Native Nations Climate Adaptation Program

Tribal Leaders Summit on Climate Change

A Focus on Climate Adaptation Planning and Implementation

REPORT

Held at The University of Arizona
Tucson, Arizona Nov. 12 - 13, 2015

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I. Executive Summary

The University of Arizona Native Nations Climate Adaptation Program (NNCAP) and Center for Climate Adaptation Science and Solutions (CCASS) hosted the NNCAP Tribal Leaders Summit on Climate Change: A Focus on Climate Adaptation Planning and Implementation at the University of Arizona in Tucson, Arizona on November 12 and 13, 2015. The summit was sponsored by the Desert Landscape Conservation Cooperative, the Agnese Nelms Haury Program in Environment and Social Justice, the Southwest Climate Science Center, and the UA Institute of the Environment (see Appendix D). The primary objective of the Tribal Summit was to convene tribal environmental managers and leaders who have approved climate adaptation plans to share experiences, lessons learned, and build support for wider tribal climate adaptation planning and implementation work. This report provides an overview of the major points and outcomes from the Summit.

II. Summit Objectives, Expected Outcomes, and Participants

A. Objectives

The 1st Tribal Summit on Climate Change held at the University of Arizona had six objectives:

1) Convene tribal environmental managers and leaders whose tribes have approved climate adaptation plan to share experiences, lessons learned, and build support for wider tribal climate adaptation planning and implementation work;
2) Build upon existing tribal capacity for climate adaption to create a network of tribal adaptation expertise, strengthen existing partnerships, and forge new collaborative relationships;
3) Share ways of incorporating traditional knowledge (TK) in the development of climate adaptation plans;
4) Identify tribal needs in managing climate risks, adaptation planning, and funding;
5) Discuss best practices in adaptation that could be shared widely across indigenous groups; and
6) Support tribes in climate adaptation planning, development, and implementation.

B. Outcomes

The Tribal Summit was successful in its objectives and resulted in four main outcomes: The outcomes are:

1) Shared knowledge and best practices for climate adaptation planning and implementation such as:

    a. Challenges and lessons learned in planning and implementation of adaptation plans
    b. Development of tribal climate adaptation networks and climate service support
    c. Partnerships and other opportunities for collaboration (e.g., universities, federal and state agencies, NGOs)
    d. Funding opportunities

2) Outlining the need for tailored and effective training in climate adaption, including planning, development, and implementation and identifying information needs of tribes to support adaptation.

3) New partnerships in planning and implementation of climate adaptation activities for tribes or specific segments/sectors of interest

4) Identification of useful deliverables:

    a. Summary report of workshop and recommendations on a larger-scale event or other next steps for 2016
    b. Summary document to be shared as guidance document(s) on adaptation planning and implementation with tribes
    c. Guidance on processes for engagement within tribes and for external organizations that provide climate services.

C. Participants

The NNCAP Tribal Climate Summit convened eight of eleven tribes who developed or are developing climate adaptation plans. They represented tribes from Alaska to New York, with two tribes from the Puget Sound region and two from New York. They had varying tribal support, including a proclamation, tribal council briefings, tribal resolution adopting a relocation plan, and one adopting a sustainability plan as tribal law. Four tribes had complete adaptation plans (Swinomish Indian Tribal Community, Jamestown S'Klallam, Saint Regis Mohawk Tribe, and Red Lake Band of Chippewa Indians), one tribe had a relocation plan (Newtok Village), one tribe has an initial climate change prioritization plan and was in the beginning stages of planning (Yurok Tribe), and one tribe had a sustainability plan with the goal of creating a climate action plan to include in the legally adopted sustainability plan (Oglala Lakota Nation). The earliest climate adaptation efforts were by the Newtok Village who began efforts in the 1980s. A majority of the adaptation plans began in the 2000s, ranging from 2007 to the present. The smallest tribe was Newtok Village, with 350 residents and 704 acres; the largest tribe was the Oglala Sioux tribe with 38,332 tribal members and 2.7 million acres. A majority of the tribes who participated were coastal tribes with one Great Plains tribe and one Great Lakes tribe (Table 1).

The Summit was attended by 60 participants, including 20 tribal representatives from at least 19 tribes (including 2 tribal council women from the Village of Newtok Alaska), 10 federal agency representatives, and 20 university representatives and students. For a complete list of participants see Appendix A.

III. Overview

The primary objective of the NNCAP Tribal Summit was to convene tribes that have council-approved climate adaptation plans to share experiences, lessons learned, and build support for wider tribal climate adaptation planning and implementation work. To achieve these objectives, the Summit was structured with (1) presentations by tribal representatives on tribal climate adaptation plans; (2) breakout groups of all participants, using the World Café approach; (3) plenary sessions focused on particular topics or breakout group findings, followed by open discussion. The Summit agenda can be found in Appendix B.

Table 1. Demographics of tribes who made presentations

Tribe	State	Population	Acres	Ecosystem	Focus
Jamestown S'Klallam Tribe	WA	390[1]	1,150	Coastal	Address impacts to natural and cultural resources (salmon, shellfish, cedar)
Newtok Village	AK	380[1]	704	Coastal	Relocation of village, evacuation plan
Oglala Sioux Tribe	SD	24,908[1]	2.7 million	Plains	Building healthy communities
Red Lake Band of Chippewa Indians	MN	7,459[1]	805,517	Great Lakes	Natural resources inventory; identify climate stressors
Shinnecock Indian Nation	NY	1,331[1]	800	Coastal	Shoreline erosion, storm surge, sea-level rise
Saint Regis Mohawk Tribe	NY/Can	~22,000[2]	13,440	Coastal	Habitat and abundance of plants and animals – food sources and cultural resources
Swinomish Indian Tribal Community	WA	806[1]	7,450 (land), 2,900 (tidal land)	Coastal	Coastal protection, wildfire control, emergency response
Yurok Tribe of the Yurok Reservation	CA	4,549[1]	56,000	Coastal	Robust monitoring

[1]Source: U.S. 2010 census

[2]Mohawk Council of Akwesasne (MCA; the elected council for the Canadian portion of Akwesasne) reports about 12,000 and SRMT (the Akwesasne government in NY) reports about 11,000, but some individuals are contained on both lists (Source: http://www.akwesasne.ca/about)

Figure 1: Location of tribes that have adaptation plans; those listed in red font made presentations at the Summit.

Table 2. Type/title of existing plans and links (see also Table 4 for more detail)

Region	Tribal Nation	Title of Plan	Link	Published
Northwest	Confederated Salish and Kootenai Tribes	Climate Change: Strategic Plan	http://www.cskt.org/CSKTClimatePlan.pdf	September 2013
Northwest	Jamestown S'Klallam Tribe	Climate Vulnerability Assessment and Adaptation Plan	http://www.jamestowntribe.org/programs/nrs/climchg/JSK_Climate_Change_Adaptation_Report_Appendices.pdf	August 2013
Northwest	Nez Perce Tribe	Clearwater River Subbasin Climate Change Adaptation Plan	http://www.mfpp.org/wp-content/uploads/2012/03/ClearwaterRiver-Subbasin_ID_Forest-and-Water-Climate-Adaptation-Plan_2011.pdf	December 2011
Northwest	Swinomish Tribe	Swinomish Climate Change Initiative Climate Adaptation Action Plan	http://www.swinomish.org/climate_change/Docs/SITC_CC_AdaptationActionPlan_complete.pdf	October 2010
Midwest	Oglala Lakota Nation	Oyate Omniciyé | Oglala Lakota Plan	http://www.oglalalakotaplan.org/wp-content/uploads/2013/11/Oyate+Omniciye+Final+Draft.pdf	May 2013
Midwest	Red Lake Band of Chippewa Indians	A Climate Adaptation Plan for the Red Lake Band of Chippewa Indians	http://www.mfpp.org/wp-content/uploads/2011/04/Red-Lake-Forest-Water-Climate-Adaptation-Plan-Final-2014.pdf	2014
Northeast	Shinnecock Indian Nation	Climate Change Adaptation Plan	Not available online	October 2013
Northeast	St. Regis Mohawk Tribe	Climate Change Adaptation Plan for Akwesasne	http://www.srmt-nsn.gov/_uploads/site_files/ClimateChange.pdf	August 2013
Alaska	Yupik/Newtok	Relocation Report: Newtok to Mertarvik	https://www.commerce.alaska.gov/web/Portals/4/pub/Mertarvik_Relocation_Report_final.pdf; https://www.commerce.alaska.gov/web/Portals/4/pub/Mertarvik_Strategic_Management_Plan.pdf	August 2011
Southwest	Navajo Nation	Considerations for Climate Change and Variability Adaptation on the Navajo Nations	http://www.colorado.edu/law/content/considerations-climate-change-and-variability-adaptation-navajo-nation	2014
West	Yurok Tribe	Yurok Tribe and Climate Change: An Initial Prioritization Plan	http://www.yuroktribe.org/departments/ytep/documents/YurokTribeandClimateChangePrioritizationPlan.pdf	September 2011

A. Five Key Questions

Tribal representatives were asked to address five key questions in their presentations about their tribal climate adaptation plan at the Tribal Summit:

1) What was your tribe's motivation for the plan?
2) What process did you use to develop the plan?
3) How did you get the support of your tribal community and nation for the plan?
4) What are the key components of the plan and what is the current status?
5) What barriers to implementation have you encountered?

B. Approach

The "World Café" approach is a type of breakout session that facilitates open and intimate discussion to gain a collective wisdom of the group by allowing participants to express their ideas through rotating opportunities to speak and/or by doodling on table paper. Ideas are also written on wall posters by a note-taker. The groups rotate between rooms and the following group is able to read and glean ideas from the notes of the previous group. The discussion is guided by a set of questions. Participants in the NNCAP Tribal Leaders Summit rotated through World Café-style breakout sessions on both days to discuss various topics related to climate adaptation planning. Each session was organized to include about eight participants reflecting a diversity of tribal, university, and federal representatives. On Day One, participants attended three of four café sessions and on Day Two they attended two of four café sessions. A facilitator, rapporteur, and recorder were stationed at each World Café session room. The facilitator led the discussion, the rapporteur wrote main ideas on flipcharts, and the recorder took detailed notes. Flip charts were posted around the room to allow each rotation of participants to observe key ideas expressed in previous sessions. The facilitators, rapporteurs, and recorders collaborated on a summary of 3 to 5 main points from each session, which were presented in plenary by the facilitator (see listing in Appendix E.)

IV. Presentations of Tribal Adaptation Plans

Eight tribes presented their adaptation plans, representing tribes from the East coast to the West coast and Alaska who were at various stages of planning, development, and implementation. These tribes included Swinomish Indian Tribal Community Jamestown S'Klallam Tribe from Washington State, Newtok Village from Alaska, the Yurok Tribe in northern California, Akwesasne Community of the Saint Regis Mohawk Tribe in New York/Canada, Shinnecock Indian Nation from New York, the Red Lake Band of Chippewa Indians from Minnesota, and Oglala Lakota Nation from South Dakota. The Swinomish and Jamestown S'Klallam tribes are both from the Puget Sound region.

A. Swinomish Indians of the Swinomish Reservation of Washington

The Swinomish Indian Tribal Community is located along the Salish Sea in the Skagit Valley along the coastline on the northwest corner of Washington State (Figure 1) and is comprised of descendants of the Swinomish, Samish, Lower Skagit, and Kikallus bands. Swinomish Indians have a population of 806 (Source: US Census 2010). The Swinomish are People of the Salmon, whose way of life is sustained by their connection to the water and their ancestral lands - where they have lived, fished,

gathered, and hunted. Ed Knight, Planning Director of the climate adaption plan for the Swinomish Indian Tribal Community, spoke on *"Climate Adaptation Planning for the Swinomish Indian Tribal Community"* and presented on the following five key points.

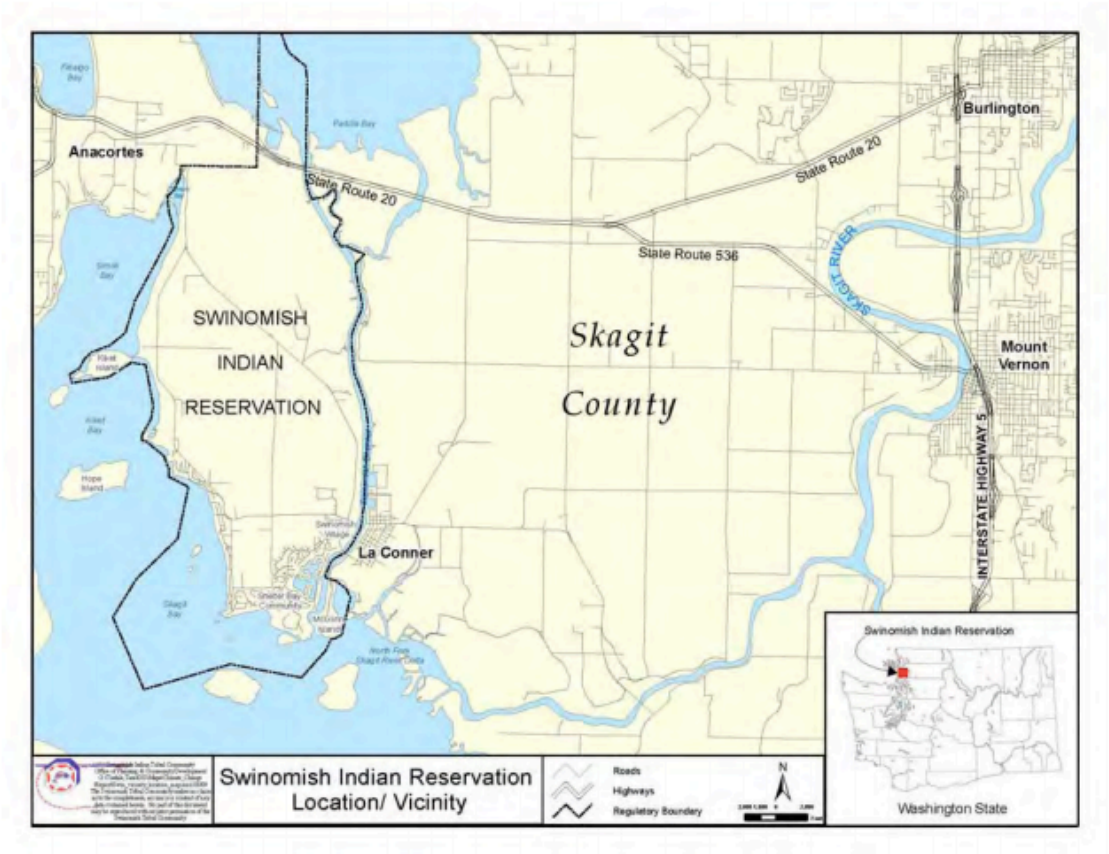

Figure 2: Swinomish Indian Tribal Community is located in the state of Washington on the northern Puget Sound, near the San Juan Islands

1) What was your tribe's motivation for the plan?

The Swinomish Indians established the Swinomish Climate Change Initiative in response to an increase in frequency and intensity of tidal surges and extreme weather events. From 2010-2013, the observed sea-level rise from storm events and high tides were much higher than was projected. This showed the Swinomish Reservation was vulnerable to rising sea levels. The tribe began to focus on risks to the tribe as a result of projected climate impacts. Because CO_2 emissions have been exceeding worst-case scenarios, a response from the tribe to protect ancestral lands was viewed as essential. Through the Swinomish Climate Change Initiative, the tribe began planning for climate adaptation.

2) What process did you use to develop the plan?

In the first of two years of planning, the tribe developed a technical report that included an impact assessment, vulnerability assessment, and risk analysis. In the second year they developed an action plan that had review strategies, assessed requirements, and developed and prioritized priorities for

implementation. These included a new forest management plan that shifted emphasis from harvesting to carbon sequestration.

3) How did you get the support of your tribal community and nation for the plan?

In 2007, the Swinomish Indian Senate passed *The Proclamation of the Swinomish Indian Senate on a Swinomish Climate Change Initiative*. This proclamation declared that all Swinomish governmental committees and departments needed to assess how to implement and incorporate climate adaptation action into ongoing and new programs. It also established a Climate Change Task Force consisting of Swinomish Office of Planning and Swinomish Public Works Department. This proclamation declared the Swinomish's intention to study impacts of climate change on its lands, resources, and community. In 2008, the Swinomish Climate Change Initiative was launched, in which it conducted preliminary scoping, identified priorities, and assembled a climate change task force. The first report that described projected impacts was released in 2009, followed in 2010 by its Climate Action Plan.

The Tribe received $380K of seed funding from the Administration for Native Americans (ANA) which funded 80% of total cost of the adaptation plan. The Swinomish partnered with the University of Washington's Climate Impacts Group, which assisted with analysis and interpretation of climate data and models. Work was guided and coordinated by the Swinomish Office of Planning and Community Development, along with an advisory group with representatives of Skagit County, the Town of LaConner, and the Shelter Bay Community, as well as a tribal community interest group. An inundation risk zone and a wildfire risk zone were identified, with total assets at risk amounting to $636M. Identified concerns included impacts to beach seining (a method of fishing that employs a fishing net that hangs vertically in the water and is deployed from the shore), other fishing, native plants, shellfish harvesting, and cultural sites.

4) What are the key components of the plan and what is the current status?

The Swinomish Indian Tribal Community determined and ranked their priorities in climate adaptation as 1) coastal zone protection; 2) maintenance of coastal dikes that protect coastal resources from sea level intrusion; 3) protection of access routes to the mainland; 4) wildfire control in forested areas; and 5) emergency response planning related to severe weather events, including wildfire and flooding. The full plan is located online at

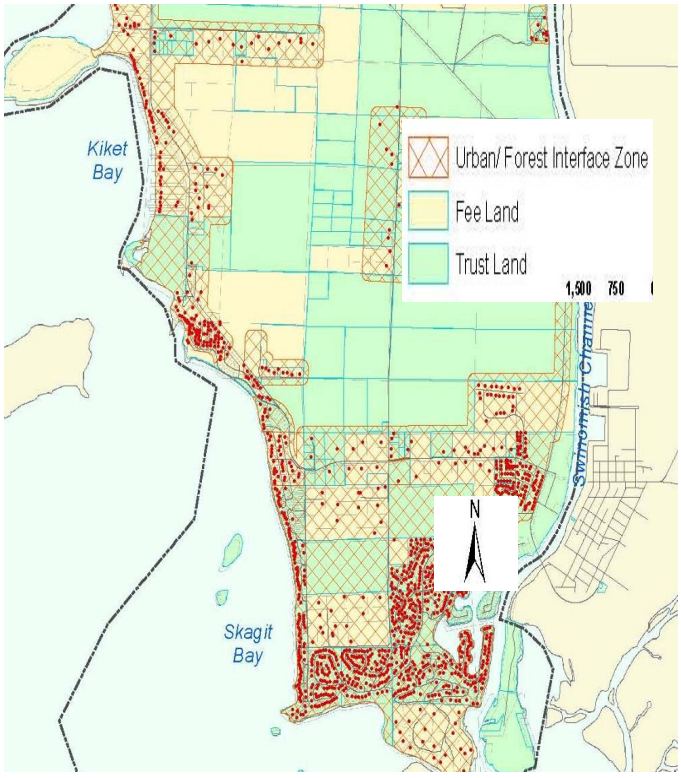

Figure 2: Swinomish Indian Tribal Community's wildfire risk zone included 1,500 properties valuing a total of $518 million.

http://www.swinomish.org/climate_change/Docs/SITC_CC_AdaptationActionPlan_complete.pdf

5) What barriers to implementation have you encountered?

The Swinomish faced several barriers. The primary barrier is that climate change impacts are extremely complex, interdisciplinary, and involve changing circumstances. Also, data and monitoring gaps exist and need to be addressed. Funding for implementing adaptation is further dependent on competing priorities and politics. The long time frame required to address impacts also makes it difficult to sustain the effort and maintain continuity of participation. Although the Tribe initiated planning five years ago, it is only now beginning an implementation process.

B. Jamestown S'Klallam Tribe

The Jamestown S'Klallam Tribe, known in their language as "the Strong People," live on their ancestral lands, located on Olympic Peninsula in the state of Washington (Figure 3). They are separated from the urban area of Seattle by the Puget Sound. The tribe has a population of 390 (Source: U.S. Census 2010) on a reservation of approximately 1,150 acres. The tribe is governed by a Tribal Council. Hansi Hals, the Tribal Environmental Planning Program Manager presented on *"Jamestown S'Klallam Tribe Climate Change Vulnerability and Adaptation Study."*

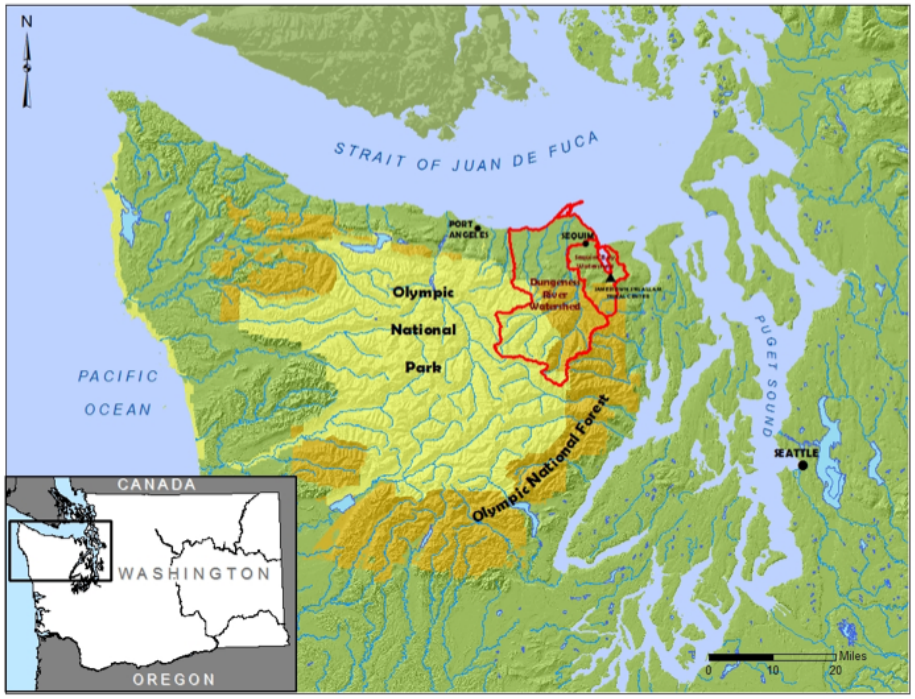

Figure 3: Jamestown S'Klallam Tribal Nation, located near Seattle, Washington, in the Puget Sound

1) What was your tribe's motivation for the plan?

The primary motivation for the Jamestown S'Klallam Tribe's climate adaption plan stemmed from observed changes in the hydrologic regime and rising sea levels. Precipitation was shifting to more rain and less snow, which is already affecting river flow and aquatic resources, particularly the

Chinook salmon, which is the primary subsistence of the tribe. These hydrologic fluctuations have resulted in abnormally high stream flows in winter, when fish are incubating. Conversely, summer low flows have recently been exceptionally low and glaciers have all but disappeared. The Tribe is also concerned about ocean acidification because of climate change and coastal upwelling in the area. Climate change impacts to salmon, shellfish, clams, oysters and cedar are of major concern to the tribe such as decreased quality of shells due to ocean acidification and increased transport of toxics due to hydrologic pulses. In the past, the tribe was devastated by poisoning of shellfish and shellfish harvesting was closed to the tribe due to health concerns. Jamestown S'Klallam Tribal Nation is also concerned and motivated by the rising sea levels and flooding of the tribal community impacting business, tribal enterprises, homes, and the main transportation corridor. The Tribe was familiar with climate change models and the projected adverse effects on natural resources, but lacked adequate planning expertise to address these concerns.

2) What process did you use to develop the plan?

The Jamestown S'Klallam Tribal Nation convened working groups to identify key issues and areas of climate change concern. A workshop was convened to create vulnerability scores for areas of key concern and prioritize concerns. A study was completed in 2013 to assess possible impacts from climate change and the Tribal Council was educated about these issues through numerous presentations on weather/climate observations and projections. Following this study, data and knowledge were shared among Tribal members and strategies were considered to increase community resiliency.

3) How did you get the support of your tribal community and nation for the plan?

As a result of coordination with the council, the Jamestown S'Klallam Tribal Nation decided to move forward with adaptation activities and received funding through the EPA General Assistance Program. They contracted with Adaptation International (AI), a consulting firm. AI effectively collaborated with an assemblage of Tribal fishermen, citizens, and elders and incorporated traditional knowledge into planning strategies. The Tribe reviewed model scenarios projected over a 25-year period to determine flood risk areas and the consultants also helped them understand potential impacts under varying greenhouse gas-emission scenarios.

Figure 4: Impacts from climate change to marine/aquatic species were identified as a very high area of concern by the S'Klallam Tribal Nation.

4) What are the key components of the plan and what is the current status?

The adaptation plan developed by the Jamestown S'Klallam Tribal Nation identifies changing climate conditions with respect to increased temperatures, changing precipitation patterns, sea-level rise and coastal flooding, ocean acidification and temperature increases, forest habitat alteration, and human health. Areas of concern were prioritized as follows: 1) very high priority: impacts on salmon, clams and oysters, shellfish, biotoxins, wildfire, and cedar harvest; 2) high priority: casino and market; transportation, and tribal campus water supplies; and 3) medium priority: Jamestown Beach water supply, natural resources lab, municipal buildings, and tribal campus wastewater tanks. The next steps toward implementing a plan are to build non-tribal community support for climate preparedness by sharing the AI study with county residents to enable proactive planning, incorporate climate preparedness into tribal government operations and policy, and collaborate with surrounding communities, counties, and other key stakeholders to monitor changes in climate that are likely to affect the Tribe. The Jamestown S'Klallam Tribal Nation is actively working on storm surge protection, floodplain restoration, and structural planning. The plan is at http://www.jamestowntribe.org/programs/nrs/climchg/JSK_Climate_Change_Adaptation_Report_Final_Aug_2013s.pdf.

5) What barriers to implementation were encountered?

While this topic was not directly addressed in the presentation, the Tribe's climate adaptation plan outlines four next steps to move from planning to action.

a. prioritizing adaptation strategies for implementation and identify individuals or departments responsible for implementation
b. building community support for climate preparedness
c. incorporating climate preparedness into the Tribal Government operations and policies
d. collaborating with surrounding communities, the county, and other key stakeholders to monitor key changes to local and regional climate that are likely to affect the Tribe.

C. Newtok Village

The Newtok Village in Alaska consists of a population of approximately 380 people and is located on the Ninglick River in western Alaska. The town has become an island due to riverine erosion (average of 71 feet per year) amplified by melting permafrost on the riverbank.[1] The river is widening and the town is below sea level causing the island to become smaller and smaller. Lisa Charles and Carolyn George, Council Members, Newtok Village Council, presented on *"Newtok to Mertarvik: To Move a Village."*

[1] Source: U.S. Army Corps of Engineers [USACE] (2009) Alaska Baseline Erosion Assessment–Study Findings And Technical Report. USACE Alaska District, Elmendorf Air Force Base, Alaska.

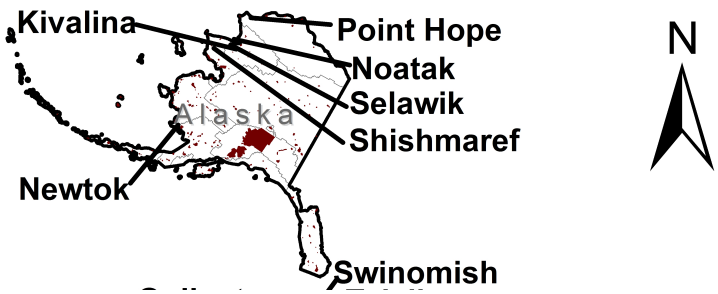

Figure 5: Newtok Village in western Alaska; the village is being relocated to Mertavik, nine miles away.

1) What was your tribe's motivation for the plan?

The erosion hazards had been recognized for decades and the Alaskan Native Village of Newtok recognized that something had to be done to ensure the people's survival. Newtok began to consider alternatives, including the disbursement of the population and various methods to control overflows from the river. Newtok Village hired an engineering firm in the 1980s to conduct an erosion assessment and evaluate viable options. The consultant concluded that relocation of the village would be less expensive and a more sustainable solution. Three alternative sites were considered and Mertarvik was selected as the relocation site for the village in 1994. Mertarvik, which means "getting water from the spring," is located on Nelson Island, approximately nine miles from Newtok.

Figure 6: Newtok Village, photo courtesy of AAASPolicyFellowships.org

2) What process did you use to develop the plan?

The Newtok Village led the planning process and used a collaborative approach to address these challenges. This process involved engagement with the Native Village Corporation and required the technical support of an interagency group of state, federal and non-governmental organizations (NGOs). The Newtok Village developed a management plan that outlined the guidance, phases and principles associated with the relocation process. Following site selection, the land exchange was coordinated between the Tribe and the Department of Interior.

3) How did you get the support of your tribal community and nation for the plan?

The climate adaptation plan was formally adopted through a Newtok Village Tribal Resolution. The Newtok Village Council held community meetings to keep everyone informed about the planning and relocation process. Information at each meeting was provided in both English and Yup'ik languages to make sure all community members understood the process and were able to voice concerns.

4) What are the key components of the plan and what is the current status?

The key components of the plan included a strategic focus on community development, site preparation for a new relocation site, housing, transportation, water, and energy. The management plan identifies priority actions for near-term goals that will jump-start progress for each focus area. The plan and related documents can be found at:
https://www.commerce.state.ak.us/dcra/planning/npg/pub/Mertarvik_Relocation_Report.pdf;
https://www.commerce.state.ak.us/dnn/Portals/4/pub/Mertarvik_Strategic_Management_Plan.pdf

5) What barriers to implementation were encountered?

Accessing funding has been the biggest barrier to the implementation of the Newtok Village Adaptation Plan. The Netwok Village has been unable to get ahead of the risks because of their dependence on disaster funding. Following a 2013 storm, the Village was eligible for FEMA funding, which provided seed funding for the initial relocation, but more money is needed to construct new homes and there is no clear path to secure additional funds. The investment guidelines of some funding agencies have also been a problem, such as requiring the establishment of a population before funding will be provided. Even after the relocation effort, the people are still vulnerable to the effects of erosion and the majority of people want to relocate to the more stable and higher elevation of Nelson Island.

D. Yurok Tribe of the Yurok Reservation

The Yurok Tribe of the Yurok Reservation has lands encompassing over 56,000 acres located in northern California, near the Pacific coast and along Klamath River. The Yurok refer to themselves as the Olekwo'l and consist of seven different tribes with a population of approximately 6,000. Fishing, hunting, and gathering remain important to tribal members since pre-contact times. Sue Wotkyns from Northern Arizona University Institute for Tribal Environmental Professionals (who is a partner of the Yurok Tribe) presented on the *"Yurok Tribe Climate Adaptation Plan."*

1) What was your tribe's motivation for the plan?

The Tribe is concerned about hydrologic changes resulting from climate events and the related impacts to surface waters and aquatic resources on which they depend for subsistence. Areas of

primary concern include drinking water, variation of instream flows, and marine/aquatic species (e.g., seaweed and lamprey). The Yurok Tribe has been actively focusing on climate change issues and engaging neighboring Tribes for a number of years with funding support from the EPA.

2) What process did you use to develop the plan?

The Yurok Tribe Environmental Program received an Environmental Justice grant from the EPA in 2010 to conduct community scoping, build staff technical capacity on climate change research and science and prepare an Initial Yurok Tribe Climate Change Prioritization Plan to identify needs and priorities for future efforts and planning. The Tribe also received an EPA grant (2014 to 2017) to identify areas of water resource vulnerability and resiliency, assess impacts on food security and Tribal health, and increase the Tribe's adaptive capacity to prepare and respond to climate change. They also received funding for conversations about climate change and identified high priority resources to protect. Recently they received an EPA Science to Achieve Results (STAR) grant to study cumulative risks and potential contamination of key subsistence aquatic resources such as shellfish, salmon, sturgeon, lamprey, crab, and seaweed. The Tribe is also expanding a monitoring network for the river, establishing an observers' network to record unusual events, and developing a climate adaptation plan. NAU's Institute for Tribal Environmental Professionals (ITEP) has been providing support for adaptation planning over the past year and facilitating Tribal workshops to identify risks and develop strategies.

Figure 7: Yurok tribal lands are in northern California, along the Klamath River

3) How did you get the support of your tribal community and nation for the plan?

The project is still in the early planning phase. ITEP has been working with the Yurok Tribe to establish a roadmap for the planning process, including: 1) the preparation of a planning guide (i.e., the identification of roles and responsibilities, timelines and work products), 2) the development of an outline for the adaptation plan, and 3) the establishment of communication, coordination and information sharing practices. To date, ITEP has held one workshop with Tribal staff and plans to conduct additional workshops on vulnerability and risks and adaptation strategies. In-person interviews will also be conducted with elders and Tribal members and information will be incorporated into the plan.

4) What are the key components of the plan and what is the current status?

Development of the climate adaptation plan is still in process. The Yurok Tribe is currently working with ITEP to conduct outreach and gather information. The establishment of a planning guide and effective communication practices between the Yurok Tribe and ITEP has been very important in this

process. ITEP planners have regularly scheduled conference calls and in-person meetings with Tribal project partners and a document-sharing site has been established. Tribal resource concerns and adaptation strategies and traditional knowledge from elders will be incorporated into the plan. The 2010 Initial Yurok Tribe Climate Change Prioritization Plan is at http://www.yuroktribe.org/departments/ytep/documents/YurokTribeandClimateChangePrioritizationPlan.pdf

5) What barriers to implementation were encountered?

Barriers were not directly addressed in this presentation, however funding and monitoring were a few challenges discussed in the panel discussion and summarized in section XX.

E. Saint Regis Mohawk Tribe

The Saint Regis Mohawk Tribe is located in the state of New York with 13,440 acres along the U.S. Canada Border and their traditional name is Akwesasne. The traditional territories of the Saint Regis Mohawk Tribe extends into Ontario and Quebec in the Adirondacks area. The Akwesasne land encompasses diverse habitats and is located at the convergence of three rivers: the St. Lawrence, Raquette, and St. Regis. Barbara Tarbell, Akwesasne Cultural Restoration Program Manager, presented on "*Climate Change Adaptation Plan for Akwesasne*."

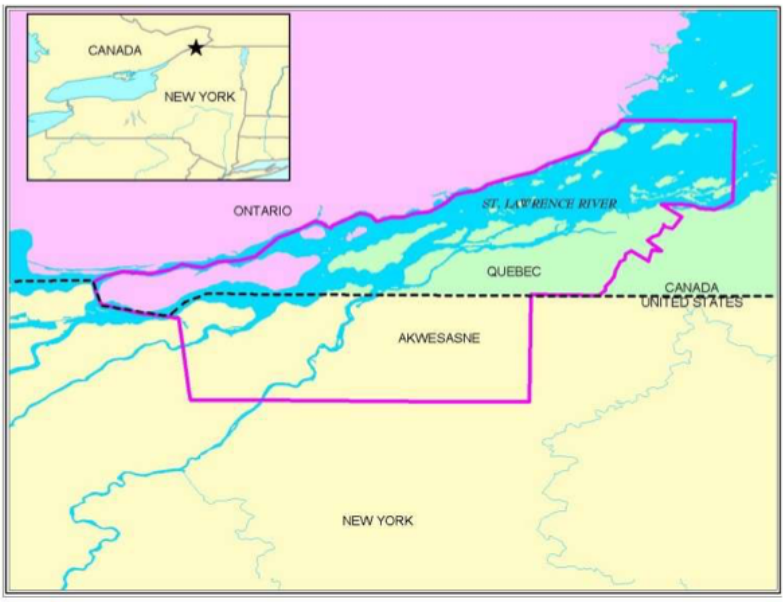

Figure 8: St. Regis Mohawk tribal territory spans the U.S. and Canadian borders.

1) What was your tribe's motivation for the plan?

The Akwesasne people live downwind and downgradient from major industrial facilities, hydro dams, and aluminum smelters. One of the rivers it borders and relies on has become an

international shipping channel, requiring dredging. All of these developments have precipitated changes to habitat and water quality and affected how and where the Akwesasne people can fish and how they collect native plants and medicines. The Akwesasne people have always monitored change and see themselves as resilient people, not victims. They felt it was important to proactively protect their land and cultural traditions in the face of a climate that is changing faster than ever before. Areas of concern were "decreased fish populations associated with higher air and water temperatures, reduced abundance of certain medicinal plant species, shifts in tree species to higher elevations and more northern latitudes, and shifts in the range of other plant and animal species."

2) What process did you use to develop the plan?

Figure 9: A St. Regis Mohawk tribal member cleans fish, a primary subsistence food of the Akwesasne.

The Saint Regis Mohawk Tribe adaptation plan was funded through a grant available to tribes in EPA Region 2. The Saint. Regis Mohawk Tribe decided not to follow the EPA grant guidelines for conducting risk or vulnerability assessment studies because these requirements contradicted Tribal values. The Saint Regis Mohawk Tribe contracted with a consulting firm, Industrial Economics, to assist in the planning, including site visits and information exchange. The Tribe also developed partnerships with agencies (e.g., USGS). The indigenous epistemology of the tribe centered around Ohén:ton Karihwatéhkwen was the foundation for the adaptation plan. In addition, the traditional Mohawk Thanksgiving Address was used to structure the plan. The plan acknowledges every element of creation, provides detailed information on climate change considerations associated with each element of creation and outlines the necessary steps for adaptation.

The adaptation plan was preceded by cultural restoration effort that were primarily funded by a legal settlement reached in 1991 with Alcoa, an industry that caused environmental damages on tribal land as a result of their industrial activities. The restoration goals are to promote restoration of land-based cultural practices and traditional economic activities within the community and preservation of the Mohawk language. The four areas of traditional cultural practice covered by settlement are water, fishing, river use; medicinal plants; hunting and trapping; and horticulture and basket-making. This restoration effort created a youth apprenticeship program where the youth learn traditional skills such as land restoration techniques, subsistence activities such as fishing and gathering medicine, and the Mohawk language. The restoration effort also established a language immersion school. The Saint Regis Mohawk Tribe is ensuring that traditional knowledge is not lost or eclipsed by science. The program has two teachers and four apprentices; at the end of four years the apprentices are expected to teach others. Emphasis is on educating tribal members on traditional practices and how to adapt to ensure traditional cultural practices can continue.

3) How did you get the support of your tribal community and nation for the plan?

The Saint Regis Mohawk Tribe was neither resistant nor enthusiastic about a climate adaptation plan. The Tribe has numerous other environmental documents and related projects so there was general community acceptance. The plan did not include too much traditional knowledge as they felt it was important to protect this information.

4) What are the key components of the plan and what is the current status?

The adaptation plan is structured based on the traditional values of Mother Earth and Grandmother Moon and addresses all the natural elements, natural resources, climate change, climate change impacts and adaptation, based on core traditions and values of the people. Partnerships are in place with the USGS and US Fish and Wildlife Service to restore Saint Regis Mohawk Tribe fisheries and make them more resilient to climate change impacts. The St. Regis Mohawk Tribe also has a pro-active forestry plan. The adaptation plan has been finalized and is available online. The plan is at http://srmtenv.org/web_docs/2013/09/SRMT_CCAP_08-30-13.pdf.

5) What barriers to implementation have you encountered?

The one barrier was that the EPA Region 2 guidelines for creating a climate adaptation plan did not fit with the traditional values and approach of the Saint Regis Mohawk Tribe.

F. Shinnecock Indian Nation

Shinnecock Indian Nation is located on the south shore of Long Island, New York on an 800-acre peninsula. The Shinnecock Nation numbers around 1,400 people; more than half of them live on the reservation. The Tribal land includes a nationally protected estuary. Shavonne F. Smith, Environmental Director, Shinnecock Indian Nation, presented on "*Shinnecock Indian Nation Climate Change Adaption Planning.*"

Figure 10: Shinnecock Indian Nation, located on the eastern coast of the United States

1) What was your tribe's motivation for the plan?

The Shinnecock Indian Nation is experiencing loss of land along Shinnecock Bay from shoreline erosion, storm surge, and sea-level rise. The cemetery was also inundated by Hurricane Sandy.

2) What process did you use to develop the plan?

The Shinnecock Indian Nation began by looking at other climate adaptation plans in EPA Region 2. They held community meetings and small work sessions. It was more effective to go directly to the tribal elders (e.g., during lunch) and discuss the elders' observations of changes in the environment (such as mosquitos and pests). The Shinnecock Indian Nation has a small environmental staff consisting of three people and had the assistance of Sainte Regis Mohawk Tribe and a consultant.

3) How did you get the support of your tribal community and nation for the plan?

Shoreline problems were evident and so discussion of shoreline impacts was a good starting place. It was also helpful to listen to concerns of specific constituent groups: hunters, baymen, and elders. Speaking to them in small groups was especially helpful. It was important to develop allies and not work in a bubble. An effective way to gain support was to find knowledgeable groups of people who become invested in the plan and become project cheerleaders. This includes working with tribes on the eastern coast of Long Island, who have been impacted by algae blooms to a greater extent than the Shinnecock Nation. There is concern that unless they can address the environmental issues of other local tribes, there will be pressure to over-harvest the resources of the Shinnecock Nation.

4) What are the key components of the plan and what is the current status?

The adaptation plan addresses climate change impacts and addresses priority areas. The Peconic Estuary Program (PEP) is assisting with a vulnerability assessment. PEP is part of a national estuary program and can leverage this work. The Shinnecock Indian Nation is gathering more scientific data with USGS such as saltwater intrusion into groundwater. The tribe started shoreline restoration work and in 2014, the Tribe received a $3.75M grant from the National Fish and Wildlife Foundation grant to restore shoreline. The tribe was competitive for this grant because they had an adaptation plan in place. A Shoreline Restoration Project is building an oyster reef to control storm surges and restore and maintain shellfish habitat. Some funding will be used for habitat restoration of marsh grasses to keep sand in place. The tribe is also doing oyster cultivation. The plan is currently being updated.

5) What barriers to implementation have you encountered?

For climate change impacts that are inevitable, such as the increasing strength of storms, tribes will need to figure out a way to live with and possibly slow the impacts. It is essential to work with nature and use changes to one's benefit, for example, the increased flow and ocean encroachment from storm surge keeps the bay flushing. Initial funding only has allowed initiation of shoreline restoration but new funds are needed to expand and address other areas. Lack of time is a challenge but the tribe wants to listen to tribal members to gain additional support and better understand traditional knowledge while it is still an available resource.

G. Red Lake Band of Chippewa Indians

The Red Lake Band of Chippewa resides in the northern Minnesota in the counties of Beltrami and Clearwater. The tribe also has land tracts in seven other counties. The reservation is on ancestral land of 805,517 acres that surrounds Lower Red Lake and includes a major portion of Upper Red Lake. It is heavily wooded, with numerous lakes, swamps, peat bogs, and prairies. Tribal enrollment is over 11,000. Red Lake has a single governing body for resources; all land is held in common. Jerilyn Jourdain, Environmental Specialist of the Red Lake Band of Chippewa Indians presented on *"Change Adaptation Planning for the Red Lake Band of Chippewa."*

1) What was your tribe's motivation for the plan?

The primary motivation for the Red Lake Band of Chippewa Indians to develop a climate adaptation plan was to provide a clear direction in the face of climate change impacts that would ensure that the tribe is using all available information to make the best resource management decisions. The tribe wishes to be at the forefront of climate change adaptation implementation and strategies and to be part of the larger conversation of indigenous environmentalism and economic justice. The tribal philosophy for planning tribal policy is to not only make the best decisions possible but also plan looking forward 7 generations.

2) What process did you use to develop the plan?

The Red Lake Band of Chippewa's climate adaptation plan was developed in partnership with the Model Forest Policy Program, a national nonprofit organization, through its Climate Solutions University curriculum. The program offers expertise in policy and planning, ecosystem services, climatologist, and stakeholder interaction. The planning process included community interviews, a scenario planning workshop and use of culture-based strategies. Environmental staff met with constituents who were dependent on tribal resources. The plan draft was completed and presented to department heads and tribal leadership in 2014, after 10 months of planning, writing, and editing.

Figure 11: The Red Lake Band of Chippewa is located in northwest Minnesota.

3) How did you get the support of your tribal community and nation for the plan?

There was initial hesitation due to political beliefs regarding climate change, however, community members, and subsistence users were involved in interviews and workshops.

4) What are the key components of the plan and what is the current status?

The plan provides an overview of tribal communities (e.g. landscape, history, resources, and demographics) and introduces climate change. One of the key components is a resource evaluation of forest and water resources. Another key component was identifying climate risks for each resource and rating them. Adaptation strategies were developed and an adaptation SWOT analysis (evaluating strengths, weaknesses, opportunities, and threats) was conducted on the strategies to determine best alternatives. Goals and objectives were defined and an implementation plan for an adaptation plan was created. The plan is at http://www.mfpp.org/wp-content/uploads/2011/04/Red-Lake-Forest-Water-Climate-Adaptation-Plan-Final-2014.pdf

5) What barriers to implementation were encountered?

It is often difficult to convey the urgency in long-term planning for climate change, however, as climate change impacts many aspects of life on the reservation, its inclusion is paramount. One barrier is gaining access to other programs such as housing, economic development, and urban

planning, as tribal programs tend to be compartmentalized. The next step in implementation for the climate adaptation plan is to draft a resolution for the Tribal Council to formally endorse and support implementation efforts.

H. Oglala Lakota Nation

The Oglala Lakota Nation is located in South Dakota and is one of seven tribes of the Lakota People. The reservation covers nine districts and 2.7 million acres, which are the aboriginal territories of the Lakota people for at least 7,000 years. The headquarters are in Pine Ridge, South Dakota. Jennifer S. Irving, MPH, Director of Regional Equity, Thunder Valley Community Development Corporation, presented on "*Oyate Omniciyé*" or the "*Circle meetings of the People."*

1) What was your tribe's motivation for the plan?

The motivation of the Oglala Lakota Nation in developing a climate adaptation plan stemmed from an interest in building community throughout the nine reservation districts. There was no strategic plan, environmental plan, or nation-wide Lakota plan. The sustainability plan was aimed at developing a nationwide plan by region using the Lakota concept of sustainability.

2) What process did you use to develop the plan?

It started with conversations by a small group of Lakota elders who were considering whether Lakota had a word for "sustainability." They arrived at "Oyate Omniciye," or "Circle meetings of the People" to capture the idea of a group of regional partners of Oglala Lakota interested in building a healthier and more sustainable tribal community. A $1M Sustainable Communities Planning Grant from HUD was awarded to Thunder Valley Community Development Corporation to lead the development of the plan. Nation officials invited a wide range of people at a kickoff event, including tribal leaders, NGOs, community members, financial interests, water/land/economic offices. The Oyate Omniciye Oglala Lakota Plan was legally adopted in tribal law in 2012 as their Official Regional Sustainable Development Plan for the Lakota Nation.

3) How did you get the support of your tribal community and nation for the plan?

The vision was to acknowledge and move on from historical injustices to build healthy, prosperous communities with wisdom, kindness, generosity and respect for all life, land, water and air. The plan honors culture and language; it was written in Lakota first, then translated to English, which made for a more thoughtful and culturally relevant process that was lengthy but worth it. Planners had youth draw and describe what they wanted for their future. Input was solicited from the entire community, from children to elders, elected officials, and community leaders.

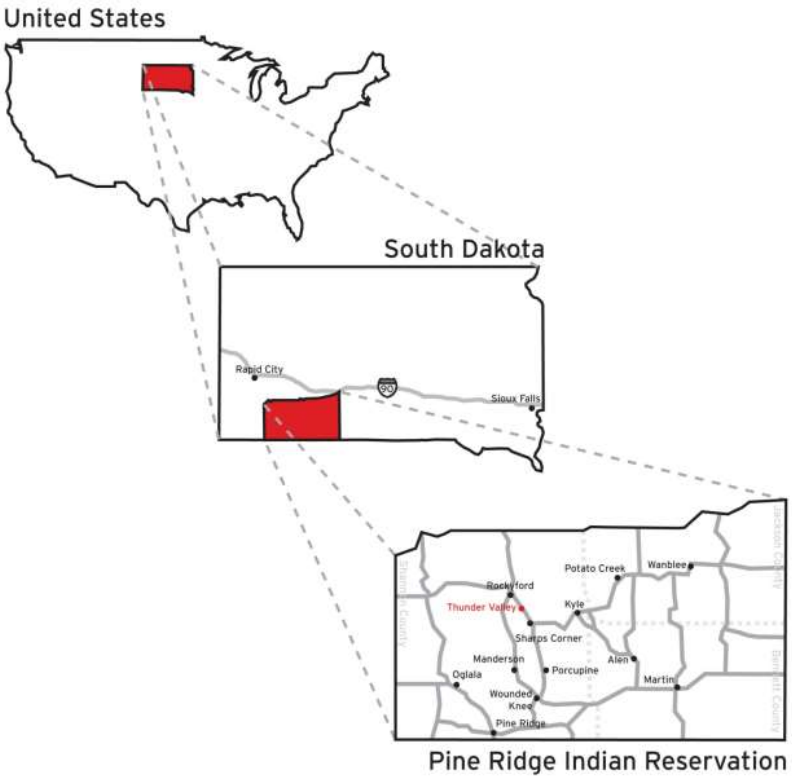

Figure 12: The Oglala Nation is located in southwestern South Dakota

4) What are the key components of the plan and what is the current status?

The plan is structured around twelve broad initiatives for planning which include: a regional planning office; governance; language revitalization; youth; model communities; health and wellness; education; economy land use; environment; communications; and transportation. It is not a climate adaptation plan per se, but a sustainability plan. Section 10 of the plan, Environment and Ecosystems, offers a variety of recommendations for preparing for and adapting to future climate changes. Previous plans included forestry, fisheries, and water resources, but none had mentioned climate. The sustainability plan includes aspects of all these other plans. The plan is at http://www.oglalalakotaplan.org/wp-content/uploads/2013/11/Oyate+Omniciye+Final+Draft.pdf

Figure 13: A word cloud developed at Oglala Lakota sustainability workshops shows "people," "community," "need," and "healthy" were the top words spoken.

5) What barriers to implementation have you encountered?

The barriers that the Oglala Nation faced in developing an adaptation plan were that change can be hard and transformation takes time. There is a need for more community buy-in to the plan, which may be facilitated by continual conversation about it among tribal leadership. The plan discusses various barriers to implementation in several of the sectors and also provides numerous case studies of how other tribes and communities overcame barriers related to planning.

Table 3. Summary of question responses for tribal plans presented

Tribe	Motivation	Process	Tribal Support	Components	Status	Barriers	Cost	Funding	Time	Partners
Swinomish Indian Tribal Community	Tidal surges, rising sea levels, & extreme weather events	1) Tribal proclamation; 2) Climate task force; 3) Seed funding; 4) University partnership; 5) inundation risk zone; 6) wildfire risk zone	Swinomish Indian Senate proclamation on a climate change initiative; Climate Change Task Force	Technical report (impact assessment, vulnerability assessment, risk analysis) Action plan (new forest management plan focused on carbon sequestration)	Ranking of priorities for action with coastal zone protection as top priority	Complex impact, data gaps, funding, competing priorities, continuity of participation		$380K from Administration for Native Americans		U. Wash. Climate Impacts Group, neighboring communities
Jamestown S'Klallam Tribe	Reduced and earlier peak river flows impacted Chinook Salmon, sea-level rise & flooding	1) working groups; 2) workshop; 3) climate change impacts study; 4) briefing tribal leaders; 5) community outreach	Briefings & discussions with Tribal Council	Incorporation of TK, climate change impacts, & prioritized impacts	Completed plan building non-tribal support Incorporating climate preparedness into tribal operations Working on storm surge protection, floodplain restoration & structural planning	None listed	UNK	EPA General Assistance Program		Adaptation International Consulting

Tribe	Motivation	Process	Tribal Support	Components	Status	Barriers	Cost	Funding	Time	Partners
Newtok Village	Erosion of Ninglick R. toward village	1) Erosion assessment; 2) ID relocation site; 3) DOI land exchange; 4) collaborative planning & engagement; 5) Newtok Planning Group; 6) Strategic management plan	Engaged Native Village Corporation Tribal resolution adaption plan	Relocation plan, community develop plans, priority actions, Yup'ik words	Completed relocation plan, initial construction, seeking funding to relocate. Received FEMA funding in 2013 for relocation	Funding & establishing population before release of funds	UNK	DOI, interagency group, FEMA	1980-2012	DOI, State Division of Community& Regional Affairs, Interagency Newtok Planning Group, consulting firm & FEMA
Yurok Tribe of the Yurok Reservation	Changes to instream flows, marine/ aquatic species & impacts to subsistence activities	1) engaged neighboring tribes 2) obtained EPA grants 3) developed initial Yurok Tribe Climate Change Prioritization Plan 4) NAU ITEP partnership 5) prioritization planning, roadmap 6) impacts to subsistence 7) expansion of monitoring network 8) establishing a LEO network	Tribal staff workshop	Prioritization Plan, Planning process roadmap to create a planning guide, outline & communication plan	Plans to interview elders & incorporate TK into plan			EPA EJ, climate change grant, conversation grant, Science to Achieve Results	2010	Northern Arizona University Institute of Tribal Environmental Professionals

Tribe	Motivation	Process	Tribal Support	Components	Status	Barriers	Cost	Funding	Time	Partnerships
Saint Regis Mohawk Tribe	Upstream industrial pollution & impacts to subsistenc e activities such as fishing, gathering of plants, & hunting	1) created cultural preservation programs to restore traditional subsistence practices & revitalize the Mohawk language; 2) obtained an EPA Grant; 3) structured plan on Mohawk philosophy	Community was involved	The natural elements based on Mother Earth and Grandmother Moon with current status, climate change impacts, adaptation, and mitigation	Partnering with USGS and USFS to implement strategies	EPA 2 Regional Grant Guidelines were not conductive to creating a plan that used an indigenous approach and philosophy of viewing Mother Earth		EPA Region 2 Grant & precursory restoration work funded by a legal settlement reach with Alcoa Industry		Industrial Economics, USGS, U.S Fish & Wildlife
Shinnecock Indian Nation	shoreline erosion, storm surge, sea-level rise, & inundation of cemetery by Hurricane Sandy, coastal flooding infiltrated private drinking wells	1. researched other tribal climate adap-tation plans; 2) community meetings & work sessions with subsist-ence groups; 3) meeting with elders; 4) used Peconic Estuary climate vulnerability assessments; 5) Shinnecock department heads meeting	Tribal hunters, bayman, community, & elders, Saint Regis Mohawk Tribe, & other Long Island Tribes	Climate change impacts and priority areas	Updating plan & shoreline restoration beginning	Funding for other aspects, & lack of time	UNK	EPA Grant (National Fish and Wildlife Foundatio n grant of $3.75Mto restore shoreline.)	2013	Saint Regis Mohawk Tribe, Peconic Estuary Program (PEP), & other Long Island Tribes

Tribe	Motivation	Process	Tribal Support	Components	Status	Barriers	Cost	Funding	Time	Partnerships
Red Lake Band of Chippewa Indians	Make best decisions that consider climate change impacts & 7 general planning	1) community interviews; 2. scenario planning workshop; 3) use of cultural based strategies; 4) meetings with subsistence users	Support of community members and DNR directors, inclusion in Tribe's strategic plan	Overview, resource evaluation, climate risks, adaptation strategies, analysis of adaptation, goals and objectives, and implementation plan	Plan completed. Next step is to have plan formally adopted by Tribal Council vote	Initial push back from tribe due to politics, effectively conveying urgency and need for adaption, limited time, interest and accessibility to data		Tribal resources & staff	2013-2014	Model Forest Policy Program & Climate Solutions University
Oglala Lakota Nation	Lakota vision to move forward from the injustices of the past & create a plan for the entire tribe by region	1) conversa-tions with Lakota elders; 2) defining sustainability in the Lakota language; 3) obtaining a grant; 4) building partnerships; 5) adopting into tribal law	Tribal elders, elected officials, community leaders. Plan was written in Lakota first using cultural values & involved tribal members at every level.	12 initiatives: regional planning office; governance; language revitalization; youth; model communities; health and wellness; education; economy land use; environ-ment; communi-cations; and transportation	Sustainability plan completed, a Climate Action Plan will be developed & included in the Oyate Omniciyé Oglala Lakota Plan	Change can be hard & transformati on takes time, more support from tribe particularly focusing on tribal leadership, implementati on barriers	$1M	Sustain-able Communiti es Plan-ning Grant by the U.S. Dept. of Housing & Urban Developm ent	2010	Thunder Valley Community Development Corporation with Oglala tribal partners, & non-governmental public and private partners

V. Panel Discussions

Panel discussions by presenters followed the first five and second five speakers, with the aim of finding common experiences, key issues of concern in adaptation planning, and paths forward in implementation.

A. Panel Discussion I

This first panel included the following five panelists/presenters: 1) Ed Knight, Swinomish Indian Tribal Community 2) Hansi Hals, Environmental Planning Program Manager, Jamestown S'Klallam Tribe; 3) Lisa Charles and 4) Carolyn George, Newtok Village Council; and 5) Sue Wotkyns, Institute for Tribal Environmental Professionals, Yurok Tribal Partner. This panel discussion included discussion on 1) ways Tribes structure and prioritize planning, 2) the need for partnerships and collaboration to make things happen, and 3) the funding barriers – particularly with implementation.

Discussion main points:

- All Tribes, political structures, and natural resource concerns are unique and there is no one-size fits all model to address these issues and develop appropriate climate adaptation strategies. Most plans are developed through the primary direction of tribal natural resource departments, but not always.
- The Swinimosh started adaptation planning early and there were no examples to reference so the Tribe used a guidebook and learned through experience. The Swinimosh proactively engaged with local, county, and community representatives. Effective communication and engagement across stakeholder groups is key.
- Tribes can implement other aspects (e.g., transportation, infrastructure, healthcare facilities) into their adaptation plans without direct funding. This can aid in saving money and moving toward solutions. The Swinomish are in the early stages of implementation and received funding to look at coastal and wildfire risk areas and implement aspects from their forest management plan to shift to traditional farming and carbon sequestration planning. The Yurok Tribe has been focusing on more robust monitoring (funded through EPA STAR) to enable expansion. The Newtok Village members are building evacuation areas and FEMA is beginning to engage more through the development of coastal hazard maps.
- A common first step in adaptation planning is identifying risks and resources at risk. Also, there is a need for partnerships (consultants, science inputs). Funding is an issue for all the tribes on this panel. Precipitating events can incentivize planning activities like the development of a sustainability plan? An iterative process is important in developing an adaptation plan. FEMA has some risk management programs that now can be tapped into in advance of a disaster or crisis such as coastal hazard maps. One suggestion was to incorporate mainstream planning that is related to adaptation into day-to-day decision-making. This can save money.
- Is the tribal planning department best suited to do initial planning, or a natural resources department? This depends on tribe and their needs. Most agree that planning is often led by natural resources or environmental departments, but it doesn't have to be that way.
- Environmental monitoring is often a challenge for tribes. The EPA STAR grant may focus on funding environmental monitoring but there are other tools that can support data such as remote sensing. Stakeholders from overlapping jurisdictions may need to engage and collaborate to plan more effectively.

B. Panel Discussion II

A second panel discussion was held after all the second set of tribal adaptation plan presentations. Panelists were: Barbara Tarbell, Cultural Restoration Program Manager of the Saint Regis Mohawk Tribe, 2) Shavonne F. Smith, Environmental Program Director of the Shinnecock Indian Nation, 3) Jerilyn Jourdain, Environmental Specialist of the Red Lake Band of Chippewa Indians, and 4) Jennifer S. Irving of the Oglala Lakota Nation.

Discussion main points:

The first question that was asked related to the challenges these tribes faced in using traditional ecological knowledge in the context of climate adaptation and how did this mesh into some tangible product. The Oglala Lakota Nation stressed that they asked about the experiences and observations of those who have lived in a certain area because they are the experts. The Saint Regis Mohawk Tribe also thought local knowledge was important and stated that they talked to elders and community members about how resources have changed particularly due to contamination. Often times, community meetings are not the best settings to ask about traditional knowledge and it is often more effective to go directly to the elders and talk to them. For example, you can discuss how climate impacts have changed your behavior (e.g., the way you fish), and then ask people what they want to do about it. It is also important to get a point of reference, or baseline by investigating what changes people are talking about to try and determine whether it's just a perception or whether it is based in fact. Start with the elders and ask them how to move forward into the future. A primary message was to remember who we are as a people. Remembering the identity of the people and its direct relationship to the native language motivated the Oglala Sioux Tribe to write their sustainability plan in the Lakota language first and then translate it into English.

Some tribes feel a sense of imbalance/sickness because traditional knowledge doesn't explain the rapid pain they are experiencing as a result of climate change. Are others experiencing this? In South Dakota, the tribes are experience impacts to health, such as when they are trying to collect medicines, they are finding that seasonal timing of and numbers of resources (e.g. plant flowering and fruiting, wildlife availability) are shifting. Phenology issues affect cultural practices. Saint Regis Mohawk Tribe agreed with this and stated that some TK that gathered in the past may not apply today, especially if impacts are amplified as a result of contamination. They asked, "How do we teach about how and when to fish when we are not allowed to fish?" Nevertheless, Saint Regis Mohawk Tribe felt that it is still important to pass along the knowledge. For the Oglala Lakota Nation, they felt a sense of imbalance helps to convey a sense of urgency. For example, timing for the planting and harvesting of wild rice is essential. The range of wild animals and fish the tribes depend on are shifting. Moose are no longer on the reservation because they moved north. Whitefish are gone. TK has been passed on historically because conditions may have stayed the same, but today conditions are rapidly changing. For the Shinnecock Indian Nation, the soft-shell clams are now scarce, and scallops are no longer there. Also, new species of warmer-water fish are appearing.

Table 4. Existing Plan Descriptions and Partners

Region	Nation	Loca-tion	Plan Title (URL)	Size	Population	Govt
Great Lakes	**Red Lake Band of Chippewa**	N Minn	Mitigwaki idash Nibi (Our Forests and Water): A Climate Adaptation Plan for the Red Lake Band of Chippewa Indians (2014) http://www.mfpp.org/wp-content/uploads/2011/04/Red-Lake-Forest-Water-Climate-Adaptation-Plan-Final-2014.pdf	800,000 acres	7,459	
	Description: The plan aims to: Keep the timber industry sustainable and resilient to change in order to minimize risk and preserve forests for future generations; Protect and preserve water quality and fishery; Manage/reduce/prevent invasive species; Encourage climate risk awareness in Tribal program planning and implementation; Expand partnership efforts to downstream communities and other management entities; Ensure the Tribe's climate resilience through proactive planning and commitment to preserving natural and culturally important resources; Expand the plan to other tribal programs in a tribal-wide planning initiative.					
	Partners: Climate Solutions University, Model Forest Policy Program, Red Lake Dept. of Natural Resources, Cumberland River Compact					
NW	**Confederated Salish and Kootenai Tribes**	NE Monta na	Climate Change: Strategic Plan (2013) http://www.cskt.org/CSKTClimatePlan.pdf	1.3M acres	Xxx	10 Council members
	Description: Seeks to protect the cultural resources and land upon which the Tribes depend. The plan addresses climate impacts and vulnerability to nine categories of tribal life: forestry, land, fish, wildlife, water, air, infrastructure, people, and culture.					
	Partners: Salish-Pend d'Oreille Culture Committee, the Kootenai Culture Committee, Next Seven Group LLC, the Great Northern Landscape Conservation Cooperative (LCC), the Kresge Foundation, and the Roundtable of the Crown Continent Adaptive Management Initiative, and by drawing from existing regional climate adaptation documents such as the Missoula County Climate Action.					
NW	**Jamestown S'Klallam Tribe**	NE Wash .	Climate Vulnerability Assessment and Adaptation Plan (2013) http://www.jamestowntribe.org/programs/nrs/climchg/JSK_Climate_Change_Adaptation_Report_Appendices.pdf	13.49 acres	390	5 Council members
	Description: The plan reflects community priorities while also acknowledging the sectors that may be most severely impacted. Plan identifies several climate impacts as most important to the community: (1) Increasing Temperatures and Changing Precipitation; (2) Sea Level Rise and Coastal Flooding; (3) Ocean Acidification; (4) Forest Habitat; and, (5) Human Health.					
	Partners: Adaptation International, a climate change consulting firm, and Washington Sea Grant, a collaboration of NOAA and the University of Washington.					
NW	**Nez Perce Tribe**	NC Idaho	Clearwater River Subbasin Climate Change Adaptation Plan (2011) http://www.mfpp.org/wp-content/uploads/2012/03/ClearwaterRiver-Subbasin_ID_Forest-and-Water-Climate-Adaptation-Plan_2011.pdf	750K acres	Xxx	9 Council members
	Description: (1) Creating partnerships to research local effects of climate change on water resources, forestry, and the economy; (2) Including climate change adaptation assessment data, goals, and objectives into local and regional planning documents; (3) Affecting a change in planning and zoning regulations along waterways and restoring the 100-year floodplain; (4) Protecting and restoring water quality and quantity for human health and anadromous fish; (5) Managing wildfire risk; (6) Reducing and/or reinforcing infrastructure in landslide-prone areas; (7) Developing ecologically connected networks of public and private lands to facilitate fish, wildlife and plant adaptation to climate change.					
	Partners: Nez Perce Tribe Water Resources Division; University of Idaho; Nick and Marci Gerhardt; Columbia River Intertribal Fish Commission; USDA Forest Service-Nez Perce and Clearwater National Forests; Senator Risch's Office; Senator Crapo's Office					

NW	**Swinomish Indian Tribal Community**	W Wash	Swinomish Climate Change Initiative Climate Adaptation Action Plan (2010) http://www.swinomish.org/climate_change/Docs/SITC_CC_AdaptationActionPlan_complete.pdf	9.6K acres	806	11 Council members
	Description: The lower Skagit River area was identified as one of two high-risk areas within the state for sea-level rise, and local events such as severe storms and flooding from tidal surges also prompted concern. The model developed by the Swinomish Tribe focuses on building an understanding of climate change impacts in order to identify strategies for climate change adaptation. After defining their approach and methods, the Tribe began work on the Impact Assessment Technical Report, which was completed in 2009. This assessment provides a baseline of information the Tribe is using to develop the climate change adaptation action plan.					
	Partners: University of Washington, Center for Science in the Earth System, Climate Impacts Group; Skagit County; Town of LaConner; Skagit River System Cooperative; Administration for Native Americans; Shelter Bay Community; and, Swinomish Public Works.					
SW	**Yurok Tribe**	N Calif	Yurok Tribe and Climate Change: An Initial Prioritization Plan (2011) http://www.yuroktribe.org/departments/ytep/documents/YurokTribeandClimateChangePrioritizationPlan.pdf	63K+ acres	4,549	5 Council members
	Description: To conduct a preliminary assessment of local impacts on Yurok People and priorities for a response to a changing environment. The outcomes were: (1) Build partnerships and develop staff capacity on technical and scientific issues surrounding Climate Change, research, state of the science, and planning and response efforts by Tribes, federal and state agencies; (2) Compile available information on Climate Change impacts at the global, regional and local level and identify data gaps and information needs specific to Yurok; (3) Conduct community scoping with Tribal Council, Tribal Membership and Tribal staff and departments to share information on Climate Change, consider potential impacts, and identify Tribal priorities for Climate Change research, planning and response; and, (4) Completion of an Initial Yurok Tribe Climate Change Prioritization Plan.					
	Partners: Northern Arizona University Institute of Tribal Environmental Professionals, EPA					
Plains	**Oglala Lakota Nation**	S Dakota	Oyate Omniciyé | Oglala Lakota Plan (2013) http://www.oglalalakotaplan.org/wp-content/uploads/2013/11/Oyate+Omniciye+Final+Draft.pdf	3.46K m^2	24,908	5 Council members
	Description: Continue the healing and strengthening of our people by bolstering identity and opportunity through the unique and beautiful perspective of Lakota knowledge, culture, and language. The plan focues on: (1) reinvigorate a thriving, dynamic, and robust society where all share in the benefits; (2) honor our connections with the Earth and seek out ways to protect her environment; (3) create meaningful economic and job opportunities that reignite cultural identity; (4) promote and enhance public health, and awareness of healthy alternatives; and, (5) provide and enhance infrastructure, housing, and social services at an affordable cost.					
	Partners: Thunder Valley Community Development Corporation with Oglala tribal partners, US Dept. of Housing and Urban Development, non-governmental public and private partners					
NE	**Shinnecock Indian Nation**	Long Island	Climate Change Adaptation Plan (2013) Not available online	800 acres	1,331	7 Council members
	Description: Focuses on (1) mitigate shoreline erosion by investigating the feasibility of restoring shoreline with native plants and shrubs; (2) further research sea-level rise and seek the consultation of local experts for ways of increasing resilience to the flooding that will accompany it; (3) decrease ground water contamination by replacing tribal cesspools with a closed community sewer and waste water treatment facility; (4) reduce tribal carbon footprint through reduced dependency on fossil fuels and increased use of renewable energy programming, and energy audit of all tribal buildings; (5) improve air quality through tribal ordinances pertaining to open burning and idling zones, lessening the number of trees cut down annually, and the planting of new trees; (6) encourage food security and food sovereignty through reestablishment of traditional food systems and community farming; and, (7) establish emergency management plan that includes response to extreme weather events.					
	Partners: Saint Regis Mohawk Tribe, Peconic Estuary Program (PEP), other Long Island Tribes, U.S. Fish and Wildlife Service, EPA					

NE	**Saint Regis Mohawk Tribe**	NY	Climate Change Adaptation Plan for Akwesasne (2013) http://www.srmt-nsn.gov/_uploads/site_files/ClimateChange.pdf	21 miles		6 Council members
	Description: The Saint Regis Mohawk Tribe's (SRMT) Environment Division is investigating the impacts of climate change on the resources, assets, and community of Akwesasne and is developing recommendations for actions to adapt to projected climate change impacts. This plan is a first step in an effort to develop practical actions that the Tribe can take in order to adapt to ongoing and expected climate changes.					
	Partners: Industrial Economics, USGS, U.S. Fish and Wildlife					
NW	**Newtok Village (Yupik)**	AK	Relocation Report: Newtok to Mertarvik (2011) https://www.commerce.alaska.gov/web/Portals/4/pub/Mertarvik_Relocation_Report_final.pdf; https://www.commerce.alaska.gov/web/Portals/4/pub/Mertarvik_Strategic_Management_Plan.pdf	10,943 acres	380	
	Description: This report presents work to date towards the development of a Strategic Management Plan (SMP) for the relocation of the village of Newtok to a new site at Mertarvik. Newtok is a growing 350-person coastal village fronting on the Ninglick River in western Alaska. The Ninglick River is rapidly eroding and consuming community land and facilities as it advances. The most recent prediction from 2007 is that the river could reach the school by 2017 and several houses in between even sooner.					
	Partners: Agnew Beck Consulting with PDC Engineers and USKH Inc. for the State of Alaska; Dept. of Commerce, Community, and Economic Development (DCCED); Div. of Community and Regional Affairs; U.S. Army Crops of Engineers					
SW	**Navajo Nation**	AZ, NM	Considerations for Climate Change and Variability Adaptation on the Navajo Nations http://www.drought.gov/media/pgfiles/navajo_adaptation_report_final_lowresolution_2014.pdf	27.4K+ m^2	300,048	24 dist. Reps for 110 chapters
	Description: This plan focuses on climate, hydrologic, and ecosystems changes. It also looks at water resources, faming, range resources, human health, tourism, fish and wildlife, and energy.					
	Partners: NIDIS, Western Water Assessment, RASEI, Getches Wilkinson Center, University of Colorado Law					

VI. Keynote Presentation

The keynote presentation entitled *"Confirmation, Controversy, or Chaos? Interactions between Traditional Knowledge and Resource Management"* was given by Dr. Henry P. Huntington of Eagle River, Alaska. He focused on the collaborations between scientific researchers and indigenous communities particularly how they can be especially fruitful in determining ways to address problems arising from climate change. Both worlds have their experts and getting them together is fun and beneficial. Relationships and mutual understanding take time to build. Indigenous peoples and traditional knowledge are especially informative about interspecies connections. If there is a native name for a plant or animal, it can often signify its significance as a traditional resource. The different approaches to knowledge that science and indigenous populations can lead to disagreement, but therein lies an opportunity to mine for answers. Traditional knowledge may be:

- anecdotal, but people stake their lives on the value of the information over time and the hallmark of science is replicability.
- subjective to some extent, but subjectivity is acceptable and adds information.
- political, but so is everything.
- cross-cultural, and often pushes individuals outside of their comfort zone.

Examples of a beneficial mixing of scientific research informed by traditional knowledge:

- Declines in the chiton population in the Lower Kenai peninsula.
    - Traditional knowledge connected these changes to sea otters but also the use of outboard motors by unraveling the chains of consumption and change over time.
- Sea ice dynamics study in the Bering Sea ecosystem.
    - Local knowledge was useful for positioning of monitoring stations. Winter winds push sea ice south, where it is thinner and disappears quickly in spring, which is not ideal for walrus hunting. Scientific models matched the local experience and provided a common basis for discussion on impacts for the walrus hunt.
- Baffin Island changes in the direction and speed of winter winds.
    - Observations of increased strength of winds in winter and variability of wind speed were at odds with hunters' observations. Wind speed perception may depend on the perceiver: how it blows in the eyes vs. how it affects an anemometer.
- Cook Inlet beluga whale population estimates were at odds with observations.
    - Could be due to speculation vs. fantasy; a management issue vs. political gamesmanship.

Some lessons learned:

- TK is valuable but not flawless. However, combined knowledge is better than relying on a single world view or understanding. Many opportunities for integrating knowledge for the benefit of all.
- Information must be co-managed. If it is worth collecting, it's worth acting on.

VII. Breakout Sessions

Eight breakout sessions were held, using the World Café format described earlier. Participants were assigned to and rotated through sessions to ensure attendance numbers would be similar. The composition of each attendance group changed for each session so that more mixing of participant perspectives could occur. Question topics were:

1. What are the barriers to adaptation that need to be overcome?
2. How can partnerships be built effectively to help get efforts off the ground?
3. What is the role of traditional knowledge in climate adaptation?
4. What is the role of universities, federal agencies, and NGOs in supporting tribal adaptation planning?
5. What do tribes need the most to facilitate climate adaptation planning and implementation? Capacity building? Trainings? Information?
6. What processes, logistics and partnerships are needed to be successful in planning and implementation?
7. What opportunities are there to incorporate adaptation activities into ongoing tribal programs and processes?
8. What activities would be useful as next steps in supporting tribal adaptation next year? In the following 5 years?

Figure 14: Summit participants discuss topics in small group meetings, using the World Café format. Photo courtesy of Renee H. Reyolds, UA/Sloan Indigenous Graduate Partnership.

Session A: What are the barriers to adaptation that need to be overcome?

The first breakout session was moderated by Julie Maldonado, University of California, Santa Barbara.

In this session, the most significant barrier identified was trust related to building internal support for climate adaptation, especially to the extent that external partners were part of the conversation. Funding for adaptation planning and implementation are always issues, but there are specific "hoops" that have to be jumped through in order to qualify for specific kinds of government funding and contracts on tribal lands. Overall access to funds to support climate adaptation has been a major limitation; however, for some tribes, access to a particular source of government funding has been a major incentive for engaging in adaptation activities in the first place. Knowing where to start with adaptation processes is daunting for many – what is the entry point for this conversation? What is most at risk in the context of climate change? What can be done about it? All of these issues are challenging. Strong leadership and commitment is a major ingredient of progress – but lack of leadership has often been a barrier. Because elders and tribal leaders are critical to the success of any new initiative, lack of access to them has been a barrier to progress for some adaptation efforts. In addition, leadership turnover causes delays in progress in some cases. In many cases, tribes do not have sufficient access to relevant climate-related information that can be easily understood. Inadequate professional support for adaptation was also noted as a barrier.

Framing and language was also identified as a barrier to adaptation. From a cultural perspective, the concept of climate change may not be easily integrated into some world views, and in many native languages there are simply no words for climate change or the kinds of impacts that have been identified. A purely "scientific" approach to adaptation may not be appropriate, so cultural barriers to adaptation need to be understood.

Solutions to these issues include developing frameworks for adaptation that are culturally driven, using appropriate language for describing both the risks and the solutions, and incorporating adaptation efforts into existing plans and programs, such as emergency response plans or economic development planning efforts. Another suggested solution was the development of a knowledge network designed to support tribal adaptation, including identifying liaisons between tribal interests and scientists and tailored communications for particular tribal applications. A "living database" of experts who can help with a range of adaptation issues in specific sectors, regions, and cases would be very helpful.

Youth leadership empowerment is an important resource for adaptation – to the extent that the youth can both embrace their own culture and rise up to embrace the idea of managing climate-related risks this can be a win-win situation. In addition, native language-based communications can be very useful in incorporating the concept of adaptation into tribal activities.

Relationship building is a critical component to adaptation success. There is a need for cultural sensitivity training, particularly for federal and state government employees but perhaps for consultants and others, in order to avoid inadvertently offending the tribal partners. In addition, reminding federal agencies of how climate-related risks relate to their Federal trust responsibilities could be a useful way to motivate support. Building long-term relationships between tribes and funding agencies is important for some adaptation efforts to succeed. A peer-mentoring program across tribes was also suggested to encourage learning about successes and barriers.

Session B: How to create partnerships that will help get efforts off the ground

The second breakout session was led by Dan Ferguson, Climate Assessment for the Southwest, University of Arizona.

Several ideas about how to foster development of productive collaborations emerged from the conversations about creating effective partnerships. Because a diversity of knowledge is necessary for well-designed adaptation planning, multiple partners from inside and outside the community may be critical to carry out adaptation planning and implementation. This was discussed in terms of building the right team or mix of expertise to achieve a successful outcome. The importance of understanding both what the external partner's and the tribe's expertise and contributions can be was also noted. Participants also pointed out that it should be the tribe who establishes the scope of their adaptation efforts, their goals, and how outside experts can contribute so that the adaptation planning is responsive to tribal needs. A component of that is the need to find a balance between local and traditional knowledge and western scientific inputs.

Throughout the conversations about building these kinds of collaborations, participants emphasized the importance of a shared set of values upon which the work can be built so that the diversity of ways of knowing and perspectives on the issues can be productively utilized. In order to establish that core set of shared values it is critical to develop solid collaborative relationships and build trust within the partners so that everyone can fully contribute. Getting these relationships established and building trust may require formal structured processes to ensure all the partners have a clear understanding of the goals, but also to understand the boundaries of the work. Participants mentioned the usefulness of memoranda of understanding (MOUs) or other written agreements between universities and tribes, or agencies and tribes, for establishing the expectations for the partnership and clarify the conditions under which the adaptation work will be done. Tribal Internal Review Boards can also provide structure and clarity and help articulate the roles of the partners. All of these types of structures that may reduce risks of misunderstandings developing.

A critical ingredient for successfully building a collaboration is for non-Native partners to work to develop cultural competency. Participants repeatedly returned to the idea that anyone working in a Native community must gain some level of understanding of the community's values and ways of knowing if a collaboration is going to be successful. An important element of developing that cultural competency is to listen and try to understand how the community perceives the adaptation challenges they are confronting, what knowledge they bring to the collaboration, and where the limits may be for non-Native partners. Historical traumas and counterproductive policies forced on Native communities have had a lasting impact and may be a barrier to establishing successful collaborations is non-Native partners do not actively work to build some level of cultural competency. In some cases existing organizations—or even meditators—may be useful to help ensure that a respectful foundation is established.

Finally, the role of funding was a thread that carried through most of the conversations about building partnerships. Money was discussed as both a barrier and an opportunity in terms of building partnerships. The absence of funding—or more often the absence of *adequate funding*—is frequently a barrier to pulling together the partners necessary to carry out adaptation work. One strategy for working with limited funding is to leverage existing partnerships, human resources, technical capacity, and networks that have been formed for other purposes and use them in the context of climate adaptation and risk reduction efforts. Funding was also discussed as an opportunity to build new partnerships. For example, a community may be successful in securing funds for adaptation work but lack the full complement of technical expertise or human resources.

By bringing funds to a collaboration from the outset they are more likely to find partners who can help them achieve their adaptation objectives.

Session C: The role of traditional ecological knowledge (TEK) in climate adaptation

The third breakout session was moderated by Karletta Chief, Soil, Water and Environmental Sciences, University of Arizona.

Traditional ecological knowledge is a term coined by academics to describe the traditional and local knowledge accumulated through hundreds and thousands of years by indigenous people. Traditional knowledge holders are typically elders, leaders, and medicine people. Traditional knowledge is not just knowledge, it is the identity of the people, it is a way of life, it is the culture of indigenous people and is primarily communicated and transferred in the indigenous language, and through songs, prayers, and stories. Understanding and learning traditional knowledge from indigenous people requires permission, trust, time, patience, accountability, protection, and understanding of its use and application. The use of traditional knowledge is very sensitive and unfortunately, traditional knowledge has been misappropriated and abused by external parties.

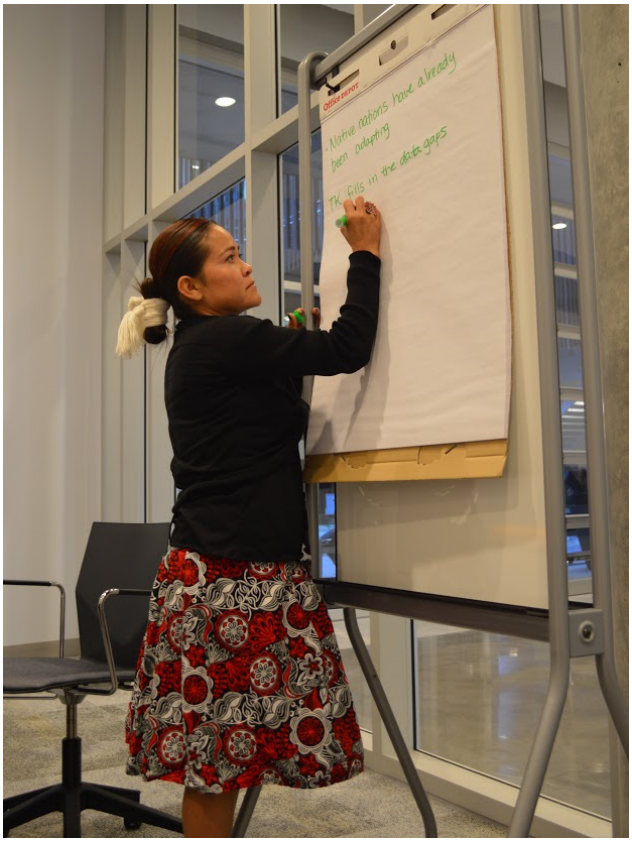

Figure 15: Moderator Karletta Chief records key discussion points in her breakout session. Photo courtesy of Renee H. Reyolds, UA/Sloan Indigenous Graduate Partnership.

For indigenous people, it is important to honor traditional knowledge and value it equally with western science. Particularly important is integrating qualitative data with quantitative data to gain a more holistic and bigger picture that includes a longer timeline. Indigenous scientists are examples of individuals who balance western science with indigenous science while knowing what indigenous knowledge is appropriate to share outside of the tribe. Ultimately, tribes must decide if and how they may share traditional knowledge. For example, one tribe has an advisory board consisting of traditional knowledge holders that work with the tribal government and managers to integrate and apply traditional knowledge appropriately.

Traditional knowledge is valuable in developing successful climate change adaptation and mitigation strategies for tribal and non-tribal people. Historically, indigenous people used traditional knowledge to adapt to their changing environments and climate and to be resilient to survive challenging environmental conditions. For example, one tribe used traditional knowledge to migrate to more fertile regions and to use specific strategies in drying and storing crops in preparation for long droughts. Traditional knowledge also has potential for establishing a baseline for local climate. Many tribal lands are not meteorologically monitored and do not have the extensive, decades-long data sets typical of urban and non-tribal areas. Traditional knowledge and local observations are valuable

for filling in the data gaps in meteorological data and corroborating existing data. Traditional knowledge in climate initiatives is also valuable overall in protecting and preserving indigenous traditions, culture, language, practices, and knowledge but also protecting it from climate change impacts. It also motivates stronger connections within the tribes, with younger generations of indigenous people seeking traditional knowledge held by elders and other traditional knowledge holders. A national working group developed *"Guidelines for considering traditional knowledge in climate initiatives"* wherein eight guidelines are offered to protect traditional knowledge and guide non-tribal entities in appropriate protocols (https://climatetkw.wordpress.com). Specifically, individuals working with traditional knowledge need to follow appropriate protocols established by the tribes they are working with, including protocols for documenting, translating, and using traditional knowledge.

One challenge in gathering traditional knowledge is fully transferring that knowledge to the younger generation because it is typically communicated in the indigenous language and the younger generation may not necessarily communicate fluently or well in their indigenous language. It is also challenging to translate concepts accurately from the indigenous language into English as it is common not to have a word-for-word translation from indigenous language to English. Also, in some communities it may not be appropriate to write down traditional knowledge, which is only communicated through oral traditions. Although traditional knowledge is very valuable in climate change mitigation, the challenge is changing national policy that can make positive changes globally such as reducing greenhouse gas emissions. Nonetheless, traditional knowledge can help formulate policies such as carbon reduction policies.

Indigenous people have a strong connection to Mother Earth and the core values are deeply connected to the protection of natural resources. Oftentimes, the respect for Mother Earth and the connection to the natural environment are not shared globally by non-indigenous peoples. For many indigenous people, their connection to the land stems from their identity, people, livelihood, and origin stories, so the respect and honor remains within their culture. As long as this is preserved and maintained, many indigenous people believe that traditional knowledge will assist in successful climate adaptation.

Session D: The role of universities, federal agencies, and NGOs in supporting tribal adaptation planning

The fourth breakout session was led by Alison Meadow of the Center for Climate Adaptation Science and Solutions, University of Arizona, and focused on the role of various entitles in supporting tribal climate adaptation efforts.

All potential external parties need to be concerned about building appropriate relationships with tribal partners and providing opportunities for collaboration. Cultural sensitivity and training can be useful in helping avoid problems and in building mutual respect and understanding. Outside partners must comply with and respect tribal research ordinances. In particular, improved communication and use of common terms and definitions is important for avoiding misunderstanding. A liaison between tribes and agencies/universities/NGOs can be useful. Capacity building (including universities helping build technical capacity for tribes and cultural competency for outside researchers and institutions) can result in more productive conversations. Many tribes have less access to historical weather, climate, and water supply data, for example, than is common outside of reservations. Data sharing is an issue but MOUs and other agreements can be used to

ensure that tribal data is protected, while also allowing outside researchers to access it when working with tribes. A central database of tribal resources and contacts would be helpful.

There is a need to move beyond research to solutions and identify how science support can be used to fill in gaps specific to tribes. There is also a need to increase overall tribal representation in adaptation activities, so that there is more internal engagement and ownership of the planning and implementation efforts. To ensure that tribes are comfortable with the outcomes, they may need to take a more proactive role in the planning process and for both agencies and tribes to work to be more clear in how they communicate with each other.

Universities can act as bridges and help communicate tribal needs for research and support. In addition, there is an opportunity to engage more with youth through academic programs and do more proactive outreach to tribes. The Federal government is not adequately fulfilling its role in supporting tribes or prioritizing tribal issues. There is a need to provide more tangible and consistent support to tribes.

Session E: What do tribes need the most to facilitate climate adaptation planning and implementation? Capacity building? Trainings? Information?

The fifth breakout session was focused on identifying the needs of tribes in climate adaption and was moderated by Kathy Jacobs, CCASS, University of Arizona.

Defining the problem that needs to be solved is an important first step in adaptation planning, and this is a good (but challenging) place to start. It is very difficult to be successful in any planning process, regardless of the location, without agreement among the parties about what the issues are and how to approach them. One way to figure out how to proceed is developing a "decision tree" to help decide what path to follow in adaptation planning. For example, identifying what cultural values or physical facilities are most at risk in the context of climate change is one place to start such a conversation, followed by a series of questions about what options can be used to address the issues that are most at risk. Another approach is to start with other objectives, such as preservation of culture, as the primary objective, and incorporate consideration of climate risks to that objective more broadly. It is important to define an appropriate entry point for the conversation about climate – should it be through a drought planning effort, a land use plan, a water sustainability discussion?

Training and empowerment of community-based trainers and science translators who can truly enter these conversations in an appropriate and credible way is an important need. There is cross-cultural training required to do this kind of work. Providing an outline for these conversations or plans and guidelines for adaptation planning and implementation would be useful. For example, guidelines on how or whether (under what circumstances) to incorporate TEK into adaptation planning would be useful. In addition, research engagement guidelines can be developed in advance of any direct engagement with tribal elders and leaders. A "Story Corps" for engagement – providing examples of successful adaptation in other tribes and successful engagement efforts could be useful – including videos of tribal members describing their experience in their own words…

Another approach is just to start working and work iteratively to overcome barriers - understanding that ongoing learning is a critical component of success. Being prepared to incorporate adaptation objectives whenever there are opportunities (new funding source, drought or fire crisis) and learn from there, being very careful to document what is learned.

Session F: What processes, logistics and partnerships are needed to be successful in planning and implementation?

The sixth breakout session focused on the processes, logistics and partnerships needed for tribes to be successful in climate adaptation planning and implementation. The session was moderated by Carolyn Enquist, USGS Southwest Climate Center.

First, the tribal sovereignty and autonomy of tribes needs to be acknowledged and partnerships should be established through the leadership, as well as at the community level, and intertribal level. Tribes have a history of being disrespected, treated as wards of state, and with a colonialist Euro-centric top-down approach. It is ultimately up to the tribe if they will participate, and enter in a discussion or partnership. This ultimate tribal authority and decision should be respected and understood and partnerships should not be pushed on a tribe when they don't want the partnership. Tribes should not be lumped into one group and tribal leaders should be approached individually and not grouped as a whole.

It is important to know the tribe and understand the culture, government structure, and approval process. Conversations need to begin face-to-face in order to build a foundation of understanding. Subsequent engagement can be through phone calls and other mechanisms once there is trust among the parties. People who are dedicated to facilitating communication, such as extension agents or tribal liaisons, often have a role in successful processes. If relationships are already in place, it is easier to take advantage of existing opportunities and learn about new funding opportunities as they arise. Because of the time it takes to build trusted relationships and cultivate learning-related cross-cultural issues, opportunities to identify and flesh out shared objectives should be built into the timelines of emergent collaborations and projects. For example, using existing policy frameworks and contracts can be used to great advantage (MOUs, MOAs, Eos, BIAs) to flesh out new objectives, identify projects, and build relationships. Although, these agreements may be bureaucratic and take time, it is an investment in building a strong and lasting partnership.

Tribes are more interested in partnerships when it will result in deliverables that can help the community rather than assessing the challenges. Partnerships should be supported well, especially since tribes have limited resources and funding. For in person meetings, financial support for travel is extremely helpful for tribal representatives to participate.

Session G: Opportunities to incorporate adaptation activities into ongoing tribal programs and processes

The seventh breakout session focused on opportunities in climate adaptation for tribes. This session was led by Zack Guido, University of Arizona.

This conversation focused on BIA Funding Opportunities, including $32M for Climate Adaptation Planning now available for tribes for capacity building, planning, travel and youth activities. The direct funding contact is Chip.lewis@bia.gov. EPA grants like GAP, Water and Clear Air grants can support tribal adaptation indirectly. Bureau of Reclamation Basin Adaptation Plans have potential and there is hope that tribes will be more integrated in a basin planning approach. Any approach should consider tribe-specific needs because a pan-tribal approach is not effective.

Opportunities include engaging students in adaptation efforts, and discussion of opportunities to educate across groups (individual to council levels) on climate issues. A tribal summit within individual tribes or across tribes can be held to pool resources for adaptation and discuss ideas. There is also a need to provide climate change and adaptation education at the individual level.

Adaptation Plans can be developed by knitting together existing tribal plans from various sectors (e.g., transportation, water, fire, housing, and infrastructure) with what is known about climate risks within these sectors. It is often best to avoid talking about climate change as a separate issue. It is also important to engage tribes at the community level.

The way these conversations are framed is important, for example a "Road map" vs. a "road" to an outcome. A road map could be a plan to hold future forums that support development of adaptation plan, rather than a discrete set of linear steps designed in advance. Implementation of plans brings special challenges, but also opportunities to finally bridge the gap between plans and desired outcomes. One idea for building adaptation plans is to focus future forums on producing content for them.

Session H: What activities would be useful as next steps in supporting tribal adaptation next year? In the following 5 years?

The eighth breakout session focused on future activities in tribal climate adaptation and was moderated by Alison Meadow, University of Arizona.

Activities for the near term include facilitating internal partnerships within tribes and engagement of citizens to translate the concept of climate change to local context and language in order to "Acknowledge what's there and empower people to deal with it." Different logistics and tactics may be required in different tribes in order to proceed with adaptation activities. For example linking existing plans (like hazard mitigation or drought plans) with adaptation plans helps to overcome resistance. Leveraging existing resource management programs can mean that additional staffing requirements may be limited.

Funding for implementation is a serious issue. Given the nature of the climate issue (e.g. the tribes didn't create the climate change problem, but they have to deal with the resulting outcomes) means that the US Trust responsibility should play a role. Another avenue to explore is using economic development money as a funding source given that economic development is likely to be affected by climate change. It is important to monitor and evaluate the success of implementation activities so that others can learn from the early adopters.

VIII. Summary of Survey Feedback

A survey was administered and given to Tribal Summit participants. The responses are summarized below and were overall very positive, with 14 responses received, with respondents self-identified as: tribal (9); academic (1); government (1); other (1); unknown/did not select a category (3).

What were the highlights of this meeting? What was most interesting or helpful?

- Case studies of planning/implementation (7)
- Traditional knowledge (TK) discussions (5)
- Format of sessions (5)
- General knowledge provided on impacts of climate adaptation planning (4)
- Networking opportunity and diversity of participants (2)
- Affirming that trust-building is key to successful partnerships (1)
- Financial sponsorship was essential and appreciated (1)

Weakness of the meeting?

- Breakouts session issues (repetitive or needed more opportunity to attend all sessions) (3)
- Need more native facilitators (1)
- Should have been a bigger meeting with more tribes (1)
- Some of the scientific language or jargon was not understandable (1)
- EPA was not represented (1)
- What do we do with info gained? What's next – more meetings with same group? (1)

Topics that should have been covered but weren't or should be in future?

- Energy and economic sustainability (1)
- Social and economic equity (1)
- How cultural resources can be addressed in climate change (1)
- Follow-up on progress of tribes' plans (1)

What would you have done differently?

- Everything was good (4)
- Input from participants on question development for breakouts (2)
- More time for talk/networking/caucusing (2)
- Start discussion with having tribal reps generate a broad list of concerns to address in a plan (1)
- Allow time for all participants to participate in all sessions (1)
- Partner tribes with plans with those who don't (1)
- Provide examples of how plans are being implemented/making a difference (1)
- More time for tribal powerpoints (1)

IX. Concluding Panel

At the end of the Tribal Summit, a concluding panel was convened that focused on important conclusions and observations from the Tribal Climate Summit. This panel was moderated by Julie Maldonado. The panelists were Travis Lane, Assistant Director, Inter-Tribal Council of Arizona; Leanna Begay, Wildlife Biologist, Navajo Nation; Schuyler Chew, PhD Student, UA Dept. of Soil, Water and Environmental Sciences; Raymond Lucero, Natural Resource Manager, Pueblo of Laguna; and Althea Walker, Education and Outreach Specialist, Gila River Indian Community.

A. What were the most significant takeaways?

There is significant work being done by tribes that needs to be shared across tribes.

- Time, accountability, patience, and trust are the cornerstones of good plans and partnerships.
- It is critical to understand and incorporate traditional knowledge and make sure it doesn't disappear from any tribal adaptation initiative. Culture and language are especially important in helping tribes hold on to values and traditions. Climate adaptation work is a chance for tribes to determine their future and promote a resurgence of language and culture. Ideas of adaptation and resilience are very Western terms that should be reframed in internal tribal conversations to reflect cultural constructs and context. Cultural preservation is as important as climate adaptation planning but they are not mutually exclusive.

B. Were there common themes, challenges and/or approaches across the tribes?

- TK and language are essential elements of adaptation planning for tribes.
- Tribes can acknowledge and recognize their history and resilience by focusing on climate change. Change, migration, and adaptation have always been important themes for tribes.

C. How to get from planning to implementation

- Future conferences should go beyond talking about planning and do actual planning, sharing more specifics about what adaptation plans are doing for tribal communities. Talk about how to respond to RFPs.
- Some tribes, such as the Swinomish, are both revising plans and working on implementing them.
- Go back to tribal members you have worked with successfully in the past to gain their help in implementation.
- Seek potential private donors to aid implementation (e.g., Ducks Unlimited, FastPro).
- Take advantage of upcoming BIA funding for tribal climate adaptation planning and implementation.
- Determine what to protect: what are the priorities and what is most at risk?

D. Next steps

- Tribal leaders must elevate issue of climate change within their own communities to determine their needs. Leaders as yet seem mostly unaware of how their constituents are being impacted and what their concerns are.
- Intertribal Council of Arizona (ITCA) is interested in convening a tribal summit. This can start an internal tribal discussion that will ensure the tribes drive adaptation partnerships. ITCA working groups can also help connect technical experts and policy experts/implementers.
- Create working groups to learn concrete tools in adaptation planning and trouble-shoot and overcome obstacles that are specific to each individual Tribe
- Look at climate change with respect to how existing funding programs such as GAP and various water and pesticide programs can support member tribes. Start developing policy recommendations for securing more funding for climate change or revamp existing tribal programs for it.
- Consider changing the reference/terminology from “climate change” to get around the politics of the issue and to action.
- “Train the trainer” programs can ensure continuity and expansion of effort, despite the challenges of turnover in tribal personnel and government.
- Natural resources personnel within tribes should engage more with tribal elders and with elected representatives to get their buy-in for climate adaptation work.
- Consider setting aside resources such as gaming dollars to fund adaptation work without being dependent on federal support.

X. Closing Remarks

Closing remarks at the conclusion for the Tribal Climate Summit were made by Marcelino Flores, Sustainability Director and Council Member, Pascua Yaqui Tribe.

Climate change is due to millions of tiny decisions being made – look at the price elasticity of these decisions. Why isn't climate change at top of our priority list? What is the economic ecology? He recently listened to James Anaya's presentation on the United Nations Declaration on the Rights of Indigenous Peoples. How was this accomplished? By appealing to basic human dignity through the concepts of equality, cultural survival, and property/social equity. Practically speaking, a tribe can be as green as possible, but it won't make a difference overall in climate change unless they can successfully appeal to a broader human-dignity audience. Additionally, with a culturally based commitment to land and water, and through work, persistence, and attention to what can be individually accomplished, there will be progress. Even very small decisions and actions will serve the common good and help the environment. The Yoeme people in Mexico recently had bounties on their heads, their river was appropriated and land given away. Pesticides were used on land, especially in Mexico, that were outlawed everywhere else. But as of October 2016, the Yoeme are receiving recognition in Mexico for their water and land, as ordered by the United Nations. And on the US side of the border, Yoeme are working on renewable energy and will have the second largest solar array on a reservation. This will give them energy security and will save water.

XI. Acknowledgements

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The Center for Climate Adaptation Science and Solutions and the Native Nations Climate Adaptation Program is very grateful to the tribal representatives who participated in this conference and so generously shared their experience and knowledge. It was a privilege to work with all of you. We are also very grateful to the amazing moderators who did so much to encourage real conversations in the workshop breakout sessions, and to the students who provided expert note-taking support. Finally, we are grateful to the Desert Landscape Conservation Cooperative, the Agnese Nelms Haury Program in Environment and Social Justice, and the Southwest Climate Science Center for their support of this event.

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Appendix A. List of Participants, facilitators, rapporteurs, note takers, and staff

Balakrishnan, Sneha	The University of Arizona	(rapporteur/note-taker)
Barton, Holly	Tohono O'odham Nation	Ecologist
Basinger-Walhom, Ursula	The University of Arizona	(rapporteur/note-taker)
Begay, Leanna	Navajo Nation	Climate Change Coordinator
Begay, Yolynda	U.S. Forest Service	Forest Planner
Black, Mary	The University of Arizona	Adaptation Program Manager
Charles, Lisa	Newtok Village	Councilwoman
Chew, Schuyler	The University of Arizona	(rapporteur/note-taker)
Chief, Karletta	The University of Arizona	Asst. Professor & Extension Specialist, Soil Water and Environmental Science
Cooley, Nikki	Northern Arizona University Institute for Tribal Environmental Professionals	Climate Change Program Coordinator, Sr.
Deswood, Helena	Southwest Regional Climate Hub	Coordinator
Enquist, Carolyn	Southwest Climate Science Center	Deputy Director
Ferguson, Daniel	The University of Arizona	Program Director, Climate Assessment for the Southwest
Flores, Marcelino	Pascua Yaqui Tribe	Council Member
Ford, Haley	The University of Arizona	(rapporteur/note-taker)
Franklin, Remy	The University of Arizona	(rapporteur/note-taker)
George, Carolyn	Newtok Village	Councilwoman
Gladstone, Fiona	The University of Arizona	(rapporteur/note-taker)
Guido, Zack	The University of Arizona	(facilitator)
Hale, Hansi	Jamestown S'Klallam Tribe	Environmental Planning Manager
Halper, Eve	Bureau of Reclamation	Natural Resources Specialist
Honyumptewa, Clayton	Hopi Tribe	Director, Dept. of Natural Resources
Huntington, Henry	Huntington Consulting	Owner
Irving, Jennifer	Oglala Lakota Nation	Thunder Valley Community Devt. Corp. Director of Regional Devt.
Jack, Michael	Quechan Tribe	Vice President
Jacobs, Kathy	The University of Arizona	Director, Center for Climate Adaptation Science and Solutions
Janseen Stina	The University of Arizona	(rapporteur/note-taker)
Joseph, Carrie	University of Arizona	(rapporteur/note-taker)
Jourdain, Nikki	Red Lake Band of Chippewa Indians	Environmental Director
Knight, Ed	Swinomish Tribe	Planning Director at Swinomish Indian Tribal Community
LaMantia, Rachel	The University of Arizona	(rapporteur/note-taker)
Lane, Travis	Inter-Tribal Council of Arizona	Assistant Director

Lewis, Charles	Bureau of Indian Affairs	Environmental Protection Specialist
Lindsey, Marti	The University of Arizona	Outreach Director, Southwest Environmental Health Sciences Center
Lucero, Raymond	Pueblo of Laguna	Natural Resource Specialist
Maldonado, Julie	University of California Santa Barbara	Lecturer
Marchand, Chad	The University of Arizona	Project Coordinator, CCASS/Haury Native Nations Climate Adaption Programs
McCarthy, Maureen	University of Nevada-Reno	Director (Interim), Academy for the Environment; Project Director, Water for the Seasons and Native Waters on Arid Lands
Meadow, Alison	The University of Arizona	Staff Scientist, Center for Climate Adaptation Science and Solutions
Montague, Tudor	Gila River Indian Community	Environmental Program Manager
Overpeck, Jonathan	The University of Arizona	Co-Director, Institute of the Environment
Palacios, Lisa	The University of Arizona	(rapporteur/note-taker)
Rae, Lynn	The University of Arizona	(rapporteur/note-taker)
Rawoot, Damian	The University of Arizona	(rapporteur/note-taker)
Rice, William	U.S. Fish and Wildlife Services	National Fish Passage Program Coordinator/National Fish Habitat Partnership Coordinator
Rinkevich, Sarah	U.S. Fish and Wildlife Services	Fish and Wildlife Biologist
Roudaut, Marie-Blanche	The University of Arizona	(rapporteur/note-taker)
Salazar, Marissa	The University of Arizona	(rapporteur/note-taker)
Schirmer, Christine	Program and Communications Manager	Southwest Climate Science Center
Schroeder, Nathan	Pueblo of Santa Ana	Restoration Division Manager
Sharma, Akanksha	The University of Arizona	(rapporteur/note-taker)
Silva-Send, Nilmini	University of San Diego Climate Education Partners	Co-Principal Investigator
Smith, Shavonne	Shinnecock Nation	Environmental Program Director
Talayumptewa, Darren	Hopi Tribe	Director, Wildlife & Ecosystems Management Program
Tarbell, Barbara	St. Regis Mohawk Tribe	Akwesasne Cultural Restoration Program Manager
Thomas, Jason	Pueblo of Laguna	Natural Resource Manager
Vilaly, Audra	The University of Arizona	(rapporteur/note-taker)
Walker, Althea	Gila River Indian Community	Education & Outreach Specialist
Wotkyns, Sue	Northern Arizona University Institute for Tribal Environmental Professionals	Climate Change Program Manager

Appendix B: Agenda

THURSDAY, NOVEMBER 12, 2015

8:30 to 9:00 **Registration**
ENR2, Room S230
***Coffee & Pastries Available

9:00 to 9:05 **Blessing** by Jesse Navarro, Tohono O'odham Nation

9:05 to 9:30 **Welcome & Purpose of Meeting** by Chad Marchand and Kathy Jacobs

9:30 to 10:45 **Native American Panel Discussion #1** *(10-minute presentations followed by discussion)*

1) **Swinomish Tribe**: *Ed Knight, Planning Director*
2) **Newtok Village**: *Lisa Charles and Carolyn George, Newtok Village Council Members*
3) **Yurok Tribe**: *Julie Maldonado and Sue Wotkyns*
4) **Jamestown S'Klallam Tribe**: *Hansi Hals, Environmental Planning Manager (Appearing via Webinar)*

10:45 to 11:15 **BREAK**

11:15 to 12:30 **Native American Panel Discussion #2** *(10-minute presentations followed by discussion)*

1) **Red Lake Band of Chippewa**: *Nikki Jourdain, Environmental Specialist/Climate Coordinator*
2) **Shinnecock Nation**: *Shavonne Smith, Environmental Program Director*
3) **St. Regis Mohawk Tribe**: *Barbara Tarbell, Akwesasne Cultural Restoration Program Manager*
4) **Oglala Lakota Nation**: *Jennifer Irving, Thunder Valley Community Development Corporation Director of Regional Development (Appearing via Webinar)*

12:30 to 1:30 **LUNCH**
Tucson Tamale Company: http://tucsontamale.com/
ENR2, Room S230

1:30 to 1:45 Instructions on Breakouts (Groups will rotate every 50 minutes to a new topic – facilitated "Café Style" discussions) by Kathy Jacobs

1:45 to 2:00 Find your Breakout Rooms

2:00 to 2:50 **Breakout Group Session #1**

1) **604 (6th Floor):** ***What are barriers to adaptation that need to be overcome?***
    a. Facilitator: Kathy Jacobs
    b. Recorder: Remy Franklin
    c. Rapporteur: Julie Maldonado
2) **N595 (5th Floor):** ***How to create partnerships that will help get efforts off the ground***
    a. Facilitator: Daniel Ferguson
    b. Recorder: Akanksha Sharma
    c. Rapporteur: Fiona Gladstone
3) **S120A (1st Floor):** ***The role of traditional ecological knowledge (TEK) in climate adaptation planning***
    a. Facilitator: Karletta Chief
    b. Recorder: Schuyler Chew

c. Rapporteur: Audra Vilaly

4) **S120B (1st Floor):** ***Role of universities, federal agencies, and NGOs in supporting tribal adaptation planning***
   a. Facilitator: Alison Meadow
   b. Recorder: Lynn Rae
   c. Rapporteur: Rachel LaMantia

3:00 to 3:50 **Breakout Group Session #2 (same sessions as above)**

1) **604 (6th Floor):** ***What are barriers to adaptation that need to be overcome?***
   a. Facilitator: Kathy Jacobs
   b. Recorder: Remy Franklin
   c. Rapporteur: Julie Maldonado
2) **N595 (5thFloor):** ***How to create partnerships that will help get efforts off the ground***
   a. Facilitator: Daniel Ferguson
   b. Recorder: Akanksha Sharma
   c. Rapporteur: Fiona Gladstone
3) **S120A (1st Floor):** ***The role of traditional ecological knowledge (TEK) in climate adaptation planning***
   a. Facilitator: Karletta Chief
   b. Recorder: Schuyler Chew
   c. Rapporteur: Lisa Palacios
4) **S120B (1stFloor):** ***Role of universities, federal agencies, and NGOs in supporting tribal adaptation planning***
   a. Facilitator: Alison Meadow
   b. Recorder: Lynn Rae
   c. Rapporteur: Marie-Blanche Roudaut

4:00 to 4:50 **Breakout Group Session #3 (same sessions as above)**

1) **604 (6th Floor):** ***What are barriers to adaptation that need to be overcome?***
   a. Facilitator: Kathy Jacobs
   b. Recorder: Ursula Basinger-Walholm
   c. Rapporteur: Julie Maldonado
2) **N595 (5th Floor):** ***How to create partnerships that will help get efforts off the ground***
   a. Facilitator: Daniel Ferguson
   b. Recorder: Akanksha Sharma
   c. Rapporteur: Stina Jensen
3) **S120A (1st Floor):** ***The role of traditional ecological knowledge (TEK) in climate adaptation planning***
   a. Facilitator: Karletta Chief
   b. Recorder: Schuyler Chew
   c. Rapporteur: Carrie Joseph
4) **S120B (1st Floor):** ***Role of universities, federal agencies, and NGOs in supporting tribal adaptation planning***
   a. Facilitator: Alison Meadow
   b. Recorder: Lynn Rae
   c. Rapporteur: Marie-Blanche Roudaut

5:00 **Adjourn** *(do not return to S230)*

5:30 to 7:00 **Mixer** at Gentle Ben's Restaurant, South Side Patio
Main Gate Square, 865 East University Boulevard, Tucson, AZ
Appetizers provided

FRIDAY, NOVEMBER 13, 2015

8:30 to 9:00 **ENR2, Room S230**
***Coffee & Pastries Available

9:00 to 9:30 Dr. Henry Huntington, Huntington Consulting
ENR2, Room S230

9:30 to 10:30 **Report Back from Breakouts** – Facilitators from each session present highlights

10:30 to 10:45 **BREAK**

10:45 to 11:30 **Breakout Session #4**

1) **604 (6th Floor):** ***What do tribes need the most to facilitate climate adaptation planning and implementation? Capacity building? Trainings? Information?***
    a. Facilitator: Kathy Jacobs
    b. Recorder: Fiona Gladstone
    c. Rapporteur: Julie Maldonado
2) **N595 (5th Floor):** ***What processes, logistics and partnerships are needed to be successful in planning and implementation?***
    a. Facilitator: Carolyn Enquist
    b. Recorder: Akanksha Sharma
    c. Rapporteur: Schuyler Chew
3) **S120A (1st Floor):** ***Opportunities to incorporate adaptation activities into ongoing tribal programs and processes***
    a. Facilitator: Zack Guido
    b. Recorder: Lynn Rae
    c. Rapporteur: Marissa Salazar/ Haley Ford
4) **S120B (1st Floor):** ***What activities would be useful as next steps in supporting tribal adaptation next year? In the following 5 years?***
    a. Facilitator: Daniel Ferguson
    b. Recorder: Sneha Balakrishnan
    c. Rapporteur: Remy Franklin

11:40 to 12:25 **Breakout Session #5 (same topics as above)**

1) **604 (6th Floor):** ***What do tribes need the most to facilitate climate adaptation planning and implementation? Capacity building? Trainings? Information?***
    a. Facilitator: Kathy Jacobs
    b. Recorder: Fiona Gladstone
    c. Rapporteur: Julie Maldonado
2) **N595 (5th Floor):** ***What processes, logistics and partnerships are needed to be successful in planning and implementation?***
    a. Facilitator: Carolyn Enquist
    b. Recorder: Akanksha Sharma
    c. Rapporteur: Schuyler Chew
3) **S120A (1st Floor):** ***Opportunities to incorporate adaptation activities into ongoing tribal programs and processes***
    a. Facilitator: Zack Guido
    b. Recorder: Lynn Rae
    c. Rapporteur: Marissa Salazar/ Haley Ford
4) **S120B (1st Floor):** ***What activities would be useful as next steps in supporting tribal adaptation next year? In the following 5 years?***
    a. Facilitator: Daniel Ferguson
    b. Recorder: Sneha Balakrishnan
    c. Rapporteur: Remy Franklin

12:30 to 1:30 **LUNCH**
BrushFire BBQ Company: http://www.brushfirebbq.com/, ENR2, Room 230

1:30 to 2:00 **Report Back from Breakouts** – Facilitators from each session present highlights

2:00 to 3:00 **Panel Discussion** – Important conclusions and observations
ENR2, Room S230

Moderated by Julie Maldonado

1) Michael Jack, Vice-President, Quechan Tribe
2) Leanna Begay, Wildlife Biologist, Navajo Nation
3) Travis Lane, Assistant Director, Inter-Tribal Council of Arizona
4) Raymond Lucero, Natural Resource Specialist, Pueblo of Laguna
5) Althea Walker, Education & Outreach Specialist, Gila River Indian Community
6) Schuyler Chew, PhD Student, Department of Soil, Water and Environmental Sciences

3:00 to 3:15 **Closing Remarks** by Pascua Yaqui Tribe Council Member Marcelino Flores

Appendix C: Tribal Summit Hosts

a. Native Nations Climate Adaptation Program

Enhancing the ability of Native Americans and their nations to meet the climate challenge

The Native Nations Climate Adaptation Program (NNCAP) was initiated in 2015 at the University of Arizona to build capacity to work collaboratively with Native American tribes and indigenous populations in the western United States and Mexico. NNCAP will work to develop and support solutions to tribal environmental concerns, especially those related to climate and climate change impacts.

Objectives:

- Coordinate the efforts of climate/environment researchers, faculty, staff, and students at the UA to support adaptation research and applications related to Native Nations.
- Assist Native Nations in identifying and building capacity for adaptation and in identifying climate-related sources of risk and opportunity.
- Support outreach and extension work related to tribes in cooperation with Arizona Cooperative Extension.
- Strengthen collaborative networks and relationships between researchers, tribal members, and other potential partners.
- Identify Native American and other partners, relevant climate and environmental research and outreach projects, existing funding sources and potential funders, and climate change adaptation projects taking place within the western U.S. on tribal lands. For purposes of this project, the western U.S. includes Arizona, California, Colorado, Idaho, Nevada, New Mexico, Oregon, Utah, and Washington.
    - Support undergraduate and graduate students interested in working with tribal nations in the field of adaptation or climate-related careers.

Contact:

Chad Marchand, NNCAP Coordinator, csm15@email.arizona.edu or 520.621.1567

b. Center for Climate Adaptation Science and Solutions

Initiated in 2014 and based at the University of Arizona, the **mission of CCASS** is to strengthen and support adaptation, risk management and resilience efforts at multiple scales by providing intellectual leadership, training, and engagement with a focus on solutions. **Our vision** is a more resilient world that incorporates science into sound management choices in the context of global change. It strives to be a nationally and internationally recognized hub in a network of adaptation activities and to help link research-based knowledge, the information needs of managers, and decision-making.

CCASS offers science-based, workable solutions and options by:

- providing an overarching “umbrella of opportunity” that leverages and builds from existing adaptation projects, resources, and expertise

- linking and strengthening existing centers of excellence across the UA campus in a network of activities that build sustained relationships and create products and services
- collaborating with practitioners, decision makers, and scientists across the U.S. and internationally
- conducting collaborative adaptation planning and implementation projects.

Core Staff:

Kathy Jacobs, Director, jacobsk@email.arizona.edu or 520.405.7395
Mary Black, Adaptation Program Manager, mblack@email.arizona.edu or 520.626.9199
Chad Marchand, NNCAP Coordinator, csm15@email.arizona.edu or 520.621.1567
Alison Meadow, Staff Scientist, meadow@email.arizona.edu or 520.626-0652
Karletta Chief, Assistant Professor, Soil, Water and Environmental Science, and co-founder of NNCAP, kchief@email.arizona.edu or 520.626.5598

Appendix D: Tribal Summit Sponsors

The NNCAP Tribal Leaders Summit was sponsored by the Desert Landscape Conservation Cooperative, the Agnese Nelms Haury Program in Environment and Social Justice, and the Southwest Climate Science Center.

The Bureau of Reclamation and the U.S. Fish and Wildlife Service have partnered to develop the **Desert Landscape Conservation Cooperative (LCC)**. The Desert LCC is a bi-national, self-directed, non-regulatory regional partnership formed and directed by resource management entities as well as interested public and private entities in the Mojave, Sonoran, and Chihuahuan Desert regions of the southwestern United States and northern Mexico. Through collaborative partnerships, the Desert LCC seeks to provide scientific and technical support, coordination, and communication to resource managers and the broader Desert LCC community to address climate change and other landscape-scale ecosystem stressors. The vision for the Desert Landscape Conservation Cooperative is "Resilient landscapes capable of responding to environmental challenges and supporting natural and cultural values for current and future generations." (http://www.usbr.gov/dlcc/about/index.html)

The **Agnese Nelms Haury Program in Environment and Social Justice** supports an array of programming to further research, education, and partnerships for socially just solutions to environmental problems. The environmental and social justice issues of the Southwest border region and the world require long-range planning and sustained commitment. The Haury Program began its investments in scholarship and research at the University of Arizona in 2014 and is extending investment through partnerships that reach out to communities. The program portfolio will evolve over time. In Fall 2015 the Haury Program will issue a call for proposals for new programming. (http://haury.arizona.edu/programs)

The **Southwest Climate Science Center (SW CSC)** was established by the U.S. Department of the Interior as part of a network of eight CSCs managed by the National Climate Change and Wildlife Science Center (NCCWSC), under the U.S. Geological Survey (USGS). The CSCs were created to provide scientific information, tools, and techniques that managers and other parties interested in land, water, wildlife and cultural resources can use to anticipate, monitor, and adapt to climate change.

The vision for the Southwest Climate Science Center (SW CSC) is to foster effective collaboration between scientists and resource managers in anticipating, monitoring, and adapting to climate variability and change in the Southwest, and attain national distinction in developing best practices for translational climate science.

The SW CSC is hosted by a consortium of six institutions that comprise the Southwest Climate Alliance: University of Arizona, Tucson; University of California, Davis; University of California, Los Angeles; Desert Research Institute, Reno; University of Colorado, Boulder; and the Scripps Institution of Oceanography at the University of California, San Diego. The University of Arizona serves as the central location and administrative center for the SW CSC. In addition to the host institutions, the SW CSC also includes important partner institutions. (https://www.doi.gov/csc/southwest/about**))**

Appendix E: Facilitator Biographies

Karletta Chief is an Assistant Professor and Extension Specialist in the Dept. of Soil, Water, and Environmental Sciences at the University of Arizona. As an assistant professor, the goal of her research is to improve our understanding, tools, and predictions of watershed hydrology, unsaturated flow in arid environments, and how natural and human disturbances affect soil hydrology through the use of physically based methods. Karletta's research also focuses on how indigenous communities will be affected by climate change. Karletta is Diné originally from Black Mesa, AZ.

Carolyn Enquist is Deputy Director of the Southwest Climate Science Center. Carolyn's areas of expertise include biological models for adaptation, climate assessment, decision-support, ecology and restoration, interdisciplinary problem-solving, monitoring and remote sensing, natural resources management, stakeholder engagement and outreach, training, vulnerability assessment, adaptation planning processes and workshop facilitation, and conservation biology.

Daniel Ferguson directs the Climate Assessment of the Southwest (CLIMAS) program housed in The University of Arizona's Institute of the Environment. CLIMAS brings together multiple academic disciplines with a variety of experts from outside the academy to help regional decision makers prepare for and respond to climatic events and climate changes. Dan's research focuses on three related areas: climate impacts and adaptation strategies in Native American communities in the Southwestern US; methods and processes for building scientist/practitioner partnerships to address climate-related issues in society; and communication of science.

Zack Guido is the Program Manager and Research Scientist for the University of Arizona's International Research and Applications Program (IRAP) and research affiliate at the Climate Assessment for the Southwest (CLIMAS). Guido's research interests include quantifying climate impacts on water resources (including glaciers), co-producing end-to-end climate services, and advancing climate risk management through participatory processes.

Katharine Jacobs is a faculty member in the Department of Soil, Water and Environmental Science at the University of Arizona and is Director of CCASS in the Institute of the Environment. Her research interests include water policy, connecting science and decision-making, stakeholder engagement, use of climate information for water management applications, climate change adaptation and drought planning. Kathy served as director of the third U.S. National Climate Assessment and was lead advisor on water science and policy, and climate adaptation, within the Office of Science and Technology Policy.

Julie Maldonado is a lecturer in environmental studies at the University of California, Santa Barbara. She specializes in working with indigenous peoples on displacement and vulnerability issues, with a focus on indigenous communities in coastal Louisiana who have been especially impacted by sea-level rise. She was a lead author on the third National Climate Assessment's Indigenous Peoples, Land, and Resources chapter and edited a special issue of *Climatic Change*, "Climate Change and Indigenous Peoples in the United States: Impacts, Experiences and Actions."

Alison Meadow is Staff Scientist for CCASS at the University of Arizona. Her areas of expertise include drought, human dimensions of climate change, interdisciplinary problem-solving, program evaluation, stakeholder engagement and outreach, tribal adaptation and science support. Her research projects include helping to develop a climate adaptation plan for and with the Tohono O'odham Nation, evaluating the co-production of climate science knowledge in the SW Climate Science Center, helping develop a drought monitoring program for the Hopi Dept. of Natural Resources, and writing an ethnography of the NOAA RISA program**.**

Appendix F: Links to Tribal Adaptation Plans Presented at Summit

- **Alaskan Native Village of Newtok**
  Mertarvik Relocation Plan
  https://www.commerce.alaska.gov/web/Portals/4/pub/Mertarvik_Relocation_Report_final.pdf

  Mertarvik Strategic Management Plan
  https://www.commerce.alaska.gov/web/Portals/4/pub/Mertarvik_Strategic_Management_Plan.pdf

- **Jamestown S'Klallam Tribe**
  Climate Vulnerability Assessment and Adaptation Plan
  http://www.jamestowntribe.org/programs/nrs/climchg/JSK_Climate_Change_Adaptation_Report_Final_Aug_2013s.pdf

- **Oglala Lakota**
  Oyate Omniciyé: Oglala Lakota Plan
  http://www.oglalalakotaplan.org/wp-content/uploads/2013/11/Oyate+Omniciye+Final+Draft.pdf

- **The Red Lake Band of Chippewa**
  Mitigwaki idash Nibi (Our Forests and Water): A Climate Adaptation Plan for the Red Lake Bank of Chippewa Indians
  http://www.mfpp.org/wp-content/uploads/2011/04/Red-Lake-Forest-Water-Climate-Adaptation-Plan-Final-2014.pdf

- **Shinnecock Nation**
  Plan is not publicly available

- **St. Regis Mohawk Tribe**
  Climate Change Adaptation Plan for Akwesasne
  http://www.srmt-nsn.gov/_uploads/site_files/ClimateChange.pdf

- **Swinomish Indian Tribal Community**
  Swinomish Climate Change Initiative Climate Adaptation Action Plan
  http://www.swinomish.org/climate_change/Docs/SITC_CC_AdaptationActionPlan_complete.pdf

- **Yurok Tribe**
  Yurok Tribe and Climate Change: An Initial Prioritization Plan
  http://www.yuroktribe.org/departments/ytep/documents/YurokTribeandClimateChangePrioritizationPlan.pdf