment (Figure 2).

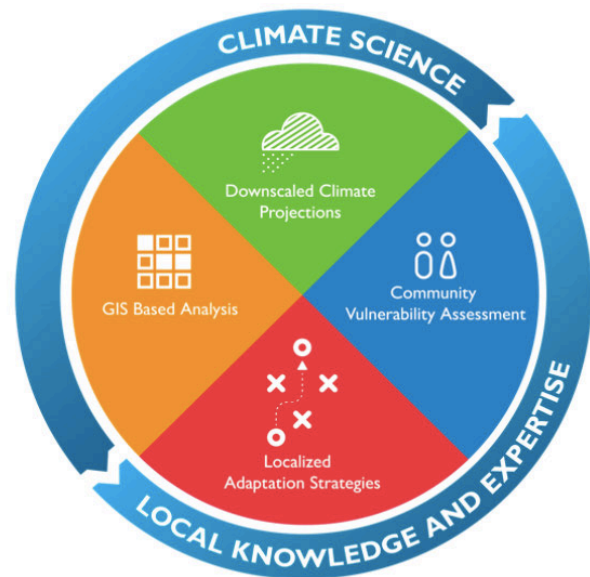


Figure 2: The collaborative process used in this project combined the best available climate science with local and traditional knowledge.

This vulnerability assessment included four steps:

1. Analyzing downscaled temperature and precipitation projections for the project area;
2. Site visits to USRT member tribes' reservations to identify Shared Concerns;
3. Use of the NatureServe Climate Change Vulnerability Index (CCVI) and other methods to determine relative vulnerability rankings; and
4. A collaborative vulnerability assessment workshop in Boise with USRT member tribes' staff and leadership.

B. Downscaled Climate Projections

This assessment used the project area as a starting point for developing localized climate projections. With guidance from the Core Team, the Project Team identified three subdomains within the project area with somewhat distinct elevations, climates, and ecosystems. The Oregon Climate Change Research Institute (OCCRI) developed downscaled climate projections from the Multivariate Adaptive Constructed Analogs (MACA) project for the full project area as well as the three subdomains. To focus the range of climate changes projections for the region, the Project Team selected two climate change scenarios: a lower warming scenario Representative Concentration Pathway (RCP) 4.5, an aspirational but still achievable future where global agreements and policies work to dramatically reduce greenhouse gas emissions; and a higher warming scenario, RCP 8.5, where global greenhouse gas emissions continue to increase at their present rate for the next several decades, often colloquially referred to as “business-as-usual”. Details on these projections are available in Section III of the main report.

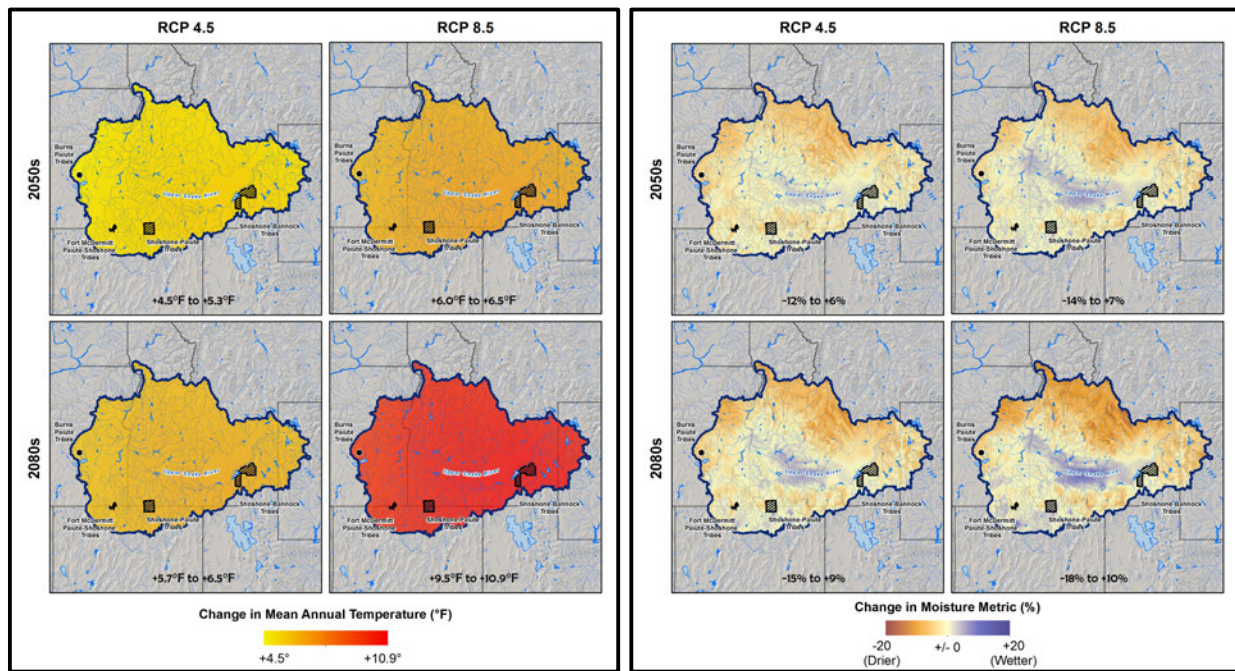


Figure 3: Projections of average annual temperature change (left) and changes to an average annual Hamon moisture metric (right) across the full project domain. For both figures, projections are provided for two different time periods (2050s upper row, and 2080s lower row) and two different climate scenarios (RCP 4.5 “less warming” - first column of both panels, and RCP 8.5 “more warming” - second column of both panels).

The downscaled climate projections provide information on potential future temperature, precipitation, and evapotranspiration on seasonal and annual time-frames. This information was analyzed by the Core Team, tribal leaders, and tribal members during site visits and the collaborative workshop. They were also utilized in the CCVI vulnerability ranking tool.

Oftentimes *annual* climate change projections do not tell the complete story of shifting climate variables within the seasons and how species, habitats, and ecosystems will be differentially affected. Seasonal projections can help tell that story. Below are the seasonal climate change projections for the “South” subdomain, which broadly covers the Upper Snake River Plains and most of the USRT member tribes’ reservations (Figure 4).

Seasonal Climate Change Projections for the South Subdomain of the Upper Snake River Watershed in the 2050s

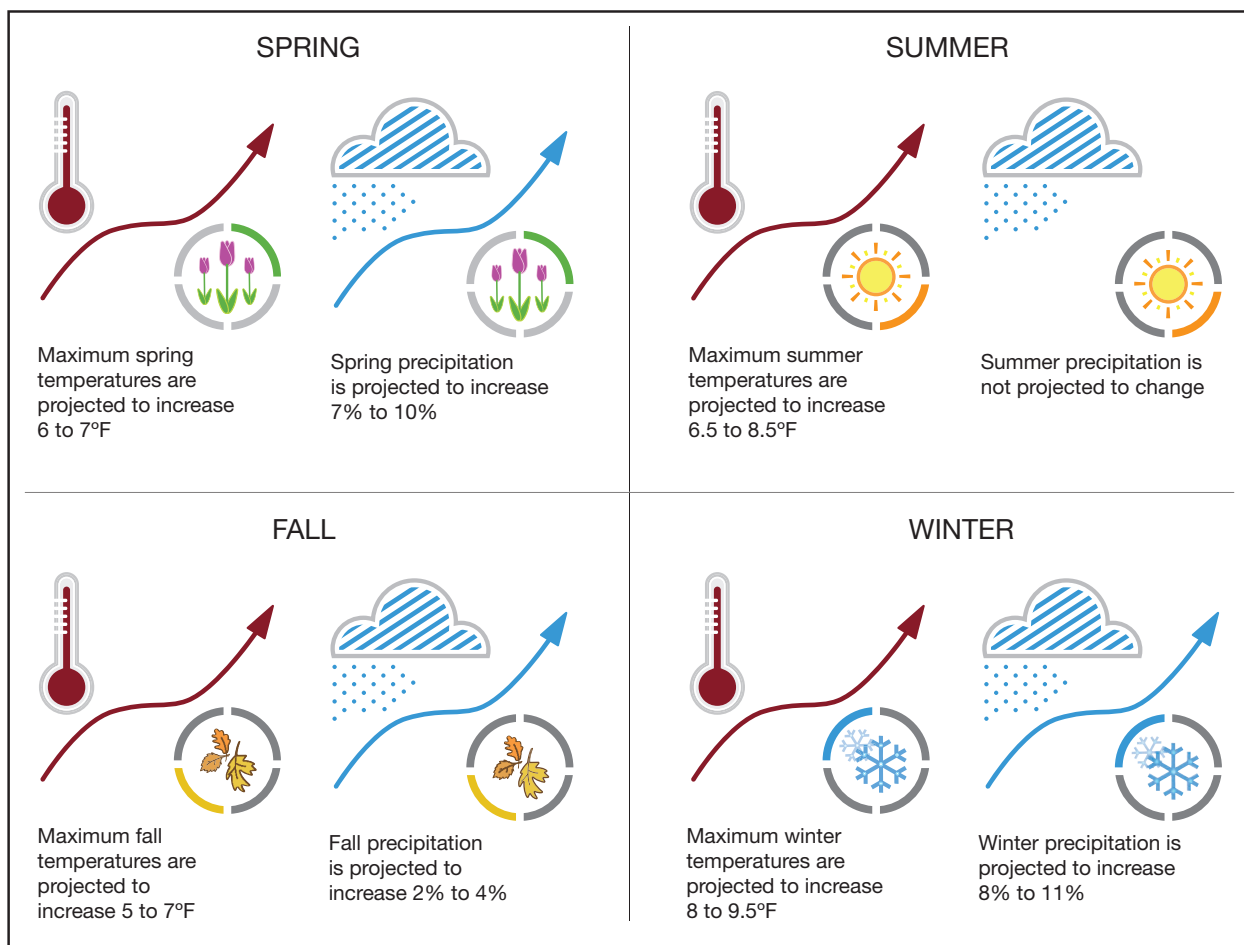


Figure 4: Seasonal temperature and precipitation projections for the 2050s (2040-2069) in the South subdomain of the Upper Snake River Watershed. Temperature increases and percent precipitation change are relative to modeled historical averages from 1950-2005. The range of values represent the average of the lower climate scenario projections (RCP 4.5) and the average of the higher climate scenario model projections (RCP 8.5) across all models.

C. Site Visits and Shared Concerns

The project was led by a Core Team composed of leadership and staff from USRT’s four member tribes and USRT (see Section IV for more details on the Core Team and the project process). The

Core Team attended and helped organize site visits to each of the four tribes’ reservations in April 2016. During these site visits, the tribes identified many species, habitats, and resources they had seen affected by changing climate conditions or they were concerned about being affected by future climate change. Concerns that were documented by two or more tribes are considered Shared Concerns. Due to time and budget constraints, the complete list of Shared Concerns was not assessed during this project. While not comprehensive, the set of 28 Shared Concerns assessed for climate change vulnerability in this project provided a balanced cross-section of the species, habitats, and resource issues important to the USRT member tribes (Table 1).

Table 1: Shared Concerns identified by the USRT member tribes and assessed over the course of this project. Those assessed quantitatively using the CCVI are indicated with an “X.” All other concerns were assessed qualitatively.

Plant Species	Assessed with CCVI Tool
Antelope Bitterbrush	
Big Sagebrush	X
Black Cottonwood	X
Camas Root	
Common Chokecherry	X
Geyer’s Willow	X
Meadow Hay	
Noxious Weed: Medusahead	
Noxious Weed: Whitetop	
Quaking Aspen	X
Redosier Dogwood (Red Willow)	X

Animal Species	Assessed with CCVI Tool
Beaver	X
Black-tailed Jackrabbit	X
Bull Trout	X
Cattle	
Chinook Salmon	X
Columbia Spotted Frog	X
Elk	X
Golden Eagle	X
Mule Deer	X
Redband Trout	X
Steelhead	X

Habitats	Assessed with CCVI Tool
Sagebrush Steppe	
Riparian	
Wet-meadow	
Springs and Seeps	

Resource Issues	Assessed with CCVI Tool
Asthma	
Wildfire	

D. Climate Change Vulnerability Index (CCVI)

NatureServe’s CCVI tool was used to analyze the climate change vulnerability of species identified as Shared Concerns. The CCVI tool utilizes data inputs that include: projections of changes in air temperature and moisture availability, species range data, and species-specific life history characteristics. These data are used to calculate a species’ relative vulnerability ranking using 23 distinct factors that affect the species’ climate change exposure¹, sensitivity, and adaptive capacity.

ⁱ The CCVI tool defines these terms as follows. *CCVI Exposure*: Projected climate change (shifts in temperature and moisture) across the range of the species within the assessment area. *CCVI Sensitivity*: The extent to which a species will respond to shifts in climate. *CCVI Adaptive capacity*: The ability of the species to withstand environmental changes.

Based on these calculations, species are assigned one of four climate change vulnerability rankings.

- (1) **Extremely Vulnerable:** Species abundance and/or range extent within the project area is extremely likely to substantially decrease or disappear.
- (2) **Highly Vulnerable:** Species abundance and/or range extent within the project area is likely to decrease significantly.
- (3) **Moderately Vulnerable:** Species abundance and/or range extent within the project area is likely to decrease.
- (4) **Less Vulnerable:** Available evidence does not suggest that species abundance and/or range extent within the project area will change substantially, though there may be changes elsewhere across the species' full range.

The CCVI tool was used to generate draft *quantitative* vulnerability rankings for the 16 plant and animal species that had sufficient range and life history data to use the tool. The remaining 12 Shared Concerns were given draft *qualitative* vulnerability rankings based on available research and local knowledge, and in some cases sensitivity information from the CCVI.

E. Collaborative Workshop and Final Results

An essential step in this project process was the collaborative vulnerability assessment workshop held July 28, 2016 in Boise, Idaho. Two members of the Project Team and ten members of the Core Team, representing USRT and each of the four USRT member tribes, gathered for this one-day workshop. The focus of the workshop was to incorporate local and traditional knowledge into the draft vulnerability assessment results for each of the Shared Concerns.

This collaborative review was accomplished using a combination of large group discussions and small group breakout sessions during which the Core Team members reviewed, evaluated, and commented on the *quantitative* and *qualitative* results of the CCVI assessment process for each of the Shared Concerns. Local knowledge was extremely valuable in modifying these results to account for local variance in factors of exposure, sensitivity, and adaptive capacity, such as: local changes in the landscape, observed interactions between species, and species' existing response to extreme weather, climate change, and changes in habitat. Ultimately, incorporation of this information led to an adjustment of 19 individual factors affecting vulnerability and the re-ranking of one species' relative vulnerability ranking.

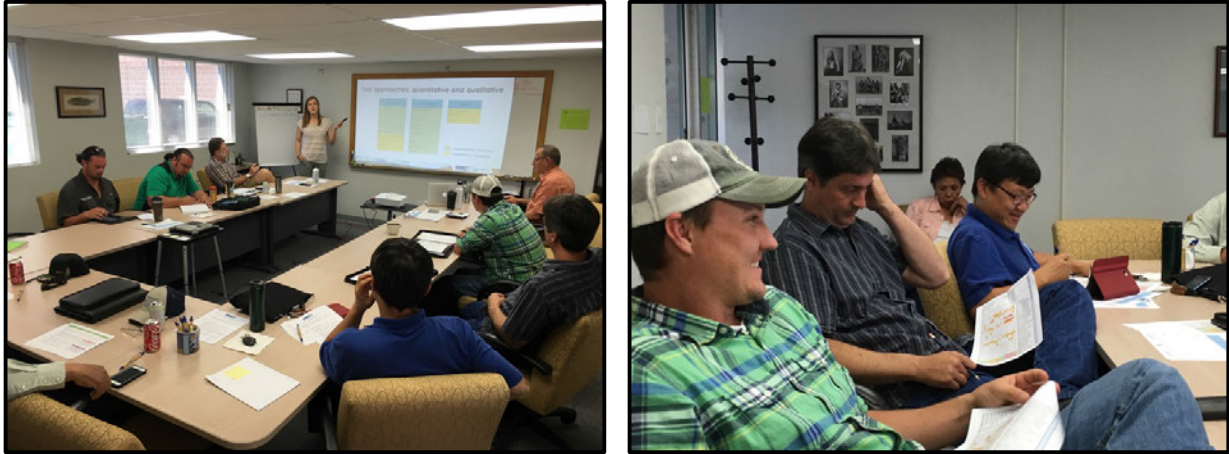


Figure 5: Photos from the Collaborative Vulnerability Assessment Workshop. Photo credit: Sascha Petersen.

Following review and update by the Core Team at the vulnerability assessment workshop, Table 2 presents the final vulnerability rankings for the Shared Concern species assessed *quantitatively* in this assessment.

Table 2: Overall vulnerability rankings for the 16 quantitatively assessed species of Shared Concern for the 2050s. Column titles reflect the climate change scenario with less warming (RCP 4.5) and more warming (RCP 8.5). Labels are the overall vulnerability ranking: EV = Extremely Vulnerable; HV = Highly Vulnerable; MV = Moderately Vulnerable, and LV = Less Vulnerable.

Species	2050s RCP4.5	2050s RCP8.5
Bull Trout	EV	EV
Chinook Salmon	EV	EV
Redband Trout	EV	EV
Steelhead	EV	EV
Columbia Spotted Frog	HV	EV
Big Sagebrush	MV	HV
Black-tailed Jackrabbit	MV	HV
Elk	MV	HV
Mule Deer	LV	MV
Black Cottonwood	LV	MV
Quaking Aspen	LV	MV
Golden Eagle	LV	LV
American Beaver	LV	LV
Common Chokecherry	LV	LV
Geyer's Willow	LV	LV
Redosier Dogwood	LV	LV

F. Next Steps

Planning for and adapting to climate change is a process and not the outcome of a single project.

This assessment is the first in a series of three steps USRT and its member tribes plan to undertake over the next several years as part of a comprehensive climate change effort, including:

- Climate Change Vulnerability Assessment – *Completed in early 2017;*
- Adaptation Plan – *To be completed in 2017-18;* and
- Implementing Adaptation Actions and Monitoring – *Dependent on future funding.*

Strengthened collaboration between the four tribes and assessment of their Shared Concerns under regional climate change was, perhaps, the most important outcome of this assessment. The collaborative results of this assessment help establish a common foundation for future adaptation efforts among and between the USRT member tribes. The species-specific vulnerability information in this report can assist in the development of truly localized adaptation strategies and actions that minimize the negative effects of climate change and take advantage of emerging opportunities. Continued collaboration and action to address these vulnerabilities and prepare for the future will help ensure that the tribes who have lived and subsisted in the Upper Snake River Watershed for thousands of years will continue to thrive for generations to come.