**Confederated Salish and Kootenai Tribes Climate Change Adaptation Planning:
PRIMER: BIA Resilience Program Grant**

Indigenous people of the world have a special moral stature on this issue [of climate change] and may have a special role to play in coming together to advocate for action.

-Salish-Pend d 'Oreille Culture Committee

Why should we prepare for climate change?

Historically, Tribal elders have recognized and prepared for climate change. Climate change planning has been occurring for centuries. Overwhelming scientific evidence demonstrates that human inputs of greenhouse gases are almost certain to cause continued warming of the planet[i]. The Northwest has already observed climate changes including an average increase in temperature of 1.5°F over the past century[ii]. Locally, all models predict warmer temperatures, lower snowpack, and more frequent and severe droughts and floods[iii]. The Confederated Salish and Kootenai Tribes acknowledge these change and its potential impacts on the Flathead Reservation in Montana.

Mission for updating the CSKT Climate Change Strategic Plan

We will integrate and update climate impacts to vulnerable resources as outlined in the 2013 CSKT Climate Change Strategic Plan (updated in 2015) to build climate resilience within CSKT tribal land and in our communities. Tribal stakeholders and other participating experts will continue to plan and develop actions to address priority threats facing tribal lands and interconnected landscapes. Participants will develop monitoring and evaluation metrics to assess progress towards adaptation planning and implementation, using best management practices.

How do we plan for climate resilience?

Adaptation planning builds resilience. **Resilience** is the capacity to absorb stress and change. **Adaptation** is a set of actions that lessen harm, in response to actual or expected climate change. Adaptation planning is the process of preparing for change, even when the future is uncertain. Adaptation is a cyclical process of prioritizing goals and actions, implementing actions, and then learning from actions to plan next steps. Adaptation can help build resilience to climate change by reducing the vulnerability of people, places and ecosystems to climate change.

For example, CKST's climate change strategic planning in 2013 prioritized whitebark pine restoration as an adaptation action. In the last five years, CSKT's forestry team has worked with a lab in Idaho to identify, grow, and plant seedlings with greater resistance to the whitebark pine beetle. This adaptation effort increases forest resilience to warming climate and increases the chance that this culturally important species will persist.

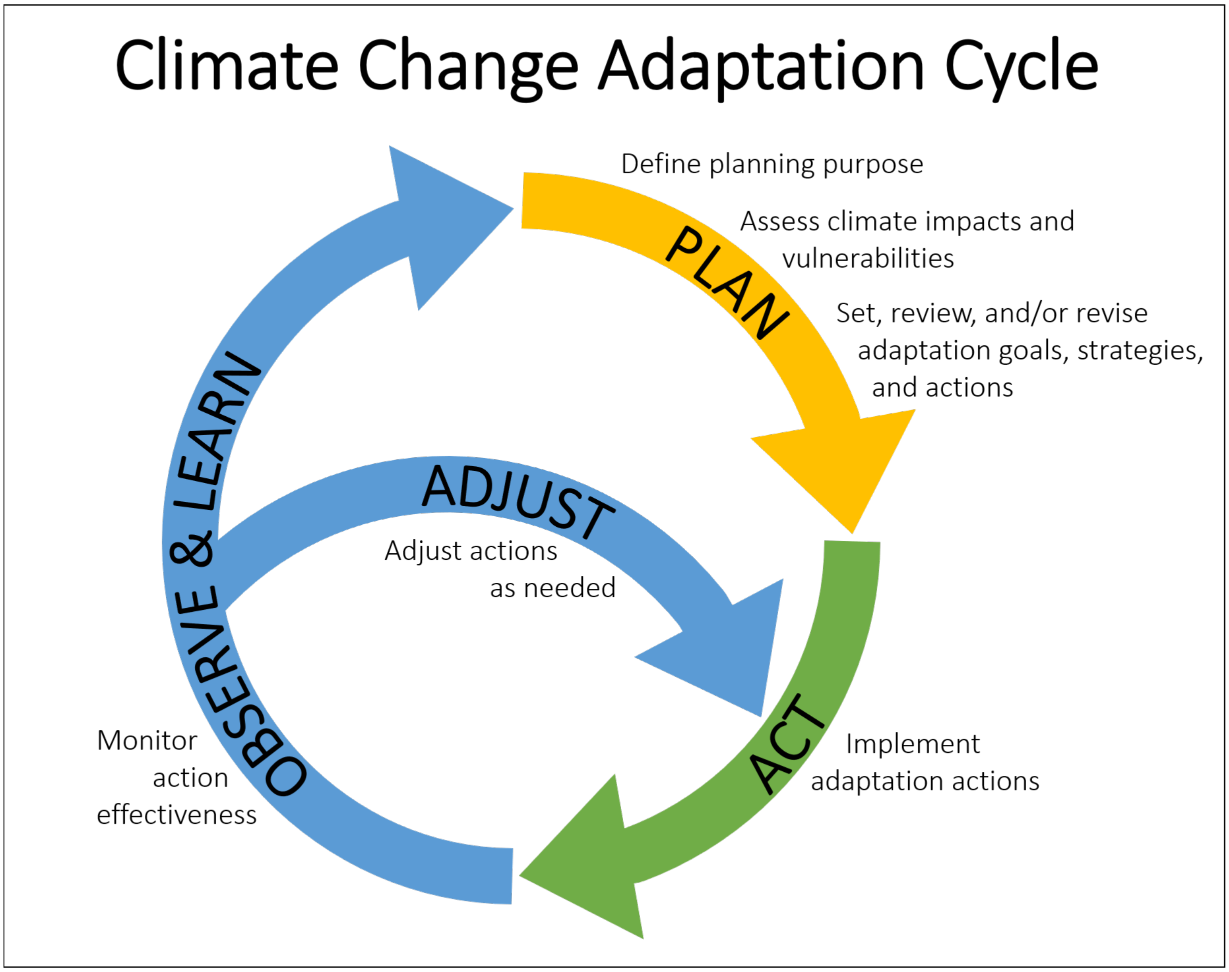

Diagram modified from Climate Smart Conservation Cycle Framework in Climate-Smart Conservation: Putting Adaptation Principles into Practice[iv] and DPIPWE 2014 after Jones 2005, 2009 https://www.betterevaluation.org/sites/default/files/Tasmanian%20Parks%20and%20Wildlife%20Service.jpg

Climate Change 2.0 Planning Principles

- Provide basic background information on climate change to ensure everyone can fully participate in the gatherings
- Foster hope and investment in climate change preparedness while providing an accurate picture of the challenges. Avoid overwhelming people with problems or data
- Motivate participation in planning and action by sharing examples of adaptation successes nationally, regionally, and locally
- Weave traditional ecological knowledge throughout the planning process and the plan itself
- Encourage contributions from all participants at each gathering
- Check-in regularly with participants to ensure everyone understands the information being shared
- Ground and personalizing climate change by sharing personal stories

The Updated Plan Will Be Organized into Nine Planning Sectors

Air

Culture

Fish

Forestry

Infrastructure

Lands

People and Health

Water

Wildlife

Planning Schedule

Gathering 1: March 13, 2019 at KwaTaqNuk Alexander room from 8am to 5pm

"Information and Inspiration"

Objectives: Participants will…

- Understand the 2019 planning process format, expectations, and goals
- Understand adaptation planning as an opportunity to make a better future
- Understand successes CSKT has already had like the EAGLES, Whitebark pine initiative, and a national leadership role in climate change planning
- Identify a shared vision for the future
- Identify strengths and opportunities in each sector, as well as areas of overlap
- Know what is written in the 2015 version of the plan
- Understand mid-century climate change projections (or scenarios) and regional impacts, including what has changed and escalated since the last round of planning
- Understand basic links between landscape health and human health in a changing climate

Between gatherings 1 and 2, the Steering Committee will: send out meeting notes to participants for review and comment; and send out a survey to each sector.

Gathering 2: April 17, 2019 at KwaTaqNuk Alexander room from 8am to 5pm

"Vulnerability"

Objectives: Participants will…

- Review strengths in each sector
- Refresh understanding of climate change projections
- Understand more specific links between human health and climate change
- Work together to identify projected climate impacts by sector
- Identify links and overlap among impacts across sectors
- Rank areas of vulnerability by sector
- Identify three areas of vulnerability in each sector to address in the plan, preferably areas that complement the areas selected by the other sectors

Between gatherings 2 and 3, the Steering Committee will send out meeting notes to participants for review and comment.

Gathering 3: May 22, 2019 at KwaTaqNuk Alexander room from 8am to 5pm

"Resilience"

Objectives: Participants will…

- Identify possible outcomes for addressing climate impacts by sector, ensuring they are SMART - specific, measurable, attainable, relevant, and timely
- Rank ability to execute possible solutions (for example, easy, moderate, difficult)
- Identify resources needed to execute high ranking outcomes
- Understand and share key strategies for communicating about climate change, especially health-related impacts
- Refresh understanding of areas of strength and vulnerability
- Identify areas of overlap between outcomes across sectors
- Rank outcomes to select up to three to pursue in each sector

Between gatherings 3 and 4, the Steering Committee will: send out meeting notes to participants for review and comment; send out draft chapters for review and comment.

Gathering 4: June 5, 2019 at KwaTaqNuk Alexander room from 8am to 5pm

"Solution Integration"

Goals: Participants will…

- Review the selected SMART (specific, measurable, attainable, relevant, and timely) planning outcomes
- Identify action steps to attain each outcome, identifying who will take the lead, the timeframe for achieving each step, funding sources, and who will pursue them
- Identify how each action step and outcome will be measured and monitored
- Understand and share ways to mainstream climate change actions across departments, using the health sector as an example
- Discuss next steps in climate change planning and implementation, including identifying people responsible for leading the next steps
- Identify a mechanism for coordinating implementation across sectors (like continuing with monthly CCAC meeting and/or hiring a climate change coordinator)

After the gatherings, the Steering Committee will send out meeting notes and then a final draft of the updated climate change plan for review and comment.

Key Climate Change Terms[1]

Adaptation: actions in response to actual or expected climate change and its effects, that lessen harm or exploit beneficial opportunities. It includes reducing the vulnerability of people, places, and ecosystems to the impacts of climate change.

Adaptive Capacity: the ability of a system to accommodate or respond to the changes in climate with minimum disruption or cost. Generally, systems that have high adaptive capacities are better able to deal with climate change.

Climate: the "average weather" generally over a period of three decades. Measures of climate include temperature, precipitation, and wind.

Climate Change: any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended time period (decades or longer). Climate change may result from natural factors and processes and from human activities that change the atmosphere's composition and land surface.

Exposure: the presence of people, assets, and ecosystems in places where they could be adversely affected by hazards.

Mitigation: actions that reduce the levels of greenhouse gases in the atmosphere; includes reducing emissions of greenhouse gases and enhancing sinks (things that absorb more greenhouse gases than they emit). Examples include switching to renewable energy sources and implementing energy efficiency measures.

Resilience: ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organization, and the capacity to absorb stress and change.

Sector: general grouping used to describe any resource, ecological system, species, management area, etc. that may be affected by climate change. For example, Transportation, Utilities, Water Resources, Forest Resources, Human Health, or Cultural Resources and Traditions.

Sensitivity: how much a system is directly or indirectly affected by changes in climate conditions (e.g., temperature and precipitation) or specific climate change impacts (e.g., sea level rise, increased water temperature). If a system is likely to be affected because of projected climate change, it should be considered sensitive to climate change.

Vulnerability: the susceptibility of a system to harm from climate change impacts. It is a function of how sensitive the system is to climate and the adaptive capacity of the system to respond to such changes.

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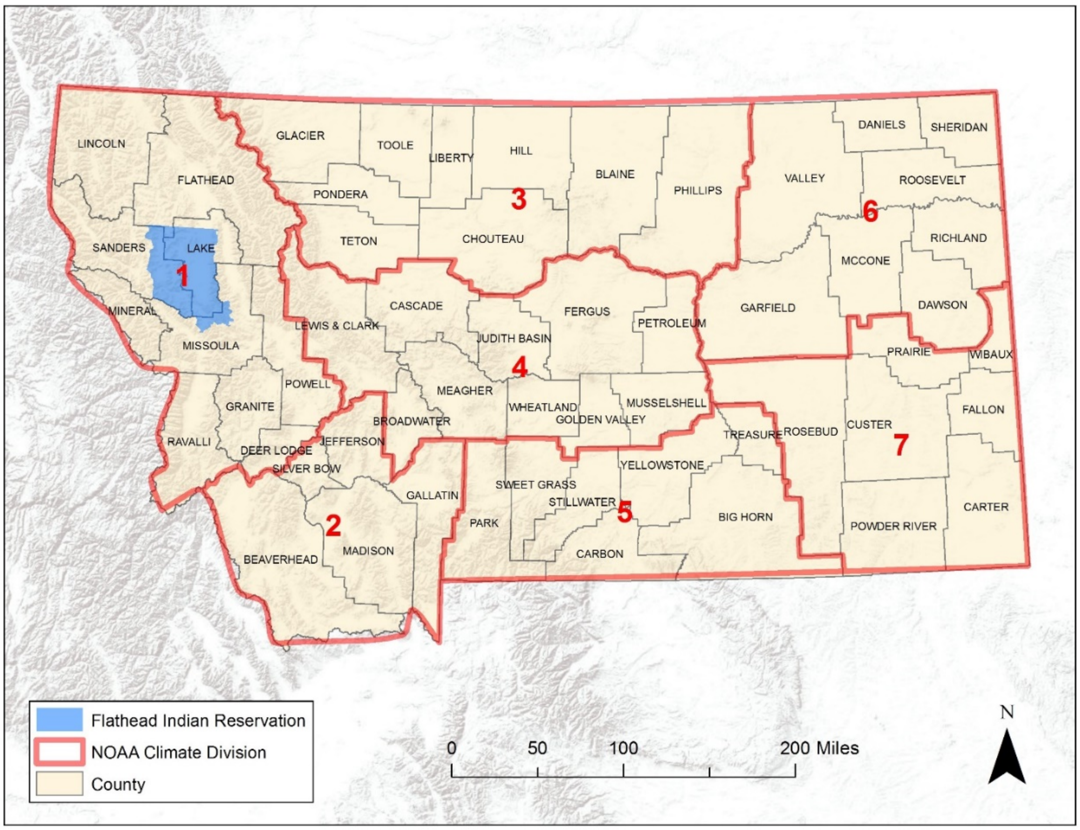
[1] The key terms listed here are adapted from the Institute for Tribal Environmental Professionals' (ITEP's) Climate Change Adaptation Plan Template. ITEP has provided the terms for use in tribal climate change adaptation plans and encourages the modification and adaptation to suit each plan. See: http://www7.nau.edu/itep/main/tcc/Resources/adaptation

Generally, systems that are sensitive to climate and less able to adapt to changes are considered vulnerable to climate change impacts.

What is driving climate change impacts?

Scientists have modelled climate change drivers to help us predict impacts. The 2017 Montana Climate Assessment downscaled global climate models to the regional level. Flathead Indian Reservation is located in the Northwestern Montana Climate Division 1, a climate division defined by the National Oceanic and Atmospheric Administration (NOAA).

Flathead Indian Reservation and NOAA Climate Divisions



Map source: Tyler Creech, Center for Large Landscape Conservation

What are emissions scenarios?

When scientists make climate predictions, they must account for different emissions scenarios. This is because we still do not know the degree to which the global community will take action to limit and reduce greenhouse gas emissions. Different emission scenarios are referred to as *Representative Concentration Pathways*, or RCPs. For example, RCP 8.5, assumes a continuation of current global emission increases (referred to as "**increasing**" in Table 1),[v] while a more middle-of-the-road scenario is RCP 4.5, known as the stabilization scenario (referred to as "**stabilizing**" in Table 1). The United Nations Paris Agreement was intended to curb emissions at levels between RCP 2.6 and RCP 4.5.[vi] The table here compares Northwestern Montana scenarios for RCP 4.5 (“stabilizing”) with RCP 8.5 (“increasing”). Note that the overall trends are similar for the two scenarios: hotter average temperatures, longer growing seasons, increased late winter and early spring precipitation, and decreased summer precipitation. However, the size of change is greater for RCP 8.5.

Table 1: Mid-Century and End-of-Century Climate Change Predictions for the Northwestern Montana Climate Division

Type of change **[*model agreement*]**	**Emissions scenario***	**Mid-Century: 2040-2069**	**End-of-Century: 2070-2099**
Increase in average annual daily maximum temperature *[high agreement, robust evidence]*	Stabilizing	+4.8 to +5.2°F	+5.8 to +6.6°F
	Increasing	+5.9 to +6.1°F	+10 to +10.8°F
Change in number of days above 90°F *[high agreement]*	Stabilizing	+3 to +7 days	+4 to +12 days
	Increasing	+7 to +11 days	+24 to +32 days
Change in number of freeze-free days *[high agreement]*	Stabilizing	+34 to +37 days	+38 to +44 days
	Increasing	+40.5 to +43.5 days	+72 to +78 days
Change in annual precipitation *[moderately high agreement]*	Stabilizing	+1.2 to +1.5 inches	+1.8 to +2.4 inches
	Increasing	+1.5 to +1.8 inches	+2.4 to +2.8 inches
Change in monthly precipitation March, April, and May *[low to high agreement]*	Stabilizing	0 to +11 inches	0 to +.45 inches
	Increasing	+4 to +11 inches	+.25 to +.45 inches
Change in monthly precipitation June, July, and August *[low to high agreement]*	Stabilizing	0 to -4 inches	-.2 to .2 inches
	Increasing	0 to -4 inches	0 to -.2 inches

Climate change predictions are based on comparisons to historical 30-year averages from 1971 to 2000.
Source: 2017 Montana Climate Assessment

* See the *What are emissions scenarios?* section for a description of stabilizing and increasing emissions scenarios

Major areas of climate change impact in the region

While precise predictions cannot be made about future conditions, there is evidence that across Montana, average annual temperatures will increase (high agreement, robust evidence), annual precipitation will increase in winter, spring, and fall (moderate agreement, moderate evidence), and precipitation will decrease in the summer across Montana (moderate agreement, moderate evidence)[vii].

More frequent and severe droughts

Warmer temperatures are likely to increase the frequency and severity of drought conditions in the late summer and early fall, and exacerbate drought conditions when they do occur throughout the year[viii]. Though summer precipitation will decline, winter and spring snowmelt and precipitation predictions suggest water availability may concentrate in the relatively cooler parts of the year[ix]. Decreased spring snowpack has been observed and is predicted into the future[x].

Earlier and increased stream runoff

An earlier onset of spring snowmelt means that peak spring stream runoff is occurring earlier in the year, and more runoff in winter is predicted[xi].

More frequent flooding

The frequency of flooding may increase, especially in spring, due to earlier snowmelt, rain-on-snow events and increased precipitation[xii].

Low stream baseflows

There are already lower stream baseflows (the portion of the stream not from runoff) in late summer, a trend predicted to continue into the future[xiii].

Warmer stream temperatures

Lower baseflows, along with warmer air temperatures, are causing stream temperatures to warm[xiv].

Longer growing season

Climate change is increasing the length of the growing season. However, day length and photoperiod will remain constant, and drought will likely increase, most likely curtailing many of the benefits brought by a longer season.

More frequent and intense wildfires and smoke

Fires are increasing in frequency and total area burned[xv]. Wildfire season length is also increasing[xvi].

Changes in the timing of plant life cycles

Climate change has already triggered a decline in some species of pollinators. As temperatures warm, plant and pollinator phenology will likely shift. The shift may occur in such a way that pollinators and plants are not synchronized.

Extreme weather events

The number of extreme heat days will likely increase in frequency[xvii]. Drought and flooding will be more frequent[xviii]. It is possible that severe hail days will increase in spring and early summer[xix]. The frequency of heavy precipitation events is predicted to increase[xx]. Variability in precipitation from year to year is projected to increase[xxi].

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[i] Environmental Protection Agency, U.S. (2013, June 27). “Climate Change: Basic Information”, Retrieved from EPA Climate Change: http://www.epa.gov/climatechange/basics/.

[ii] Karl, T.R., Melillo, J.M. and Peterson, T. (2009). “Global Climate Change Impacts in the United States. New York, NY: Cambridge University Press. Retrieved from www.globalchnage.gov/publications/reports/scientific-asesments/us-impacts.

[iii] Marni E. Koopman. (2011) “Missoula County Climate Action: Creating a Resilient and Sustainable Community” Missoula.

[iv] B.A. Stein et al. (2014), "Climate-Smart Conservation: Putting Adaptation Principles into Practice", National Wildlife Federation.

[v] Halofsky et al. (2017), "Climate Change Vulnerability and Adaptation in the Northern Rocky Mountains".

[vi] Whitlock et al. (2017), "2017 Montana Climate Assessment".

[vii] Ibid.

[viii] Ibid.

[ix] Ibid.; Melillo, Richmond, and Yohe (2014), "Climate Change Impacts in the United States: The Third National Climate Assessment".

[x] Whitlock et al. (2017), "2017 Montana Climate Assessment". A. F. Hamlet and D. P. Lettenmaier (2007), "Effects of 20th Century Warming and Climate Variability on Flood Risk in the Western U.S.," *Water Resources Research* 43, no. 6; Romero-Lankao et al. (2014), "North America," in *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, ed. V.R. Barros, et al. (Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press).

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[xii] Whitlock et al. (2017), "2017 Montana Climate Assessment"; Romero-Lankao et al. (2014), "North America," 2014.

[xiii] Rood et al. (2008), "Declining Summer Flows of Rocky Mountain Rivers: Changing Seasonal Hydrology and Probable Impacts on Floodplain Forests."; C. H. Luce and Z. A. Holden (2009), "Declining Annual Streamflow Distributions in the Pacific Northwest United States, 1948–2006," *Geophysical Research Letters* 36, no. L16401; Leppi et al. (2012), "Impacts of Climate Change on August Stream Discharge in the Central-Rocky Mountains."

[xiv] N. Mantua, I. Tohver, and A. Hamlet (2010), "Climate Change Impacts on Streamflow Extremes and Summertime Stream Temperature and Their Possible Consequences for Freshwater Salmon Habitat in Washington State,"

ibid.102, no. 1-2; D. Isaak et al. (2012), "Climate Change Effects on Stream and River Temperatures across the Northwest Us from 1980-2009 and Implications for Salmonid Fishes," ibid.113, no. 2.

[xv] John T. Abatzoglou and A. Park Williams, “Impact of Anthropogenic Climate Change on Wildfire across Western US Forests,” Proceedings of the National Academy of Sciences 113, no. 42 (October 18, 2016): 11770–75, https://doi.org/10.1073/pnas.1607171113.; Anthony LeRoy Westerling, “Increasing Western US Forest Wildfire Activity: Sensitivity to Changes in the Timing of Spring,” Phil. Trans. R. Soc. B 371, no. 1696 (June 5, 2016): 20150178, https://doi.org/10.1098/rstb.2015.0178.; Westerling, “Increasing Western US Forest Wildfire Activity”.

[xvi] Westerling, “Increasing Western US Forest Wildfire Activity”.

[xvii] Whitlock et al. (2017), "2017 Montana Climate Assessment".

[xviii] Ibid.

[xix] Ibid.; Fourth National Climate Assessment (2018).

[xx] Fourth National Climate Assessment (2018)

[xxi] Whitlock et al. (2017), "2017 Montana Climate Assessment".