Salmon, shellfish and wildlife make up the cornerstones of our rich fishing and hunter/gatherer history and culture. For thousands of years, our ancestors practiced sustainable management to ensure that the resources would continue to be here for future generations. Today it is a constant struggle to preserve resources for our children and their children, as habitat continues to be degraded or lost, coupled with some of the worst environmental conditions ever seen.

– Scott Schuyler Upper Skagit Tribe

Upper Skagit Indian Tribe

Signatory to the Treaty of Point Elliott, the Upper Skagit Tribe’s historical villages were located on Samish and Skagit river watersheds. Upper Skagit was not granted a reservation at treaty time and most Upper Skagits refused to relocate to other tribes’ reservations. This act of defiance, along with their continued resistance to encroachment after treaty signing, forever persevered Upper Skagit identity and culture. Although not well known, Upper Skagit also was one of the original tribes to participate in the treaty fishing case, as many Upper Skagit were continually arrested in the 1960s and ’70s and thrown in jail for fishing. Today, Upper Skagit Tribal members continue to fish on the Skagit on or near their historical villages from present day Mount Vernon to Newhalem.
Recovery Plan Seeks to Restore and Protect

The land in the upper portion of the Skagit watershed is primarily under the jurisdiction of the federal government, located within the Mount Baker-Snoqualmie National Forest, multiple wilderness designations, and National Park and National Recreational areas. The middle section of the watershed and most of the watershed’s floodplains are largely managed as forestlands or rural residential in private, county or state jurisdiction. The land in the lower watershed or delta is managed by private agricultural users, as well as the only urban area under city jurisdictions within the watershed.

Human land use and resource extraction over the last 150 years have resulted in the degradation of salmon habitat. The continued degradation of productive salmon habitat in modern times largely relates to human infrastructure, and ongoing agriculture and forestry practices within the watershed.

Despite these land use alterations, the Skagit River still remains one of the most productive watersheds within Puget Sound drainage. The Skagit supports all five anadromous salmonids as well as steelhead, cutthroat and bull trout, and is currently the only watershed still managing wild native fisheries. The Skagit supports six native Chinook populations.

The Skagit Chinook Recovery Plan (2005) was developed from a life cycle model that identified the limiting factors for Chinook productivity.

These factors include:
- Loss of floodplain habitats and connectivity;
- Loss of delta habitats and connectivity;
- Loss of pocket estuaries and connectivity;
- Degraded riparian zones;
- Sedimentation and mass wasting;
- Hydromodification;
- Hydroelectric operations;
- Flooding; and
- Water quality impairments.¹

The habitat recovery strategy for Skagit Chinook populations sought to restore and protect habitat at a landscape level and focused on habitat-forming processes. Salmon productivity depends not on a single habitat or life stage but on all the habitats used by salmon throughout their life. The restoration actions were designed at a scale of independent populations as well as all the Skagit Chinook populations.

The habitat protection strategy for Skagit Chinook populations focused on how best to protect existing habitat from future degradation. These recommendations were largely developed for local and state regulatory agencies for decisions that pertain to land and water uses that may impact Chinook Recovery goals.

This strategy focused on:
- Instream flows;
- Basin hydrology;
- Stream channel complexity;
- Riparian areas and wetlands;
- Estuary and nearshore; and
- Fish passage.²

Project Restores Habitat, Function to Floodplain

Legacy land-use impacts on federal lands remain a challenge for salmon habitat restoration and recovery. The Upper Skagit Indian Tribe is leading a collaborative effort to identify a restoration plan for a large alluvial floodplain in the Goodell Creek watershed. The goal of this action would be to increase habitat productivity by reconnecting isolated and lost floodplain habitat, improving hydrology and water quality that would benefit multiple salmonid species including Chinook and steelhead. The majority of the watershed is under the jurisdiction of the North Cascades National Park Service and still provides near-pristine ecological function. However, the alluvial floodplain is managed under the Ross Lake National Recreational Area and is impaired by a century of floodplain occupation and infrastructure. The salmonid habitat impacts are related to loss of channel complexity, channel migration and floodplain processes due to roads, levees and undersized stream crossings.
Lack of Funding Limits Recovery Progress

Implementation of the Skagit Recovery Plan is lagging behind the pace originally anticipated during plan development in 2005. Restoration work has progressed with numerous capital projects focused on restoring fish habitat and passage. However, the Skagit Chinook Recovery Plan has faced significant funding shortages for large-scale restoration projects, as well as the political momentum and focus to maintain Chinook recovery as an achievable political goal. In addition, recovery based on voluntary actions of local and private landowners has slowed, as the obvious and easier projects have been restored. What remains now are large complex projects that will need multiple landowners and broad agency support due to the size and complexity of the remaining project types. Incentives and local leadership are needed to advance these difficult but critical restoration strategies to completion.

A major element of the 2005 Skagit Chinook Recovery Plan relies on revisions to local, state and national environmental regulatory programs to protect salmon habitat and habitat-forming processes. Progress on implementing these regulatory and incentive programs has also lagged behind recovery expectations. Numerous shoreline management plans within WRIAs 3 & 4 are still in the process of being updated, and alignment of all federal regulatory guidelines with Puget Sound salmon recovery is still lacking.

Recovery Efforts Show Signs of Improvement But Still Lagging in Key Indicators

At the 10-year mark of the Puget Sound Salmon Recovery Plan, a review of key environmental indicators for the Skagit Basin area shows an improvement in restoration efforts but degradation of water quality, marine and freshwater shoreline habitat conditions, and floodplain and riparian processes. In general, there is a short-term improvement in restoration efforts but degradation of habitat and to monitor and enforce compliance of existing regulations. In addition, funding shortfalls for large-scale projects contribute to the slow pace of progress.

Review of the trend for these key environmental indicators since the 2012 State of Our Watersheds Report shows improvement for some indicators and a steady loss for others in habitat status:

<table>
<thead>
<tr>
<th>Tribal Indicator</th>
<th>Status</th>
<th>Trend Since SOW 2012 Report</th>
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</thead>
<tbody>
<tr>
<td>Floodplain</td>
<td>In the Middle Skagit River floodplain, approximately 55% of the land area has been cleared of native forest and is being maintained and cleared for human development. This type of land use is considered an impaired floodplain forest and has not changed in at least the last 20 years. Continued floodplain forest impairment is one reason the Middle Skagit remains a juvenile rearing bottleneck to population production. As long as floodplain forests remain impaired, salmon conservation activities will not fully succeed.</td>
<td>Declining</td>
</tr>
<tr>
<td>Water Quality - Shellfish</td>
<td>While the Clean Samish Initiative is improving shellfish growing conditions in Samish Bay, as of spring 2015, Samish Bay’s downgraded status had not changed, while most of the bay is conditionally approved for shellfish growing. This closure impedes the Tribe’s ability to exercise treaty rights, as well as shellfish growers and recreationalists alike. Renewed efforts to review Samish Bay’s status and address upstream impacts to Samish Bay shellfish growing are needed.</td>
<td>Declining</td>
</tr>
<tr>
<td>Shoreline Modifications / Forage Fish Impacts</td>
<td>Since 2011, 4,300 feet of new marine shoreline armoring has been added in Island and Skagit counties. This accounts for 23% of all permitted marine shoreline armoring completed in Puget Sound. 193 (38%) of 510 miles of erosional drift cells in the northern Whidbey basin, Padilla and Samish bays have already been armored or modified. 94% of documented forage fish spawning occurs along erosional drift cells.</td>
<td>Declining</td>
</tr>
<tr>
<td>Shoreline Modifications / Freshwater</td>
<td>The Upper Skagit Tribe recently completed its survey of hydromodifications along streambanks within floodplains of the Skagit River watershed, with a focus on Chinook salmon habitat. They surveyed 220 miles of stream and found 499 structures and 32.1 miles of hydromodified bank along Chinook-bearing waters. There is not clear evidence of riprap being removed from the Middle Skagit River since 2005.</td>
<td>Declining</td>
</tr>
<tr>
<td>Impervious Surface</td>
<td>Between 2006 and 2011 impervious surfaces increased by 1 to 2% inside of the NPDES Phase II permit area of Anacortes, Mount Vernon, Burlington, Sedro Woolley and Concrete, and outside of the NPDES Phase II permit area in La Conner, and along I-5, State Route 9 and State Route 20.</td>
<td>Declining</td>
</tr>
<tr>
<td>Restoration</td>
<td>Upper Skagit Tribe has commenced the planning phase of the restoration and protection of the North Cascades National Park Complex to restore prioritized salmonid and floodplain habitat on Goodell Creek, a large Skagit River tributary focusing on levee and road removals and replacing or removal of stream crossings.</td>
<td>Improving</td>
</tr>
<tr>
<td>Climate Change</td>
<td>Climate change is real, and salmon ranges, timing and productivity are responding to this change. Fishery management needs to adapt more quickly to be effective with novel freshwater and ocean conditions. Upper Skagit Indian Tribe seeks support to improve capacities to detect and predict impacts of climate change on salmon populations. They also seek coordination to improve fisheries management to incorporate these novel conditions and the variability associated with them to ensure treaty rights can be exercised in the future.</td>
<td>Concerns</td>
</tr>
</tbody>
</table>

The Tribe continues to work toward the protection and restoration of healthy and functional nearshore, estuarine and river habitat, restoring those areas that are degraded, and conducting research to understand the organisms and the habitats they occupy.
Looking Ahead

Salmon habitat in the Skagit River basin and along the Skagit Whidbey basin near-shore was completely altered during the 20th century. Now a fight is underway to protect what is left and restore some sections of what was lost. Population growth and associated development within the Skagit basin will continue to pose significant challenges to salmon conservation and recovery efforts. Current trends indicate that land-use regulation reform is required and continued funding of habitat restoration activities is necessary in order to achieve the agreed-upon recovery goals.

For the Upper Skagit Indian Tribe, what is needed is an environment that supports increasing the number of returning salmon and a healthy Puget Sound. The watershed is currently home to over 120,000 residents with different perspectives on what is needed for the future of the Skagit River and Puget Sound, including all aquatic flora and fauna that are dependent on a healthy functioning ecosystem. Development and implementation of policy focusing the broad list of pressures and opportunities to salmon recovery is needed at the federal, state and local levels. A successful program must include a local coordinating body that provides a forum for the Tribal perspective and leadership. New alliances must form to help raise the concerns and align focus and energy for salmon recovery, like sport fishing organizations and the tribal fishing communities. In the near term, support must be made for protecting hatcheries as they represent the only viable tool for mitigation against lost habitat and protecting treaty rights.

Over the next few years, the Tribe will be focusing on additional upriver protection and restoration projects, with a focus on rebuilding the three Skagit Spring Chinook populations. These freshwater restoration projects will focus on both spawning and rearing habitats that benefit multiple salmonid species by using a habitat-forming framework. Given the pressures from human occupation and the ever-increasing climate change impacts on natural systems, every effort must be taken now to protect what is still functioning while restoring productivity and resiliency to reach salmon recovery goals and protect treaty rights.

Upper Skagit tribal fishermen harvest sockeye salmon near the confluence of the Baker and Skagit rivers. The harvest is an integrated stock of both hatchery and wild-spawned fish.

Upper Skagit tribal members practice their treaty rights by harvesting cedar (top left) and teach youth about the importance of their tribe’s culture and natural resources.
With a 3100-square-mile watershed, the Skagit River is the largest in Puget Sound and the third largest on the West Coast of the continental United States. It provides 30% of Puget Sound’s freshwater input. The Skagit River originates in British Columbia, and flows south into Washington state before continuing westward through Skagit County and into the sound. The upper half of the watershed is primarily within the National Forest and the North Cascades National Park, and the lower half mainly comprises private forest, agriculture, rural residential and urban residential lands. The Baker, Sauk and Cascade rivers all flow within the Skagit River watershed.

The Tribe’s administrative offices remain in the Skagit watershed east of Sedro-Woolley. Current Upper Skagit membership is 1,860 and is now the largest Tribal community in the Skagit basin. There are over 120,000 residents in the Skagit watershed. Population is projected to increase to an estimated 162,000 people by 2040.¹

The Upper Skagit Tribe has occupied lands along the Skagit River and throughout the watershed since time immemorial. The watershed once provided them with an abundance of fishing, hunting and gathering opportunities.

Since European settlement, land use in the watershed has been dominated by natural resource extraction. The foothills and mountains have been mainly used for wood products, mining and outdoor recreation. The river valleys, the delta and the coastal areas have been used for agriculture, industry, commerce and residential development. The Skagit River is home to all five species of Pacific salmon, as well as steelhead. It has the healthiest and largest runs of wild Chinook and pink salmon in Puget Sound.²

The last 150 years of human land use has resulted in declines in Chinook and other salmonid productivity, yet the Skagit River watershed remains relatively healthy. The Skagit Chinook Recovery Plan provides a strategy for both protection and targeted restoration. It will take federal, tribal, state and local leadership to provide a consistent yet adaptive plan to control the future impacts of land use in the watershed.

Data Sources: SSIAP 2004,¹ USFWS 2014,¹ WADNR 2014a,¹ WADNR 2014b,¹ WADNR 2014c,¹ WADOT 2013,¹ WAECY 1994,¹ WAECY 2011a,¹ WAECY 2013a,²
Fecal Coliform Pollution Threatens Tribal Shellfish Harvest in Samish Bay

The Clean Samish Initiative is improving conditions for shellfish growing and harvest in Samish Bay. However, high counts of fecal coliform bacteria continue to keep most of Samish Bay’s commercial shellfish areas either Conditionally Approved (closed during high rain events) or Prohibited (closed year-round) to shellfish growing, leaving only a small section in the north of Samish Bay Approved (open year-round) for shellfish growing.\(^1\)

Samish Bay is important for shellfish resources, both economically and ecologically. User groups include shellfish growers, recreationists and members of five different tribes who have reserved rights to collect fish and shellfish from the bay. The ability to exercise this right has been put into jeopardy by fecal pollution runoff through the entire Samish watershed.

The Samish Bay shellfish closures are impeding the Tribe’s ability to exercise treaty rights to provide resources to tribal members. Future economic development plans of establishing a shellfish aquaculture business are still uncertain due to lack of tangible success in addressing point and nonpoint pollution in this watershed.

**GIS estimate of acres of shellfish growing area in Samish Bay and their January 2016 status**

<table>
<thead>
<tr>
<th>2016 Washington Department of Health Shellfish Growing Area Status in Samish Bay (Acres)</th>
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<tbody>
<tr>
<td>Prohibited</td>
</tr>
<tr>
<td>------------</td>
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<tr>
<td>1282</td>
</tr>
</tbody>
</table>

70% of the fecal bacteria affecting Samish bay shellfish growing and harvest areas originates upstream in the Samish River watershed.

Data Sources: SSHIAP 2004,\(^2\) WADOH 2014,\(^3\) WAECY 2008,\(^4\) WAECY 2011 \(\dagger\)

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Upper Skagit Tribal member and natural resources technician Larry Peterson and field coordinator Mike Bartlett gather clams for a tribal celebration.
Shoreline Armoring Threatens Forage Fish Habitat in Whidbey Basin, Padilla, Samish Bays

There are an estimated 510 miles of critical forage fish habitat in the northern Whidbey basin, Padilla and Samish bays of Island and Skagit counties. More than 193 miles (38%) is either modified or armored.\textsuperscript{1,2} Since 2011, 4,300 feet of new marine shoreline armoring have been added in Island and Skagit counties which accounts for 23% of all permitted marine shoreline armoring in Puget Sound during that time period.\textsuperscript{3} Leadership is needed to protect what little forage fish habitat is left.

Forage fish spawn almost exclusively on erosional drift cells. Their spawning habitats are sustained by sediment erosion from coastal bluffs depositing or accreting along the shoreline in the direction of net-shore drift which is controlled by prevailing Puget Sound winds and currents.\textsuperscript{4} The greatest impact to forage fish habitat on erosional drift cells is shoreline armoring, as it interrupts erosion, distribution and accretion of sediment.\textsuperscript{5}

Impacts to forage fish are felt directly by federally listed Puget Sound Chinook salmon, as they feed on forage fish. Forage fish spawning beaches are protected through the state’s Hydraulic Code Rules, Growth Management Act (GMA) and Priority Habitats and Species (PHS) program, yet these habitats remain vulnerable to shoreline armoring and modification. Considering the critical ecological role of erosional drift cells for forage fish spawning, additional regulatory focus must work to stop additional armoring in these critical habitats. Additionally, incentives must be created to support the removal of these impacts.

193 of 510 miles of erosional drift cells in the northern Whidbey basin, Padilla and Samish bays have already been armored or modified.

Data Sources: PSNERP 2008,\textsuperscript{7} SSHIAP 2004,\textsuperscript{8} WADNR 2014a,\textsuperscript{9} WAECY 2011a,\textsuperscript{10} WAECY 2013b,\textsuperscript{11}
Skagit County Provides Less Stormwater Protection Outside of Cities, Towns and Populated Places

Between 2006 and 2011 impervious surfaces increased by 1 to 2% inside of the NPDES Phase II permit area of Anacortes, Mount Vernon, Burlington, Sedro Woolley and Concrete and outside of the NPDES Phase II permit area in La Conner, and along I-5, State Route 9 and State Route 20.\(^1,2\)

Increasing percentages of impervious surface potentially increase pollutants to stormwater, which further degrades water quality and salmon habitat. In Skagit County, the requirements for stormwater management are different inside of the National Pollutant Discharge Elimination System (NPDES) Phase II permit area than they are outside of that permit area. Inside the permit area, there will be a Low Impact Development (LID) requirement for new development and re-development. Outside of the permit area, LID will be allowed but will not be required.\(^3\) Inside the permit area, the technical basis for stormwater management requirements will be full compliance with the 2012 Stormwater Management Manual for Western Washington. Outside the permit boundary, single-family residences on parcels greater than 1 acre (the vast majority of county development), are only partially required to comply with the manual.\(^4\) Those living outside of the NPDES permit area deserve the same level of water quality protection as those living inside the permit area. Skagit County’s current stormwater management plan, which separates those inside the permit area from those outside the permit area, is not providing equal stormwater protection for everyone.

Data Sources: NLCD 2006,\(^5\) NLCD 2011,\(^6\) SSHAIP 2004,\(^7\) WADNR 2014,\(^8\) WAECY 2012\(^9\)
Federal Land Habitat Restoration Important to Treaty Resource Protection

The Goodell Creek watershed is in the North Cascades National Park, a relatively intact ecological setting. However, the alluvial floodplain at the mouth of Goodell Creek lies within the Ross Lake National Recreational Area, and is restricted by a system of roads and levees, power transmission lines and undersized stream crossings.¹

To restore natural alluvial fan and floodplain processes, levees need to be removed, service roads need to be re-sited and State Route 20 stream crossings need to be expanded. This action would increase productivity for multiple salmonid species, including threatened Chinook and steelhead, and would promote ecologically diverse life history strategies within these populations. Proper functioning of the high-elevation Goodell watershed will be particularly important as climate change drives increasingly negative impacts to tribal resources.

Even federally owned public trust lands that are protected in national parks, forests, recreational areas and wilderness designations may exhibit a history of ecosystem disturbance. These legacy issues are often overlooked for restoration opportunities, or worse, are deemed to be considered the new baseline for addressing future environmental and fishery-related impacts.

The Tribe has focused on working with federal trustees to identify these legacy issues, and partnerships to support the trust responsibility and treaty rights. Restoration of these lands is an important aspect of treaty resource protection.

The Upper Skagit Indian Tribe recently received SFRB funding for the feasibility planning of the Goodell Creek project. The Tribe is leading the collaborative effort with the National Park Service, Seattle City Light and state Department of Transportation to analyze and discuss the costs and benefits of constructing the restoration project. This planning phase will be crucial to identifying the funding strategy and determining how quickly the project will move ahead toward design and construction.
Land Use Impairs Forests of Floodplain

In the Middle Skagit River floodplain, approximately 55% of the floodplain’s land area has been cleared of native forest and is being maintained and cleared for human development. This type of land use is considered an impaired floodplain forest. Based on satellite imagery data, this level of floodplain impairment has not changed in at least the last 20 years. Continued floodplain forest impairment is one reason the Middle Skagit remains a juvenile rearing bottleneck to population production. As long as floodplain forests remain impaired, salmon conservation activities will not fully succeed.

Skagit County land use and forest condition in the Middle Skagit River floodplain

An estimated 73% of the Middle Skagit floodplain is zoned for agriculture. While Skagit County recognizes that the state’s Growth Management Act (GMA) requires protection of floodplain areas critical to fish and wildlife habitat, it is primarily focused on allowing ongoing agriculture practices and has focused its efforts on protecting agricultural interests in the county. As a result, Skagit County has opted against mandatory critical area buffers where the floodplain and agriculturally zoned lands overlap, and instead opted for a set of Watercourse Protection Measures for Ongoing Agriculture. In 2011 the county enrolled in the Washington State Voluntary Stewardship Program (VSP), but due to a lack of state funding, has yet to implement this program. If water quality or critical area violations from agricultural practices are reported under this new program, the county can enforce Watercourse Protection Measures. However the program does not seek to monitor activities and only responds to voluntary reports.

Data Sources: Skagit Co. 2010, Smith et al. 2011, WAECY 2011b
Shoreline Management Exemption for Existing Residents Leaves the Skagit River Vulnerable

The Upper Skagit Tribe recently completed a survey of hydromodifications along streambanks within flood-plains of the Skagit River watershed, with a focus on Chinook salmon habitat. They surveyed 220 miles of stream and found 32.1 miles of hydromodified bank along Chinook-bearing waters.¹ There is not clear evidence of riprap being removed from the Middle Skagit River since 2005.

Shoreline armoring’s impact to Chinook salmon is direct; juvenile densities are up to five times lower along armored shore than along natural shore, and they are disconnected from acres of floodplain habitat historically available to them.²³ To protect Skagit River’s shoreline and floodplain from future armoring, Skagit County is proposing a Rural Conservancy – Skagit River Floodway environmental designation for the middle Skagit River reach. This designation should prohibit construction of residences, other structures and associated shoreline armoring. However, existing residential structures still receive an exemption, both from state and from county shoreline regulations, and may be allowed to armor shoreline for protection. Ongoing agriculture within the Skagit River Floodway may also be able to claim exemption from county SMP shoreline armoring regulations, but the Skagit flood ordinance should prohibit shoreline armoring to protect agricultural land within the Rural Conservancy – Skagit River Floodway.

The Skagit Chinook Recovery Plan calls for removal and/or relocation of dikes and levees wherever possible. Beginning with the Skagit Chinook Recovery Plan and continuing with the Skagit Watershed Council, a strategy for acquiring floodplain parcels and removing riprap has been developed in the Middle Skagit River. Much of the strategy remains conceptual, however, and there is no clear evidence of riprap removal in the middle Skagit River since 2005.

Data Sources: SSHIAP 2004,⁶ SRSC 2005,¹ USIT 2015⁵
Climate Change and Fisheries Management: What does the future hold and are we ready to manage it?

Climate change is real, and salmon ranges, timing and productivity are responding to this change. Fishery management needs to adapt more quickly to be effective with novel freshwater and ocean conditions. USIT seeks support to improve capacities to detect and predict impacts of climate change on salmon populations. They also seek coordination to improve fisheries management to incorporate these new conditions and the variability associated with them to ensure treaty rights can be exercised in the future.

Climate change has already had dramatic influence on salmon populations and has driven changes in ranges,1 return timing in adults2 and productivity.3 In addition, climate change has been identified in altering evolutionary trajectories of some salmon species.4 These changes are happening rapidly and dramatically alter the underlying ecology of Pacific salmon management. Conditions in 2015 are an example of how different and how complex these changes can be with novel situations such as the Pacific “blob,” an area of extremely warm water off the west coast of North America, and more variation in El Niño events that influence water temperature and precipitation rates in streams and rivers. Fisheries managers have little information regarding the influence of these events on salmon populations and the fisheries that interact with them.

Managers, policy makers and politicians have been slow to accept, understand and assimilate this change that may soon result in a mismatch between real salmon biology and the assumed biology of salmon management. Many underpinnings of salmon management have been established over recent decades, such as population forecasting and fishery exploitation rates. For example, many models used for forecasting and fisheries implementation are built from historical conditions, conditions that may not hold true today or as climate change becomes more of a reality. If the underlying ecology changes as predicted, then the underpinning of salmon management must be vigilant and flexible.

Upper Skagit Indian Tribe is working to understand the impacts of climate change on the salmon populations, to begin thinking about future fisheries management and treaty rights. USIT staff have begun assessing potential climate change impacts on juvenile production for the Chinook, coho and steelhead that Upper Skagit people rely on for cultural and subsistence needs, and a vital economic resource. In our analysis, which utilizes published methods,5 each species assessed had varied responses to future climate scenarios. Chinook salmon productivity will decrease dramatically over the next 70 years, while coho productivity will decline only slightly. Steelhead will tend to decline but have more variable productivity over the landscape, suggesting that production will be high in isolated reaches, while more of the basin will support little productivity. We should be clear that temperature is only one aspect of climate impacts on salmonid populations and that we are working to develop a broad understanding of these processes. However limited in scope, this analysis shows how juvenile production might change over time and between species that could challenge future fisheries management.

USIT hopes that through extensive analysis of future changes in salmon ecology, co-managers of the Skagit River salmon populations can begin addressing potential changes in monitoring and management to be truly adaptive to changing conditions. We ask for leadership to work with us in addressing these concerns in hopes that these fish will persist and remain harvestable into the future.

Change in growth potential for juvenile Chinook and coho salmon and steelhead from 2013 to 2040 (blue) and 2013 to 2080 (red) in the Skagit River basin. The future loss of growth potential associated with increases in stream temperature varies for each species within the known anadromous zone.
Spatial extent of growth potential for juvenile Chinook, coho salmon and steelhead in 2013, 2040 and 2080 in the Skagit River basin. Future predictions suggest that much of the mainstem Skagit into the Sauk River will have temperatures that will decrease growth potential. The implications of these changes to co-management of the resource, tribal governance and future treaty rights is unknown.

Data Sources: SWIFD 2014, USDA 2016
Upper Skagit Indian Tribe

Citations

Chapter Summary
2  Ibid.

Upper Skagit Indian Tribe: Land Jurisdiction

Fecal Coliform Pollution Threatens Tribal Shellfish Harvest in Samish Bay

Shoreline Armoring Threatens Forage Fish Habitat in Whidbey Basin, Padilla, Samish Bays
7  Ibid.
11  WAECY. 2013b. Coastal Landforms and Feeder Bluffs.

Skagit County Provides Less Stormwater Protection Outside of Cities, Towns and Populated Places
Federal Land Habitat Restoration Important to Treaty Resource Protection


Land Use Impairs Forests of Floodplain


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