

The Swinomish Tribe and Tsleil Waututh First Nation: Correlation and Climate Sensitivity of Human Health and Environmental Indicators in the Salish Sea

In 2012, the North Pacific Landscape Conservation Cooperative (NPLCC) and the Northwest Climate Science Center (NW CSC) awarded over \$300,000 in funds to seven projects that facilitate the use of traditional ecological knowledge, or TEK, to inform natural and cultural resource management. As one of the tribal recipients of these funds, the Swinomish Tribe partnering with the U.S. Geological Survey proposed a project aimed at addressing climate impacts to their community. This profile explores the work of the Swinomish Tribe and their project partners, the Tsleil-Waututh Nation, and USGS as part of an ongoing effort to share information about these indigenous-led projects.



Climate Change Impacts for the Swinomish and Tsleil-Waututh Communities

The Swinomish Tribal Indian Community Reservation, located adjacent to the Skagit River delta in the Puget Sound, is under threat from climate change. The Swinomish descended from bands of peoples from the Skagit and Samish watersheds and the Salish Sea, as well as nearby waterways and islands. Traditional Swinomish territories have been identified as particularly vulnerable to increased storms and sea-level rise that are projected to occur as a result of climate change. Indeed, in 2006, the State of Washington Department of Ecology identified the Reservation as a high-risk area for sea-level rise. In response, the Swinomish Tribe began working to address climate impacts on their community through the development of an Impact Assessment Technical Report (2009) and a Climate Change Adaptation Action Plan (2010). Additionally, the Swinomish have been active participants in the Coast Salish Gathering, an intertribal group focused, in part, on addressing climate change (Donatuto and O'Neill, 2010).

In the lower mainland of British Columbia, the Tsleil-Waututh are the "People of the Inlet," having lived and prospered in the vicinity of Burrard Inlet, Indian Arm, and adjacent valleys since time out of mind. Their traditional territory incorporates what are now urban and agricultural areas in the south to the Fraser River and Boundary Bay, as well as wilderness watersheds northwards to Howe Sound and the Pitt River. Because of the location of their traditional territory, which is in close proximity to the Swinomish Tribe, and their traditional dependence on the foreshore and marine waters for subsistence, the Tsleil-Waututh people are also at high risk from climate impacts. By collaborating with the Swinomish Tribe, the Tsleil-Waututh Nation seeks to better understand potential climate change impacts, strengthen important connections with Coast Salish relatives that face similar threats, and generate the capacity to adapt.

Understanding Impacts Together

The team of researchers are examining environmental and community health indicators in relation to climate change using Indigenous Knowledge (IK)¹, which is central to the project, as well as western scientific research and assessments. After examining environmental and health indicators together, researchers will apply these indicators to landscape conservation to demonstrate how IK can be used to identify management priorities.

Working within an IK framework allows researchers to develop definitions for community and environmental health that are specific and relevant to their particular communities. This helps ensure that the project supports and protects Swinomish and Tseil-Waututh community health, in part by acknowledging the unique definition of what health means in these communities. This innovative project draws on local data to develop both community health and environmental indicators, so that results will be finely tuned to address needs specific to the Swinomish and Tseil-Waututh people. Furthermore, integrating IK into management decisions is an important step in asserting the rights and responsibilities of indigenous peoples to manage their homelands and traditional territories. This project represents a major contribution to climate adaptation planning, which historically has not included a focus on indigenous solutions, and often treats community health and environmental conservation as unrelated. To complete this project, the team is undergoing the following steps:

- Summarizing and synthesizing data about two existing environmental indicators of climate change impacts. The Swinomish Tribe is focusing on shellfish and shoreline armoring. The Tseil-Waututh Nation is focusing on foreshore and archaeological resources.
- Assessing community health impacts and priorities vis-à-vis forecasted climate change impacts using previously developed Swinomish community health indicators.
- Comparing and integrating community health indicators with climate forecasts.



Developing and Refining Community Health and Environmental Health Indicators

The project team is currently synthesizing existing environmental and community health data in both communities, as well as gathering new data on community health priorities through workshops. This data will be used to draft an environmental health report. For the Swinomish community, shellfish data, environmental data, forecasted habitat changes due to sea-level rise, and increased wave action will be presented at the community workshops. These workshops provide community members with an opportunity to discuss how community health may be affected and which health indicators to prioritize.

Workshop results will be used to create a climate sensitivity diagram that describes how climate change is affecting environmental and community health. This project is especially valuable because the model of integrating environmental and community health indicators may be applicable to other indigenous communities, and can be used as a template for climate change research by other communities.

Researching Indicators Relevant to Native Communities

In earlier research (Donatuto et al., 2011), the Swinomish Tribal staff found that there was no viable community health framework to help their community adapt to climate change impacts. Consequently, they set about creating a set of community health indicators, titled Indigenous Health Indicators (IHIs), with the goal of providing a relevant framework for tribal and First Nations communities (Donatuto, Gregory and Campbell, manuscript in review). The Indigenous Health Indicators are:

- Community Connection
- Natural Resources Security
- Cultural Use
- Education
- Self Determination
- Well-being

Having developed IHIs, researchers have now shifted focus towards refining previously-identified environmental indicators that were developed using regional data. According to an interview with Jamie Donatuto, the combination of regional and Swinomish-specific data will create a more relevant and comprehensive set of environmental indicators.

The Swinomish research team began developing indicators by working with the Puget Sound Partnership's list of environmental indicators. From these regional data, they narrowed down indicators that were especially relevant to their community, namely shellfish health and shoreline armoring. These indicators were chosen because the Swinomish Tribe has an established shellfish monitoring program with nearly two decades of data on shellfish density and species composition for several Swinomish Reservation beaches, and because inventories of amount and types of shoreline armoring are continuously being updated for the Reservation shorelines.

In their current work, the research team is using specific climate impacts on these two environmental indicators in conjunction with the community health indicators to predict how the environment and community will be impacted by different climate change scenarios. Having identified the indicators, Eric Grossman, Coastal Geologist of the USGS, then models and assesses the change to nearshore processes stemming from projected increases in storm surges, wave energy and sea level rise and their impact to shellfish health and gathering. The team then cross-references these changes with community health indicators to improve understanding of how these impacts will affect Swinomish community health (Donatuto and Grossman, 2013). Meanwhile, the Tsleil-Waututh are working to identify and refine their own community indicators. By modeling the response of chosen indicators to projected coastal climate change impacts, Swinomish and Tsleil-Waututh communities will have tools to evaluate vulnerabilities and identify solutions to enhance, protect, or restore valued eco-cultural environments.

Community Participation in Developing Indicators

Community involvement is a critical part of refining community health indicators. As part of this project, Swinomish researchers rely on community input to help shape and guide priorities that are presented to the tribal government. Greater involvement of tribal government leadership provides an opportunity for information to be vetted and distributed more widely to tribal membership. Community workshops facilitate the distribution of information about community health indicators and climate impacts, and aid in information gathering efforts regarding community priorities and concerns around health and climate impacts. Involving community members in the development of these indicators will help ensure successful use of IHIs and community support for adaptation strategies.



*Swinomish tribal members beach seining on the western shore of the Swinomish Reservation.
Photo by: Jim Gibsom*

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Native Leadership and Native Knowledge in Developing Adaptation Solutions

The work of the Swinomish and Tsleil-Waututh provides the possibility of a methodological template for other tribal communities seeking to adapt to climate impacts. Native communities have Indigenous Knowledge that is important in developing culturally appropriate and locally effective adaptation strategies, as well as access to Western scientific knowledge, and are thus in a unique position to effectively work with both of these knowledge systems. This particular approach offers a nuanced and tribally-driven exploration into how climate change impacts will affect ancestral lands, cultural practices, and community health without necessitating the release of any culturally sensitive or proprietary knowledge. By considering impacts and management priorities in tandem using a simple method that is easy to understand and employ by community members and decision-makers alike, these two communities are developing adaptation strategies that address climate impacts while also preparing each community to manage their land in a culturally appropriate and ecologically sound manner.

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Tribal Climate Change Profile Project:

The University of Oregon Environmental Studies Program and the USDA Forest Service Pacific Northwest Research Station are developing tribal climate change project profiles as a pathway to increasing knowledge among tribal and non-tribal organizations interested in learning about climate change mitigation and adaptation efforts. Each profile is intended to illustrate innovative approaches to addressing climate change challenges and will describe the successes and lessons learned associated with planning and implementation. For more information about the PNW Tribal Climate Change Project, contact Kathy Lynn at kathy@uoregon.edu, or visit <http://tribalclimate.uoregon.edu/>.

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