NATIVE AMERICAN TRIBES AND NATIONS' CLIMATE ACTION

Examination of climate policy of a selected actor

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I. Executive Summary

This report examines three different Tribal Nation's responses to climate change through adaptation and mitigation actions in Washington State. The tribes of focus are Lummi, Swinomish, and the Confederate Tribes of Yakama Nation, selected to investigate tribal networks (Evans et al., 2020). Additionally, the Yakama Nation was selected to compare how inland are affected by and striving to manage climate change based on their proximity to a river rather than coastline, like the Lummi and Swinomish. Though responsible for minimal contributions to greenhouse gas emissions, a primary cause of anthropogenic climate change, these self-sovereign Tribal Nations have established thorough, well-developed responses to the climate change crisis. In addition to being effective for their own uses, these proposals can serve as a model for other governments in developing implementation plans.

II. Federal Government Interaction with Tribal Government

In accordance with a memorandum issued by the White House in 1994 (under President Clinton), the US federal government is to interact with Tribal Governments in a government-to-government manner. This means that interactions between the federal government and tribal government must be open to the public/have high transparency, that development of plans, projects, etc. incorporate considerations and concerns for tribal governments, and that cooperation and consultation between the two governments be common practice (*Government-to-Government Relations*, 2016). The relationship between the US federal government and sovereign tribal nation governments is unique in this 'government to government approach,' and the US Supreme Court has consistently upheld tribal sovereignty. Further, state and federal government have no authority over tribal governance unless Congress has explicitly designated it. This has occurred in several situations, such as specific crimes that were declared to be punishable under federal law (*Government-to-Government Relations*, 2016). Thus, although Congress has power over tribal governments in limited circumstances, it is assumed that tribal governments have the right to self-govern because their rights have been established as a self-sovereign government.

The U.S. Constitution Explicitly Recognizes Four Sovereigns
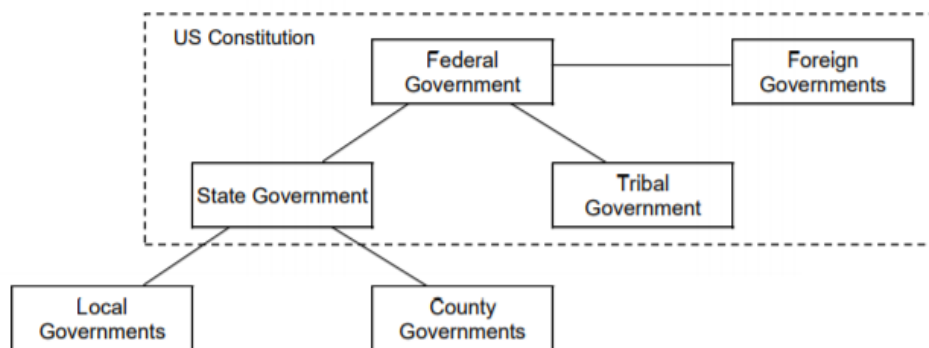
Source: Historical Tribal Sovereignty & Relations – Native American Financial Services Association (Government-to-Government Relations, 2016)

III. SWINOMISH RESERVATION CLIMATE ADAPTATION ACTION PLAN

A. POLICY ACTOR

The Swinomish Indian Reservation on Fidalgo Island in Western Washington stretches across 15 square miles and includes forested uplands and tidelands. The Reservation comprised of coastal Salish groups has a culture of ceremonial fishing and is strongly dependent on the natural resources that surround it. The Swinomish village on the Reservation serves to support and integrate their culture, governance, and resource-use practices.

Ensuring a climate-resilient community requires initiatives to mitigate the causes of climate change and adapt to its impacts. Through grant sources and support from the Administration for Native Americans (ANA), a Strategy Advisory group - the Swinomish Office of Planning and Community Development, University of Washington Climate Impacts Group (CIG), comprising representatives of Skagit County, the Town of LaConner, Shelter Bay, and Tribal Representatives, was formed to develop a technical assessment of the effects of climate change, and strategies to respond to climate change impacts across four resource categories - Coastal Reserves, Upland Resources, Physical health, Community Infrastructure and Services, and Cultural Traditions and Community Health.

Figure 1*: Swinomish Climate Assessment Strategy (Office of Planning and Community Development, 2010, p. 11)*


The primary regions and resources vulnerable to impacts of climate change in the Swinomish Reservation include the risk of sea level rise, tidal/storm surges, wildfires, loss of estuaries and salmon rearing areas, permanent inundation, loss of cultural grounds and traditional native species, and health risks as a result of pollution and drier climates. The impact of climate change extends across the entire Reservation and thereby emphasize the need for climate action responses undertaken by the Tribal community and governmental authorities.

B. THE POLICY TOOLS

The Swinomish Reservation employs multiple policy tools to evaluate and address projected impacts of climate change across the four resource groups. Policy tools are evaluated through the six objectives they seek to achieve.

Figure 2: *Objectives in policy design (Office of Planning and Community Development, 2010, p. 38)*
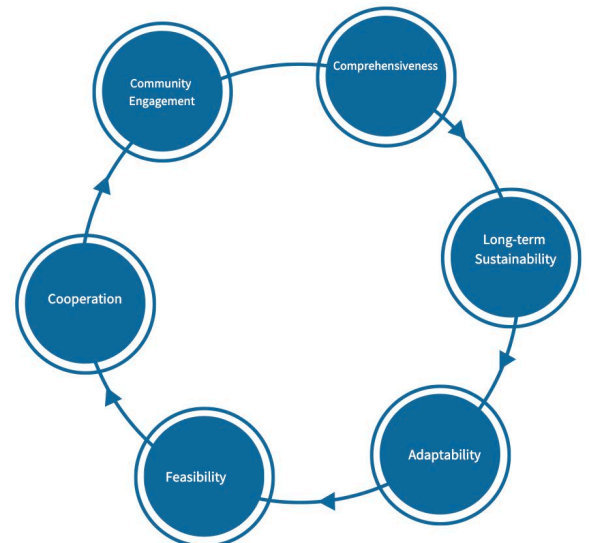
Upon satisfying these objectives, adaptation solutions are developed using policy tools that fall into the following categories:

Table 1: *Policy Tools for Climate Action (Office of Planning and Community Development, 2010, p. 37)*

Policy Tools	Action
Incentives, Programmatic, Non-Regulatory Approaches	- Incentives and disincentives - Volunteer Action groups - Formation of open space buffers
Regulatory/Code-controls	- Zoning, building codes - Impact screening - Risk response and management plans
Education and Technology Solutions	- Engineering standards/designs - Fortification strategies - Preventive measures - Relocate horizontally and vertically - Tribal Networks
Automaticity	- Litigation - Legislation
Prevention Planning	- Continuous revision of plans - Climate risk assessment - Identification and consensus of climate data
Emergency Preparedness (Protective)	- Management plans for extreme weather events - Enhanced training/workshops - Citizen Action Plans - Live Simulation Exercise

For the purpose of this analysis, the policy tools described above will address mitigation and adaptation targets across the 4 categories of importance to the Swinomish Indian Reservation that are of high risk and vulnerability alongside its capacity of implementation and success as a result of transparency of the strategy.

Coastal Reserves

The predominant impacts of climate change on coastal reserves include inundation from sea level rise and storm surge, changes in biodiversity as a result of increasing temperature and acidity, risks to infrastructure, local livelihood etc.

Table 2: *Climate Adaptation Plan for Coastal Reserves (Office of Planning and Community Development, 2010, pp. 45-51)*

Impact	Adaptation Strategies	Tools	Partners	Timeframe for implementation	Goals of Strategies
Inundation from Sea Level Rise and Storm Surge	Map risk zones and raise repair and replacement efforts Increase shoreline setback distance Establish rolling easements	Regulatory, Engineering, Incentives (Combination of Tools)	Tribal Community, Skagit County, Landowners, Federal Government, Funding Agencies	3-10 years	Preserve pristine natural systems Identify/protect vital ecosystems Equitable Management in

Impact	Adaptation Strategies	Tools	Partners	Timeframe for Implementation	Goals of Strategies
	Raise dikes to hold back tidal waters Remove fill along shoreline channels to promote species migration Increase sediment input in tidal ecosystems				cultural, economic, and environmental goals Protect tribal rights Reserve and Restore
Decreased Habitat Viability due to changing Water Parameters	Aquaculture techniques to facilitate proper growth and development of shellfish species	Regulatory, Engineering, Programmatic Approaches (Combination of tools)	Tribal Community, Fisheries, Skagit River System Cooperative (SRSC)	3-10 years	Integrate physical and spiritual health Maintain and Enhance biodiversity richness

Upland Resources

The primary impacts of climate change on upland resources include wildfires, pest infestations, disease, heat stress, migration of native forest species, diminishing freshwater resources such as groundwater, and saltwater intrusion.

Table 3: *Climate Adaptation Plan for Upland Resources (Office of Planning and Community Development, 2010, pp. 54-56)*					
Impact	**Adaptation Strategies**	**Tools**	**Partners**	**Timeframe for Implementation**	**Goals of Strategies**
Increased Wildfire Risk in Urban and Forestlands	Fire Wise program in risk zones to mitigate fuel pollutants Integrate fire prevention within environment and infrastructure Train for response action with fire department	Education, Emergency Preparedness, Self-Governance, Engineering Approaches (Combination of tools)	Tribal members, Fire Department, Homeowners, Skagit County, Department of Natural Resources	1-3 years	Manage sustainable land and forest use Protect indigenous forest species of cultural importance Promote and maintain biodiversity richness

Physical Health

The effects of climate change can pose serious threats to human health, including the spiritual well-being of members through heat stress, pollution, and contamination of resources of importance to their ceremonial practices.

Table 4: *Climate Adaptation Plan for Physical Health (Office of Planning and Community Development, 2010, pp. 59-62)*					
Impact	**Adaptation Strategies**	**Tools**	**Partners**	**Timeframe for Implementation**	**Goals of Strategies**
Heat related illness	Establish education programs on health services available Media and technological advancements to indicate weather changes Retrofit infrastructure for cooling Facilitate development in locations optimal for cooling	Prevention Planning, Engineering solutions, Self-governance, Programma-tic approaches, Health standards	Tribal members, State Health Department, Social Services, Fire Departments, Tribal health centers, Rehabilitation centers, Architects, Swinomish Housing Authority	1-3 years	Improve access and quality of tribal health centers and services (Tribal Networks) Educate tribal members on health risks as a result of climate impacts Protect tribal treaty rights to improve spiritual/physical health
Increased Risk of Respiratory Diseases	Monitor and report respiratory diseases by individual cases	Regulatory, Programma-tic Approaches, Self-governance	Tribal community, Swinomish Tribal Health Centers, Industries, Agencies, Funding	Continuous	Practice safe and equitable practices Provide continuous assessment reports for individuals and keystone species
Toxic Seafood Contamination	Monitor seafood and the Salish Sea Introduce Aquaculture techniques	Regulatory, standards, flexibility of policies	Tribal community, Funding Agencies, Fisheries, SRSC	3-10 years	

Community Infrastructure and Services

The Swinomish Reservation has developed adaptation strategies within transportation services, utilities that include water resources, sewer management, storm drainage, and lastly emergency preparedness and services to enable access to traditional practices and the Reservation itself.

Table 5: Climate Adaptation Plan for Infrastructure and Services (Office of Planning and Community Development, 2010, pp. 64-72)

Impact	Adaptation Strategies	Tools	Partners	Timeframe for Implementation	Goals of Strategies
Management of low-lying roads and bridges	Protect roads and bridges to and from the Reservation by elevating dikes Relocate, establish vacating routes, and alternate safer routes Avoid construction in risk zones	Engineering solutions, Regulatory/ standards, Protection plans and cooperation with Agencies (Combination of tools)	Tribal members, Skagit County, Engineers, Funding Agencies, Department of Transportation, Risk Managers	10 years or more	Sustainable and equitable management of transportation networks, emergencies, and businesses managing coastal resources Avoid infrastructure development along high-risk zones
Reduced water supplies due to decreased sources or flooding	Introduce water management plans in drought conditions Credit exchange to manage water use Establish grey wastewater mechanism disinfection programs Increase energy efficiency of appliances Establish water storage facilities for groundwater, rainwater, runoff Manage stormwater facilities	Engineering solutions, Education, Incentives, Standards, Emergency Preparedness (Combination of tools)	Tribal members, Health Services, Swinomish Utility Authority, Skagit County, Environmental Protection agency, Department of Natural Resources, Department of Ecology, Puget Sound Energy	1-3 years	Maintain water supplies for human, land, and emergency uses Revise management of policies Recharge facilities for water resources (rivers and groundwater) Invest in green technology and long-term management of resources Improve reliability of communication systems (Tribal Networks) Integrate efficient green energy systems within infrastructure and emergency/disaster risk protocols and management
Service Disruption of Communication and Energy Systems	Develop and Implement alternate energy systems	Engineering solutions, Programmatic approaches, incentives, Self-	Tribal members, Service providers, Department of Energy,	3-10 years	

| | Support green economy

Introduce alternative communication systems within the Reservation | governance, Cooperation (Combination of tools) | Federal Agencies, Funding Agencies | | |
|---|---|---|---|---|---|

Mitigation Strategies

Table 6: Climate Mitigation Strategies (Office of Planning and Community Development, 2010, pp. 85-86)		
Strategies	**Action**	**Goals for Strategies**
Resource Management and Conservation	Prioritize energy and resource conservation

Partner with Skagit County, Department of Natural Resources, Energy Departments, Federal/State Governments, Funding Agencies | Reduce energy costs and use

Reduce GHG emissions

Participate in green livelihood and practices

Implement sustainable practices in personal and economic ventures

Establish carbon sequestrating and incentives through credit exchange

Adapt strategies across various sectors |
| Change in Workhours | Save energy use through reduced commute

Reduce carbon footprint | |
| Green Energy | Prioritize green energy sources for homes, health centers and other facilities

Reduce greenhouse gas (GHG) emissions | |

C. IMPLEMENTATION

The Swinomish Reservation recognizes the need to develop effective climate change strategies and the implementation of policies through the support of the reservation's Strategy Advisory group. In some cases, establishing a strong support system requires external funding which is not always available to tribal communities, hence it becomes important to integrate resilience in policy design and implementation.

Table 7: Strategies for Policy Implementation (Office of Planning and Community Development, 2010, p.76)	
Objective	**Action**
Flexibility	- Common solutions for common impacts
- Cost effective
Community Outreach	- Establish equity in policy design
- Implement training for climate action

Applicability	- Prioritize immediate impacts - Integrate traditional knowledge alongside modern technology in policies
Policy Design	- Recognize federal barriers - Adapt to incentivize strategies at all levels
Streamline	- Streamline actions to cope with political inertia/lack of funding
Communication and Partnerships	- Recognize regional/national stakeholders - Initiate cooperative efforts with other tribes to decolonize territories and protect resources

D. TRANSPARENCY

Tribes with the greatest economic, environmental, and social stability have adapted their constitution to encourage transparency in both government and citizen engagement for successful policy implementation and evaluation.
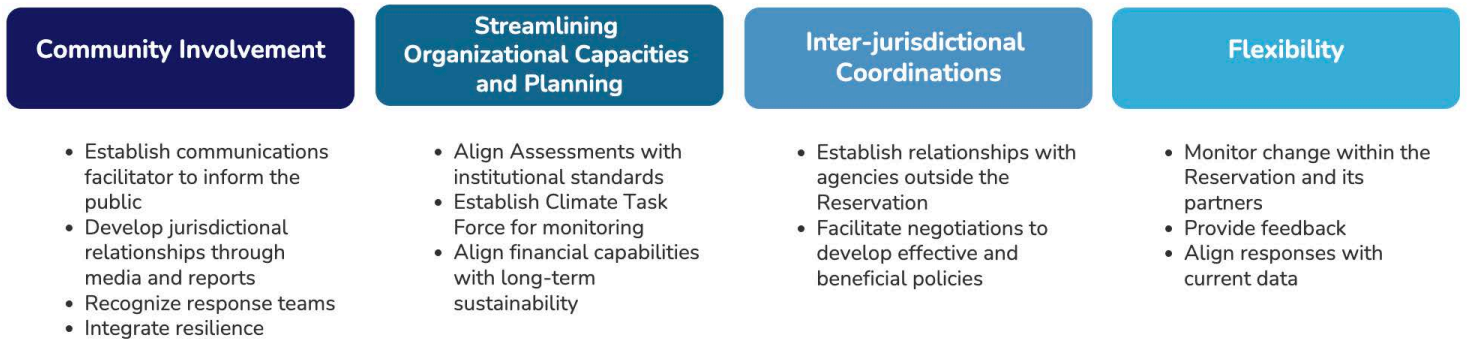

Figure 3: *Strategies for Policy Transparency (Office of Planning and Community Development, 2010, pp. 81-84)*

IV. LUMMI NATION CLIMATE RESPONSE PLAN

A. POLICY ACTOR

Lummi Nation is located in Northwestern Washington, just west of Bellingham and about 20 miles south of the Canadian border. They are the third largest tribe in Washington State, serving over 5,000 members and managing nearly 13,000 acres of tidelands on the Reservation (Kuhlman, Freidmund, & Gabrisch, 2016). As a self-governing tribe, they have developed the Lummi Nation Climate Change Mitigation and Adaption Plan (CCMAP), created both to reduce climate change impacts and to adapt mitigation measures to minimize impacts that have been set in motion and cannot be avoided. At this stage, many of the tools outlined in the CCMAP are recommendations or plans based on the tribe's evaluations of climate change impacts and vulnerability, rather than concrete and actionable goals.

The report begins with proposing the following three objectives to confront climate change impacts on the natural resource, social and built environment fronts:

Table 1: Lummi Nation Objectives to Combat Climate Change:	
I.	Review existing climate change impacts assessments and scientific literature relevant to the Puget Sound region to evaluate projected climate change impacts on the Reservation.
II.	Assess the vulnerability of the natural systems (i.e., water resources, coastal resources, forest resources, and fish, wildlife, and traditional use plants), social systems (i.e., human health, emergency services, and cultural resources), and built systems (i.e., land use, transportation, and utilities) on the Reservation to climate change impacts.
III.	Develop a range of mitigation and adaptation strategies that may be implemented to reduce identified vulnerabilities and make the Reservation and the Lummi Nation more resilient to climate change.

Anticipated ecosystem changes due to climate change that will impact Lummi Nation include sea surface temperature increases, increased rainfall during winter and decreased during summer, rising sea level, increased storms, changes in streamflow seasonality and quantity, and ocean acidification (Kuhlman, Freidmund, & Gabrisch, 2016). The tribe recognizes that the severity of these changes will be determined by the degree to which humans respond to climate change, and thus they feel an urgency to develop an action plan now.

Vulnerability Assessment

The foundation of CCMAP is a framework that observes the way climate change affects natural and built environments, and social structures within the Reservation. This model provides a foundation for Lummi Nation's vulnerability report and serves as the basis by which they plan and prioritize their mitigation and adaptation proposal.

Table 2: framework for assessing climate change sectors and vulnerability		
Environment	**Sector**	**Examples/Planning Areas**
Natural	Water, Coastal, and Forest Resources Fish, Wildlife and Plants	Freshwater – Groundwater and wetlands Coastal – Shorelines, tidelands and seawater Forests – Forest type, wildfire, landslides and disease Wildlife – Types of salmon, shellfish, upland wildlife, plants
Social	Human Health, Emergency Services, and Cultural Resources	Human health – Heat related illness, natural disasters leading to injury, respiratory and infectious disease, mental health Emergency Services – Fire and police Cultural Resources – Depletion of irretrievable resources critical to Lummi Nation culture
Built	Land Use, Transportation and Utilities	Land use - Floodplain infrastructure, residential development and agriculture Transportation – Road system integrity and access Utilities – Water supply, wastewater collection and treatment, energy supply, stormwater management

In the vulnerability assessments, the above sectors are each assigned a rating to identify the tribe's vulnerability in relation to them, ranking from low to high. This mapping approach allows for a

comprehensive perspective of climate change adaptation that looks at the intricacies of a system, rather than attempting a surface level approach, which would overlook key aspects of climate change impacts.

Adaptation and Mitigation Plan

The Lummi Nation acknowledges that both adaptation and mitigation efforts for climate change are crucial. Despite the fact that their collective global carbon footprint is low, they recognize that a unified approach to climate change is critical to success and that their geographic location puts them at higher risk for climate change impacts. They establish that mitigation efforts are required to reduce the greenhouse gas concentrations in the atmosphere, which will guide the severity of climate change impacts over the coming decades (Kuhlman, Freidmund, & Gabrisch, 2016). Adaptation measures also need to be implemented to manage the damage that has already occurred.

As such, Lummi Nation has developed five adaptation and mitigation recommendations for actions that can take place on the reservation, seen below.

Table 3: Lummi Nation Climate Change Adaptation and Mitigation Actions:
1) Create a Climate Preparedness Committee with a minimum of one representative from a designated group of organizations. This includes but is not limited to; the Lummi Indian Business Council, the Natural Resources Department, the Cultural Resource Department, the Police Department, and Tribal Sewer and Water, etc.
2) Establish a community education and outreach program to increase understanding of climate change, knowledge of how to prepare and foster community support for mitigation, and adaptation plans.
3) Emphasize a focus on the following high priority items: improving energy efficiency (building, behavior and transportation), emergency preparedness and response, reducing flood and wildlife risk, reduction of stressors on salmon populations, improvement of water quality in shellfish beds, restore and protect Nooksack River basin, and protect drinking groundwater systems.
4) Further clarify mitigation and adaptation strategies based on feedback from community and the Climate Preparedness Planning Committee for implementation.
5) Identify and maintain funding to implement strategies and identify the tribal entity who will take on the task of implementation.

These approaches have been developed to facilitate prompt and feasible responses to climate change, which can be implemented and are built for long-term changes.

B. POLICY TOOLS

Lummi Nation highlights the three highly utilized climate change policy tools. These include regulatory, non-regulatory and engineered actions (Kuhlman, Freidmund, & Gabrisch, 2016). *Regulatory actions* consist of proposed rulemaking, including implementing carbon emission limits, zoning restrictions and regulatory standards for building codes. *Non-regulatory actions* focus on minimizing actions rather than implementing them, and include incentives to reduce carbon emissions, disincentivizing high risk activities, providing funding for those who need financial assistance due to being designated as high risk (funds for relocation, for example), and land acquisition. Finally, *engineered goals* refer to development of technology such as green infrastructure and renewable energy. Items that may fall outside of these categorizations but are still important to efforts include improvements on ecological observation and

natural hazard planning (Kuhlman, Freidmund, & Gabrisch, 2016).

C. POLICY PROVISIONS AND TRANSPARENCY

Actions that Lummi Nation have either taken or intend to take are extensive. In 2012, they created the first federally backed tribal mitigation carbon bank. This process involved restoring nearly 2,000 acres of riverine ecosystem near the Nooksack and Lummi rivers, which will serve as a carbon sequestration site (*Lummi Nation*, 2012). This area will be used to sell carbon credits to developers who must offset the impacts of their development on wetlands and other habitats.

Lummi Nation was also instrumental in fighting the Gateway Pacific Terminal coal terminal at Cherry Point. This involved Lummi Nation collaborating with environmental, citizen and faith-based groups to develop a coalition demanding that Lummi Nation treaty rights be upheld and that the Army Corps of Engineers deny the GPT permit request (Allen, Bird, Stoney, & Dolsak, 2016). This victory has been cited as an example of collaborative groups coming together, led by a tribal government, to deny furthering fossil fuel infrastructure, which would have had enormous negative impacts on Lummi Nation and the surrounding community.

The CCMAP has developed goals for each of the items suggested in the vulnerability assessment table (Table 2). The resulting product is the Mitigation and Adaption Action Plan for 2016-2026, a ten-year proposal for further defining how these goals will be reached via the Climate Preparedness Planning Committee.

As mentioned previously, the CCMAP proposal has focused more on vulnerabilities and risks posed rather than an action plan for implementing these goals. For instance, the transportation mitigation section of their proposal suggests carpooling or walking to destinations more frequently, and an investment in more pedestrian-friendly infrastructure rather than a regulatory, clearly defined policy developed in an effort to measurably reduce carbon emissions. Likewise, adaptation goals and strategies propose items such as "strengthen regulatory flood risk reduction measures," and "continue to assess coastal areas for flooding and erosion risks" when outlining strategies for reducing property damage from flood risk. This analysis did not find supplemental materials that further define these goals or the financial/funding plans to meet them. However, some actions have been taken to further advance renewable energy infrastructure prior to this proposal's publication, such as a wind power assessment preformed in 2012, geothermal heat devices and advances on implementing solar energy and LED lighting (*The Lummi Nation: Pursuing Clean Renewable Energy*, n.d.).

Though the Lummi Tribe has provided a wealth of information in their CCMAP document, it appears that they will need to continue fine-tuning this instrument to transform it into a policy tool that can be actionable, provides initiatives, and allow for measurable achievements and monitoring of how progress is unfolding. As the specifics of implementation for these goals have yet to be defined, transparency of actions taken to achieve these targets is not yet available.

V. CONFEDERATE TRIBES OF THE YAKAMA NATION CLIMATE ADAPTATION PLAN

A. POLICY ACTOR

The Confederated Tribes of the Yakama Nation are composed of fourteen bands and tribes, the: Kah-milt-pah, Klickitat, Klinquit, Kow-was-say-ee, Li-ay-was, Oche-chotes, Palouse, Pisquose, Se-ap-cat, Shyiks, Skinpah, Wenatshapam, Wishram, and Yakama. Their land spans 1.2 million acres in the Yakima Basin of south-central Washington comprised of primarily forest, lower-level agriculture, and co-manages several rivers including the Columbia, Wind, White Salmon, Klickitat, Yakima, Wenatchee, Methow, Entiat and Okanogan (Climate Adaption Plan for the Territories of the Yakama Nation, 2016). Representatives from each of the fourteen bands and tribes form the Yakama Tribal Council. A general council is made up of all tribal members eighteen years and older who vote on matters with a common belief that their existence, culture, and resources rely on the respectful management of land and water. The Yakama Nation's mission is to sustainability manage resources while maintaining respect to the land and their culture. Together, the youth and older generations of the united tribes work to formulate efforts toward mitigating climate change effects.

The Climate Adaption Plan of the Territories of the Yakama Nation Version 1 was created in 2016 with the help of Cascadia Consulting Group, SAH Ecologia LLC, the University of Washington Climate Impacts Group, and the oversite of the Department of Natural Resources. Three objectives are stated in the climate adaption plan, the first being to combat climate change. The second focuses on involvement with tribal, local, and regional experts to develop vulnerability and risk assessments of resources of importance, and the third will focus on implementation of decided adaption actions (Climate Adaption Plan for the Territories of the Yakama Nation, 2016).

Table 1: Yakama Objectives for Climate Change
1. Identify important resources and cultural components most likely to be impacted by climate change.
2. Utilize work currently underway to recognize and help reduce climate change impacts.
3. Specify recommendation for vulnerability and risk assessments to priority interests and implementation of decided actions.

The plan is broken into four major parts: introduction & background, summary of climate change drivers and potential impacts, community resources, and environmental resources. Community resources include culture and heritage, health and public safety, tribal infrastructure, and lands and agriculture. Environmental resources include forestry, water and wetlands, fisheries, shrub-steppe and rangelands, wildlife and vegetation, and toxins.
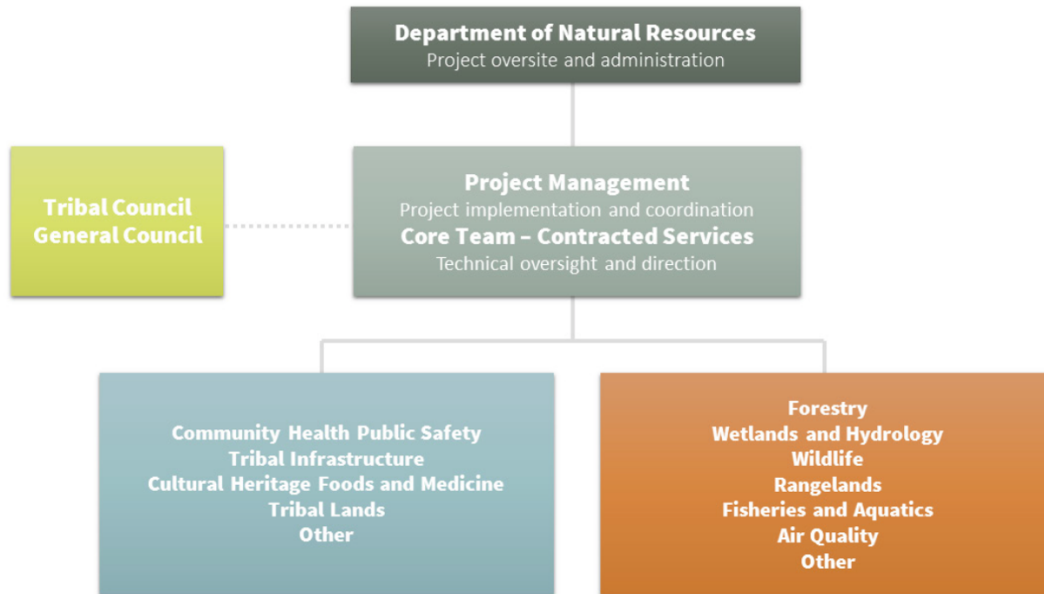
Figure 1. Management structure for the Yakama Nation climate adaptation planning process (Climate Adaption Plan for the Territories of the Yakama Nation, 2016).

B. POLICY TOOLS

Since the Yakama Nation is still in phase one, tools are theoretical with the foundation outline structured to workshops discussing what needs to be addressed, further studied, and then decide what solutions should be implemented. The breakdown of suggested solutions for research, monitoring, management and implementation are extensive, but the primary climate related actions are listed in Table 2.

Technical workshop topics	Planning workshop topics
Climate Change Impacts on Vegetation Management, Forestry, and Fire Risk (June 16)	Tribal Leadership and Engagement: Planning for Adaptation (May 27)
Climate Change Impacts on Wildlife and Shrub Steppe (June 17)	Consequences and Building Resilience (July 22)
Wetlands, Water and Fish (July 8)	Adaptation Actions to be Considered (August 13)
	Screening potential adaptation strategies (September 24)

Figure 2. 2015 table of workshop topics.

Table 2: Action sectors and items	
Sector	**Proposed solution item**
Culture & Heritage	- Develop outreach & education materials - Protect & enhance priority wetlands, riparian areas, and other ecosystems

Health & Public Safety		- Work with Washington State Department of Ecology & Department of Health to monitor health guidelines and air quality measures. - Develop local committees to proactively implement climate change adaption measures - Develop preparedness planning
Tribal Infrastructure		- Inventory water withdrawal sites for fire suppression and dust management use - Consider climate change considerations when proposing and assessing current and old ventures.
Lands & Agriculture		- Develop watershed models to describe forestry and snowpack interactions - Develop plan to obtain stable funding - Use models to improve seasonal water supply forecasts - Update 2011 Yakama Nation Water Resources Management Plan to consider climate change
Forestry		- Evaluate staffing and support needs for the Forestry Management Plan - Develop climate change models and hydrologic models to manage water access
Water & Wetlands		- Work with the State of Washington, U.S. Forest Service, establish priorities for removing roads & strategies for improving water-holding capacity - Educate & encourage water conservation measures in residents - Explore irrigation efficiency methods
Fisheries		- Use models for forecasted stream temperatures and changing hydrologic regimes - Evaluate practices at hatcheries - Increase restoration efforts in critical streams and riparian areas - Consider opportunities for water redistribution for critical basins - Evaluate potential to purchase water rights
Shrub-Steppe & Rangelands		- Study how vegetation patterns will change over time with climate change - Revise grazing policies for fire adaption
Wildlife & Vegetation		- Seek to better understand habitat connectivity needs in context of climate change - Protect and enhance priority floodplains and riparian areas - Restore riparian habitat - Consider operations nurseries and seed banks for temperature vulnerable species - Increased controlled burn program

Toxins	- Identify cleanup sights of contamination from groundwater flow due to climate change - Develop education and outreach strategy so people know of contamination issues

C. POLICY PROVISIONS AND TRANSPARENCY

The climate action plan for the Yakama Nation is four years old with many of the suggested strategies for solutions requiring more time for results to be seen. Funding accessibility, partnerships with outside entities, and implementation is in progress. Studying what critical resources, both for livelihood and culture, need to be prioritized which will affect the amount of funding and implementation actions required. Transparency, while not stated clearly in the adaption plan, is implied that the community is consistently involved with the process of workshopping topics, studying issues of concern, and creating solutions to be implemented.

VI. Intertribal Connectivity

As governments throughout the nation develop climate change adaption strategies, it becomes increasingly important that inter-governmental communication exists in an effort to develop more diverse, robust and comprehensive climate change responses. This may be particularly true in the case of state and federal governments and tribal governments; tribal governments can bring creative and unique planning to the question of climate change response, facilitating the generation of knowledge in policy exchanges (Evans, Dolsak, Plog, & Prakash, 2020). An approach such as this is especially useful as policymakers confront the novel, widespread and complex challenges posed by global warming.

VII. Comparison of Swinomish and Lummi Tribe's Climate Change Response

The recognition of tribal sovereignty and authenticity of regional traditions, cultures, and strategies towards the impacts of climate change, has introduced a Native Networks initiative to connect tribal lands across the US which encompasses a pilot program to foster community resilience and strong relationships in trade and resources across a wide range of tribal communities. The tribes of Western Washington and British Columbia First Nations dedicated to the sustainability of their community and resources recognize the importance of these relationships and attend regular gatherings to discuss issues of shared impacts, indigenous knowledge, and community wellness in developing coordinated climate action plans. In addition to this, the tribal network not only emphasizes the importance of incorporating traditional knowledge but has built a foundation through knowledge sharing across generations and regionalities.

With the Tribal Nations of Lummi and Swinomish in close proximity to the coast, they share a variety of adaptation and mitigation goals across common resources. A key distinction between the two tribes is that while Swinomish Reservation has strategic initiatives in place with well-developed timelines and funding arrangements, Lummi Nation still needs to secure funding support and develop actionable plans for their proposals. Further research is required to understand why there is such a difference in developmental progress between the two proposals, but there is a notable contrast between the two nations given the relative similarities in detail and depth of both tribal reports, and the extent to which many of the threats and mitigation/adaptation strategies overlap. This is indicative of tribal nation's response to climate change across America; while some tribes, such as Swinomish, are at the forefront of climate change adaptation responses, others are in the early developmental stages or in a period of having completed a great deal of research, but still in need of implementation plans (as is the case with Lummi Nation) (*How Native Tribes Are Taking the Lead on Planning for Climate Change*, 2020).

Upon analyzing these similarities and differences, it is evident that a tribal network can allow tribes to evaluate and revise their climate action plans while making active recommendations on efficient ways to implement policies that ensure practicality, tribal resilience, raise awareness on relevant climate issues, and integrate effective local knowledge alongside modern technology within the process of policy design. See Appendix 1 for additional information about similarities between Lummi Nation and Swinomish Reservation.

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IX. Appendix I

Climate Action Strategies of Lummi, Swinomish, and Yakama Nations

Climate Action Plan	Similarities	Differences
Assessment Criteria	- Evaluates and identifies vulnerable regions impacted through technical assessments and current climate data and models - Develops mitigation and adaptation strategies to build climate resilience	
Resources Impacted	- Natural systems – water/coastal/forest resources, keystone species, biodiversity richness - Social systems – health, cultural resources, emergency preparedness - Infrastructure – land-use, transportation, utilities	- Infrastructure: Swinomish Reservation develops alternative communication systems - **Yakama:** Focuses on invasive species impacts than biodiversity
Impacts of concern	- Sea level rise, storm surges, loss of cultural grounds, loss of native species, wildfires, health risks such as diseases and heat related illness	- **Swinomish:** loss of estuaries and salmon rearing regions, permanent inundation - **Lummi:** increased rainfall in winters and lack of in summer, ocean acidification, streamflow seasonality and quantity - **Yakama:** increased rainfall in winters and lack of in summer, flooding, and aquifer capacity
Framework of Plan	- Recognizes interdisciplinary approach across ecosystems and sectors - Prioritizes high risk zones - Conducts vulnerability and risk assessment through mapping	- **Swinomish**: Climate Action plan is more detailed as it addresses – adaptation, mitigation, implementation, and transparency in separate sections

	- Key Criteria: cooperation, long-term sustainability, flexibility, comprehensiveness, feasibility	
Goals of Mitigation Strategies	- Reduce greenhouse gas emissions - Focus on carbon reduction - Become energy efficient - Implement sustainable practices in personal and economic ventures - Creation of Climate Preparedness Committee/Strategy Advisory group composed of representatives from different departments - Engage in Community Outreach	- **Swinomish:** Plans to introduce carbon sequestration and incentives through credit exchange
Goals of Adaptation Strategies	- Improve energy efficiency across sectors - Introduces emergency preparedness and disaster risk management protocols - Reduce risk of floods and wildfires - Improve infrastructure and property damage - Improve biodiversity richness of salmon and shellfish species - Restoration and protection of water resources, upland resources, biodiversity, physical and spiritual health, and tribal rights - Equitable management of cultural, economic, and environmental resources	- **Swinomish:** Stronger emphasis on tribal networks through resource management, trade, communication, and health systems - **Lummi:** Emphasizes tribal connectivity longitudinally and laterally
Policy Tools	- Regulatory, Non-regulatory, Engineering solutions - Recognizes combination of tools for management	- **Swinomish:** Emphasis on education, preventive, and protection tools in separate categories with clear indication of how the policy tool is used, time of implementation, and potential partners - **Lummi:** proposals outline are recommendations or theoretical, recognizes need for more well-defined policy design
Implementation	- Emphasizes community outreach and external partnerships - Streamlines approaches based on funding capabilities and political inertia - Prioritizes immediate impacts and identifies tribal entities who will take on the task	- Although strategies are similar Swinomish categorizes these implementation strategies in more detail across six objectives

Transparency	- Emphasizes relationships (interjurisdictional and communal) to provide feedback - Develops climate task force for revision and monitoring of resources and changes - Ensures assessments align with institutional requirements	- Although strategies are similar, Swinomish categorizes its transparency goals in detail across four objectives