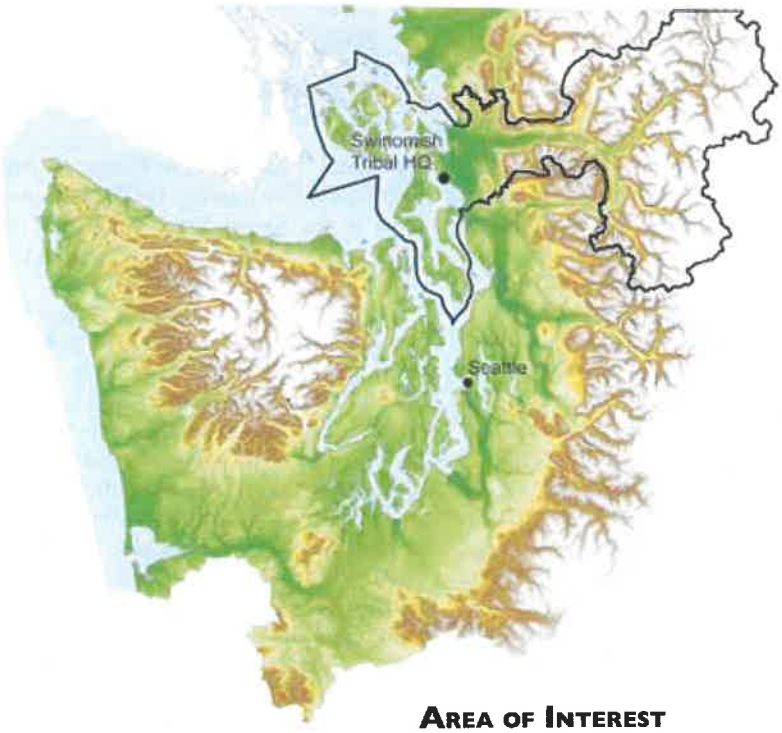
2020 State of Our Watersheds Report
Skagit River Basin

Swinomish Tribal Community

Our watersheds are on the front line of the battle to restore salmon, but we are losing that habitat faster than it can be restored. Both hatchery and naturally spawning salmon depend on the same habitat for their survival. It is critical that we protect existing habitat as we continue our work to restore our watersheds.

– Lorraine Loomis
Fisheries Manager



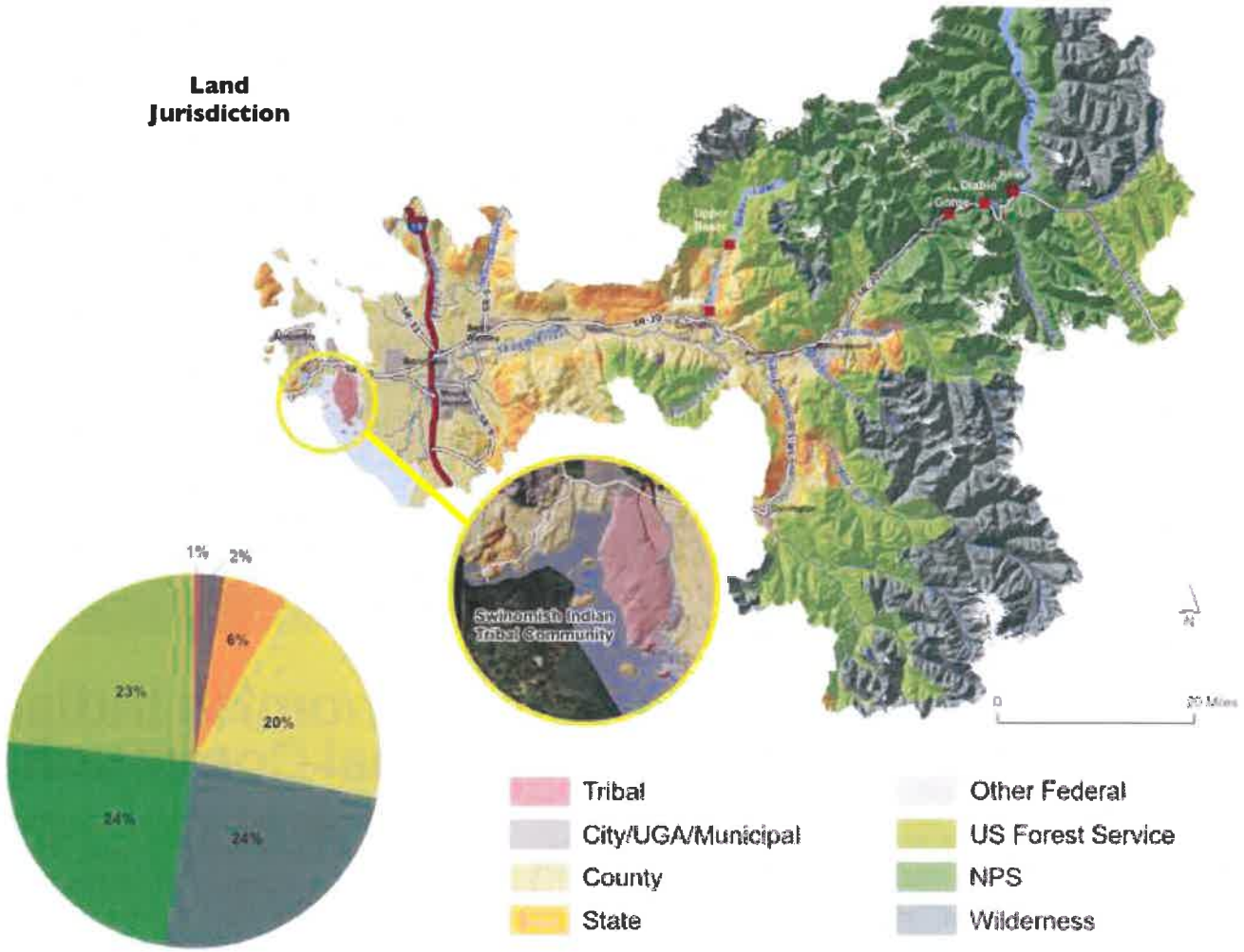
Area of Interest

Swinomish Indian Tribal Community

The Swinomish Indian Tribal Community is made up of Coast Salish people descended from groups and bands originating from the Skagit and Samish river valleys, coastal areas surrounding nearby bays and waters, and numerous islands including San Juan, Whidbey and Camano islands. The Swinomish reservation on the southeastern end of Fidalgo Island is surrounded by 27 miles of saltwater shoreline. It is bounded on the west by Skagit Bay, the east by Swinomish Channel and the north by Padilla Bay. The reservation is about 15 square miles in size and includes 7,450 acres of upland and approximately 2,900 acres of tidelands.

Swinomish Indian Tribal Community

Skagit River and Nearshore



The Skagit River flows from a 3,100-square-mile watershed that originates in British Columbia and flows south into Washington state before continuing westward through Skagit County and into Puget Sound. It has the largest watershed in Puget Sound, and provides 30% of the sound's freshwater input.[1] There are an estimated 396 glaciers in the watershed, making up one of the largest areas of glacial cover in the United States outside of Alaska.[2] The Baker River, Sauk River and the Cascade River all flow from glaciers within the Skagit River watershed.

The Skagit River watershed has been home to the Swinomish Indian Tribe, the Upper Skagit Indian Tribe and the Sauk-Suiattle Indian Tribe since time immemorial. All three tribes have their reservations in the watershed and all have entered into a treaty with the United States guaranteeing them the right to fish at their usual and accustomed places forever. These U&A areas include some or all of the Skagit River watershed, depending on the tribe..

Since European settlement, land use in the watershed has been dominated by natural resources extraction. The foothills and mountains have been used mainly 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. As of 2019, the U.S. Census Bureau estimates 129,205 residents in Skagit County, a 25% increase in population since the year 2000.[3,4]

The upper watershed is primarily within the National Forest and the North Cascades National Park. The lower watershed is mainly composed of state forest, private forest, agriculture, rural residential and urban residential/ commercial/industrial lands. There are five Federal Energy Regulatory Commission (FERC) licensed dams in the Skagit River watershed: the lower and upper Baker River dams, and the Gorge, Diablo and Ross Lake dams.

The Skagit River is home to all five species of Pacific salmon, as well as steelhead trout. It has the healthiest and largest runs of wild chinook and pink salmon in the Puget Sound.[5] Even so, the last 150 years of human population growth and associated land use has resulted in declines in chinook, a near collapse of chum and declines in other salmonid productivity. The Skagit Chinook Recovery Plan (2005) 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.

Map Data Sources: USFWS 2018,[6] WAECY 2018a,[7] WAECY 2018b,[8] WAECY 1994,[9] WADNR 2014c,[10] WADNR 2014d,[11] WADOT 2013,[12] SSHIAP 2004[13]

Chapter Summary

The Swinomish Indian Tribal Community is primarily made up of descendants of four treaty-time groups: the aboriginal Swinomish, the Lower Skagit, the Kikiallus and the aboriginal Samish. They all came together to sign the Treaty of Point Elliott with the United States in 1855. The treaty established a reservation for future use. The Swinomish Reservation is on Fidalgo Island surrounded by the Swinomish Tribal Community's ancestral homelands, including the Skagit Valley and Samish River Valley, the coastal areas surrounding Skagit, Padilla and Fidalgo bays, Saratoga Passage and numerous islands including Fidalgo, Camano, Whidbey and the San Juan Islands.

For thousands of years, the people of the Swinomish Indian Tribal Community maintained a culture centered on abundant saltwater resources that included salmon, shellfish and marine mammals, as well as upland resources such as cedar, camas, berries and wild game. Since European settlement began in the middle of the 19th century, the landscape has changed to support cities, residences and agriculture, and not to support the natural estuaries, large floodplains and riparian-lined tributaries needed for healthy populations of salmon, shellfish and all the resources the Swinomish people relied upon historically. That pattern continues today, and with a growing population of people, the degrading impact it has on salmon habitat has intensified.

The primary limiting factors to salmon recovery are the quantity and quality of habitat in the watersheds where salmon begin and end their lives. The treaty tribes believe the salmon recovery effort should focus on those waters.

The State of Our Watersheds Report examines key indicators of habitat quality and quantity across the watersheds in the tribe's Usual and Accustomed fishing areas as defined by *U.S. v. Washington* (Boldt decision). The 1974 ruling upheld tribal treaty-reserved rights, including the right to half of the harvestable salmon returning to Washington waters every year, and established the tribes as co-managers of the salmon resource.

The goal of the State of Our Watersheds Report is to provide tribes with a basic assessment of the health of their watersheds and to gauge progress toward salmon recovery. This report is part of the Treaty Rights at Risk initiative begun by the tribes in 2011 as a call to action for the federal government to exercise its trust responsibility to the tribes and lead a more coordinated and effective salmon recovery effort. More information is available at *www.treatyrightsatrisk.org*.

For this report, the Swinomish Indian Tribal Community has focused on portions of their watersheds that are of greatest concern because of habitat loss and degradation. It is important to note that the State of Our Watersheds Report is a living document that will be updated as new data become available, providing both a metric for assessing changes in salmon habitat and a method for monitoring those changes. The report also will be used to quantify the progress made with the region's salmon recovery plans.

Principal Findings

Habitat Mitigation Is Offsetting the Negative Impact of Riprap Repair to Riverine Edge Habitat

As part of the 2011 Environmental Assessment (EA) for the batched 2007 and 2011 repairs at 60 sites along the lower Skagit River mainstem, the U.S. Army Corps of Engineers was required to complete habitat mitigation. Monitoring was conducted at 13 of the 60 sites, and when compared with baseline riprap conditions, the mitigation sites as a whole were found to have offset impacts to riparian vegetation, rearing habitat, refuge habitat and forage habitat for fish. This should not be interpreted as restoration or recovery of habitat, this mitigation only means that the riprap repair actions taken by the Corps that negatively impacted riverine edge habitat and riparian habitat in the lower Skagit River were at least partially offset by habitat mitigation.

Skagit River Tidal Delta Habitat Restoration Successful, but the Pace Has Slowed Since 2009

From 2004 to 2013, the tidal habitat footprint in the Skagit River delta increased from 3,384.65 hectares to 3,467.68 hectares, from 80% to 81.9% of the desired future condition (DFC) of the Skagit River Chinook Recovery Plan. Continued focus is necessary, as the pace of habitat restoration has slowed considerably since 2009. From 2005 to 2009,103.3 hectares of tidal delta extent were restored (25.8 hectares per year) and since 2009, only 71.2 hectares have been restored (10.2 hectares per year).

Pocket Estuary Restoration Remains Important to Skagit River Chinook Recovery

Through 2015, pocket estuary restoration was completed at 6 sites totaling 33.6 acres of usable habitat area and chinook smolt production was estimated to have increased by 48,457 smolts. Since 2015, there has been a small amount of active restoration in Dugualla Lagoon, and Similk Beach has entered a more active restoration phase, but nothing has been completed.

Nearshore Armoring Continues to Impact the Intertidal Zone

Continued survey of the shoreline in the Skagit and Samish marine nearshore areas has found an additional 5 miles of nearshore armoring since 2008. Current estimates are that 118 miles of this area are armored or modified. Marine shoreline restoration that removes shoreline armoring to restore the nearshore to its natural condition is the best option for salmon recovery. Another opportunity to improve shoreline condition is to prioritize "soft armoring" options when existing "hard armoring" is being permitted to be repaired or replaced along the shoreline.

High Stream Temperatures Remain a Limiting Factor for Skagit River Chinook and Steelhead Recovery

The 2004 Lower Skagit tributaries temperature TMDL failed to meet its goal of "100 percent of all stream miles of these creeks to be protected by riparian shade or enrolled as part of larger creek restoration and improvement projects by 2020." In March 2020, Washington Department of Ecology published guidance on a renewed effort to revitalize action on the TMDL.

The renewed effort continues to emphasize voluntary actions and relies on financial incentives to achieve riparian planting on private properties. Sole reliance on voluntary efforts will never be sufficient to meet water quality standards for salmon streams or the needs of Skagit chinook or steelhead recovery in a timely manner, particularly as climate change creates warmer, drier and longer summers. This is an urgent issue about which Swinomish and its treaty tribe partners have been sounding the alarm for two decades

and Ecology must take action far beyond its sole, passive reliance on voluntary measures.

Public and Private Culverts in the Skagit River Watershed Continue to Block Anadromous Salmon Habitat

A recent comprehensive survey of culvert barriers to anadromous fish passage in the Skagit watershed documented 443 culverts on anadromous fish-bearing streams. Of these, 352 culverts are fish-passage blockages and 91 culverts are unknown but may be fish-passage blockages. Over 74% of the blocking and unknown culverts are either privately owned (204 culverts, 46%) or county owned (122 culverts, 28%). The remaining 117 culverts (26%) are spread across other public ownerships.

Climate Change Impacts to Streamflow Will Threaten Steelhead Recovery in the Skagit

Results from climate change modeling for a collection of sites throughout the Skagit River system show increasing winter peak flow and decreasing summer low flow as more future annual precipitation is expected to fall as rain than snow. By 2099, results from an ensemble of models forecast that the 2-year high flow event will increase from its historic average by 22% under a low emission scenario, and by 33% under a high emission scenario. The same ensemble of climate models forecast that by 2099, the lowest 7-day 2-year low flow event will decrease from its historic average by 33% under a low emission scenario and by 45% under a high emission scenario.

Conclusion

Restoration of salmon habitat continues to occur in the Skagit River freshwater and intertidal environments. However, the pace of restoration has slowed in the last five years, and this is compounded by a rapidly changing climate and continued discovery of habitat impairments. For restoration to lead to recovery, the schedule needs to accelerate.

While it does not carry the positive impact of restoration, mitigation does at least partially offset the negative impacts to habitat of infrastructure maintenance within the Skagit River system. Monitoring mitigation showing some success and failure should lead to increased mitigation success in the future.

Enforcement of the regulatory framework that is in place to protect salmon habitat continues to be greatly lacking in the Skagit River system. There continues to be a reliance on volunteerism towards compliance of environmental laws and regulations, and the result is much less habitat being protected and/or restored than needs to be. Salmon habitat is in critical condition in many areas within the Skagit River system, and the urgency of regulation enforcement is needed to move quickly out of that critical condition.

Recovery Efforts Show Improvement But Still Lagging in Key Indicators

At the 15-year mark of the Puget Sound Salmon Recovery Plan, a review of key environmental indicators for the Skagit basin reveals mixed results in progress toward the recovery plan's goals and objectives. Priority issues continue to be improving degradation of water quantity, repair of fish-passage barriers and shoreline conditions. There has been progress in two indicators: restoration of tidal deltas and positive signs from monitoring of habitat mitigation sites.

Stepping back and looking at the big picture, there is still a shortage of staff at all levels (e.g., federal, state, tribal, county) needed to address the issues and implement actions to restore and protect habitat and to monitor and enforce compliance of existing regulations. In addition, funding shortfalls for large-scale projects contribute to the slow the pace of progress.

Kari Neumeyer, NWIFC

Illabot Creek

Review of the trend for these key environmental indicators since the 2016 State of Our Watersheds Report shows improvement for some indicators, no trend for a few and a steady loss for others in habitat status:

Tribal Indicator	Status	Trend Since SOW 2016 Report
Habitat Mitigation	Habitat mitigation monitoring at 13 of 60 sites along the lower Skagit River mainstem demonstrated to offset impacts to riparian vegetation, rearing habitat, refuge habitat and forage habitat for fish	Improving
Restoration - Tidal Delta	From 2004 to 2013, the tidal habitat footprint in the Skagit River delta increased from 3,384.65 hectares to 3,467.68 hectares, from 80% to 81.9% of the desired future condition (DFC) of the Skagit River Chinook Recovery Plan. Continued focus is necessary, as the pace of habitat restoration has slowed considerably since 2009.	Improving
Restoration - Pocket Estuary	Through 2015, pocket estuary restoration was completed at 6 sites totaling 33.6 acres of usable habitat area and Chinook smolt production was estimated to have increased by 48,461 smolts. Since 2015, there has been a small amount of active restoration in Dugualla Lagoon, and Similk Beach has entered a more active restoration phase, but nothing has been completed	No Trend
Shoreline Modifications	Shoreline survey data through 2017 revealed 118 miles of shoreline armoring and modification including nearshore tidal barriers in the marine nearshore of Skagit and Samish Rivers intertidal areas. In 2008, published data for that same region showed 113 miles of shoreline armoring and modification including nearshore tidal barriers. It is assumed that the majority of the 5-mile increase is due to improved data, including for areas not previously surveyed	No Trend
Water Quality - Temperature	The Department of Ecology's voluntary riparian planting program has failed to meet its 100 percent goal of riparian planting by 2020. This failure has put into serious jeopardy the 2080 goal of temperature compliance for the nine lower Skagit tributaries, as well as the habitat recovery needs for ESA-listed Chinook and steelhead	Declining
Stream Blockages - Culverts	A recent, comprehensive survey of culvert barriers to anadromous fish passage in the Skagit watershed documented 443 culverts on anadromous fish bearing streams. 352 of these culverts are fish passage blockages and 91 of these culverts are unknown but may be fish passage blockages. Over 74% of the blocking and unknown culverts are either privately owned (204 culverts, 46%) or county owned (122 culverts, 28%). The remaining 117 culverts (26%) are spread across other public ownerships	Declining
Climate Change Impacts	Results from climate change modeling for a collection of sites throughout the Skagit river system show increasing winter peak flow and decreasing summer low flow as more future annual precipitation is expected to fall as rain than snow.	Concern

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

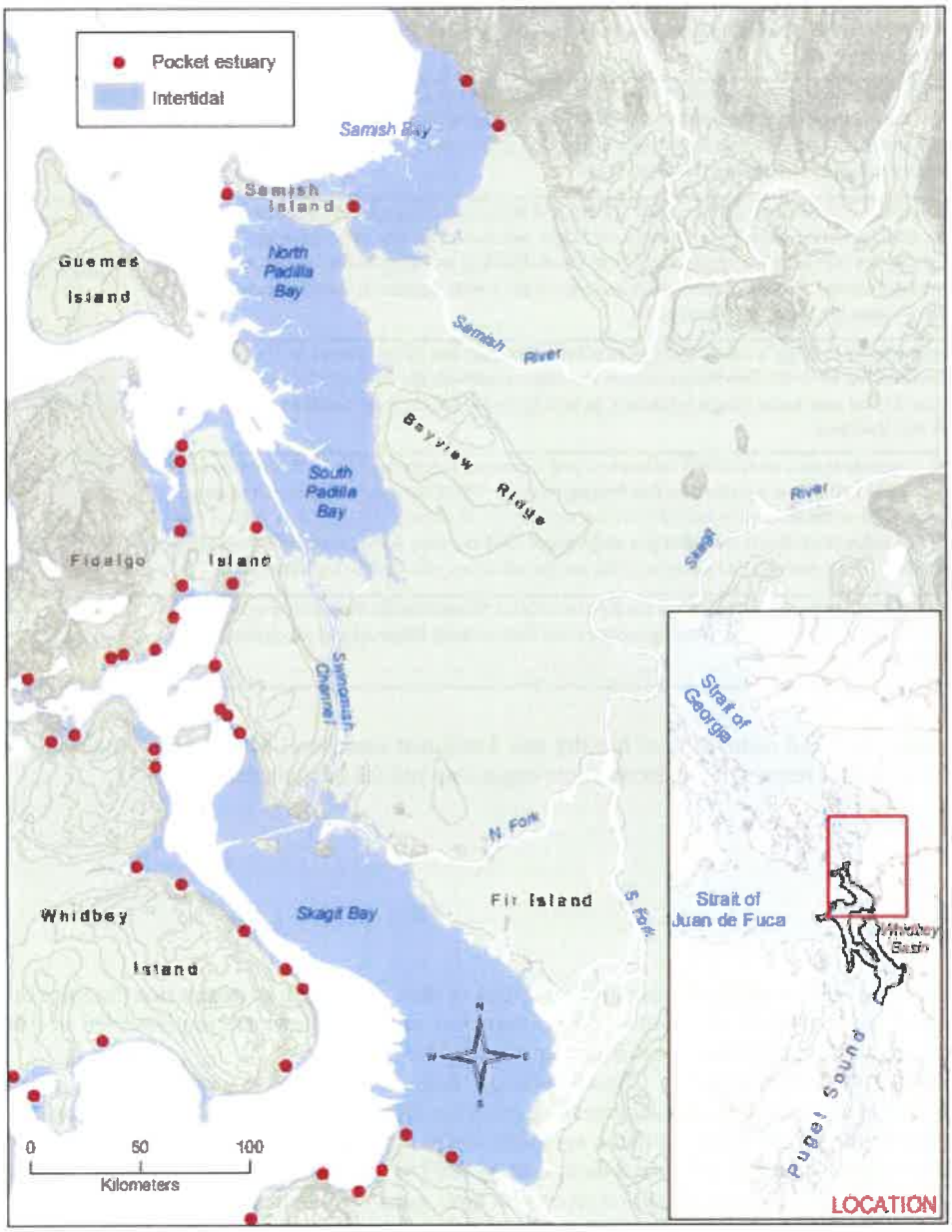
The Swinomish Tribe has prioritized restoration and protection efforts throughout the Skagit River watershed to recover all six species of wild salmon for current and future generations. Unfortunately, many exemptions exist for ongoing land uses, and the state has been unwilling to ensure that there is sufficient cold, clean water in all of our salmon streams. This has hindered the pace of restoration, causing salmon recovery to be behind schedule in meeting the Recovery Plan goals.

The state needs to adopt and expeditiously implement a regulatory framework that serves to protect and restore salmon habitat if the recovery goals for chinook, steelhead and other wild Skagit River salmonids are to be realized. Federal agencies with a trust responsibility need to exert leadership to ensure that the spirit and letter of environmental protection laws are implemented as fully and equitably as possible.

Climate change will continue to exacerbate many of the long-standing recovery challenges in the Skagit basin, especially without adequate riparian habitat. We and our state co-managers and federal trustees need to redouble our efforts to enforce existing habitat protection laws, create and implement innovative new programs that restore full function to our watershed, and continue to do the hard work necessary to achieve salmon recovery goals for current and future generations.

Critical Chinook Habitat Restoration in the Skagit River Intertidal Zone Continues, but the Pace Has Slowed

Skagit River Nearshore and Intertidal Region[5]



Nearshore and estuarine habitats throughout the Skagit River intertidal zone provide juvenile Skagit chinook forage for growth, refuge from predators, a transition zone for physiological change from a freshwater fish to a saltwater fish, and migratory routes to more food in the ocean.[1] These habitats have been greatly impacted through agricultural and residential development since the late 19th century, and these land-use impacts have directly impacted Skagit River chinook productivity. How well the nearshore and estuarine habitats of the Skagit River Intertidal Zone support these four functions directly influences the recovery and future viability of Skagit River chinook.[2]

Skagit River delta habitat, preferred for rearing by tidal delta rearing juvenile chinook, has decreased by 87.9%.[3] Pocket estuary habitat in the intertidal zone, preferred for rearing by fry migrant ocean type juvenile chinook salmon, has decreased by roughly 80% in area.[4] The construction of bulkheads and tidal barriers along the intertidal shorelines has had a significant impact on chinook rearing habitat in the tidal delta and pocket estuaries, as well as an impact on chinook forage by impacting beach spawning habitats of surf smelt and Pacific sand lance (forage fish).

Restoration in each of these areas of the intertidal zone has been ongoing for over two decades. There have been significant strides made since 2005, through implementation of the scientifically based and well-coordinated Skagit River Chinook Recovery Plan. However, restoration progress has slowed in recent years. When this is coupled with climate based changes in the sea level of the intertidal zone, and with improved survey methods discovering more impacts than previously expected, it becomes clear that restoration of the intertidal zone will need to accelerate into the future if chinook recovery is to occur.

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Skagit River Tidal Delta Habitat Restoration Successful, but the Pace Has Slowed Since 2009

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Skagit River Tidal Delta Restoration Sites (2004-2016)

Tidal delta marsh grows naturally through a process of progradation, which is the result of river sediment input depositing within the delta over time. In the Skagit River delta, progradation rates have been declining since the early 1970s, with marsh loss already occurring in the Skagit Bay frontal marsh and to a lesser degree in the South Fork marsh.[8] The Skagit River remains leveed in many places and peak water and sediment-moving flows occur with stream power like a "fire hose" that pushes sediment further into Skagit Bay instead of depositing it into the delta to create tidal marsh. As well, sea level rise is creating periods of higher wave energy, which in some instances, is beginning to erode marshlands that aren't naturally protected, especially along the Skagit Bay frontal marsh.

If tidal habitat restoration continues at the pace that has been occurring since 2009, it will take until 2096 (90 years in total) to reach the desired future conditions (DFC) laid out in the 50-year Skagit River Chinook Recovery plan. To reach DFC for tidal marsh by 2030 (midpoint of a 50-year recovery plan), the pace of restoration needs to increase, and there must be explicit consideration of sea level rise, storm surge and sediment routing as an update to the current tidal habitat restoration plan.[9]

Skagit River Tidal Delta Habitat Restoration between 2004 and 2016[12,13]

Restoration	Year	Hectares Gained
Fisher Slough	2011	18.66
South Fork Dike Setback	2007	8.37
Smokehouse	2008	26.9
Swinomish Channel	2008	3.37
Wiley Slough	2009	64.62
Fisher Island Farms	2016	52

Map Data Sources: GSRO 2019,[10] ESRI 2020[11]

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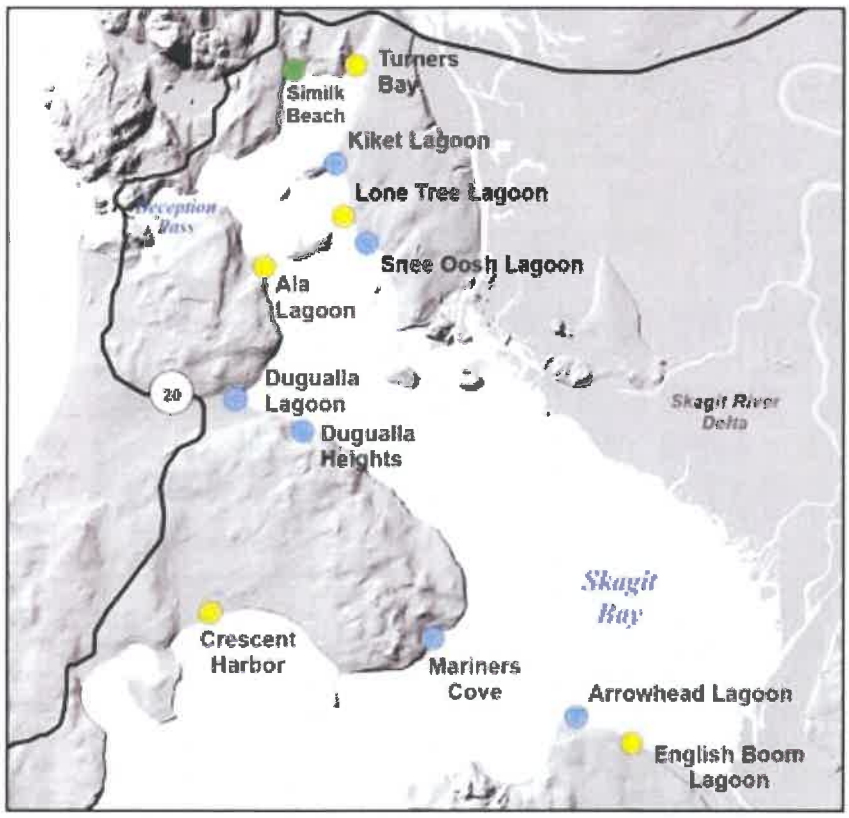
Pocket Estuary Restoration Remains Important to Skagit River Chinook Recovery

Through 2014, pocket estuary restoration was completed at 5 of the 12 prioritized Skagit Chinook Plan sites. Habitat status and trends monitoring reveals the restoration increased usable pocket estuary habitat area for chinook smolt production by over 240 acres. The Dugualla Heights restoration site entered the design phase, but was not completed due to concern of the design not having enough salmon habitat benefit. It is still considered as a restoration target, and can be completed with a better design. Since 2014, no additional restoration has occurred at the 12 prioritized sites although Similk Beach has entered an active planning/design phase with restoration anticipated in the near future.[14]

Within the Whidbey basin, modeling and field surveys have led researchers to conclude that over two-thirds of historic pocket estuaries have been completely lost to juvenile salmon use, and the remaining one-third has been reduced in size by approximately 50%.

In response, the Skagit Chinook Recovery Plan prioritized the restoration of 12 pocket estuaries, all of which are within a day's swimming distance for Skagit River juvenile chinook. Restoration of these 12 sites is expected to result in the production of over 147,000 additional smolts. Over 63% of the increased production, or over 93,000 smolts will come from the completed restoration of the Dugualla Lagoon project.[15]



There are 12 prioritized pocket estuary restoration projects. 5 have been completed, 1 is active and 6 remain conceptual.

Site	Hectares of habitat			Acres of habitat		
	Year 2005	Year 2014	Change	Year 2005	Year 2014	Change
English Boom Lagoon	1.07	1.35	0.29	2.64	3.34	0.71
Ala Lagoon	8.21	7.05	-1.16	20.28	17.42	-2.86
Crescent Harbor	0.00	94.13	94.13	0.00	232.61	232.61
Lone Tree Lagoon	2.22	2.44	0.22	5.48	6.02	0.55
Turners Bay	18.75	22.49	3.75	46.32	55.58	9.26
Total	**30.23**	**127.46**	**97.23**	**74.71**	**314.97**	**240.26**

Pocket estuary restoration has resulted in over 240 acres of usable pocket estuary habitat area for chinook smolt production.[21]

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Map Data Sources: SRSC and WDFW 2005,[16] SRSC and WDFW 2012,[17] HWS 2020,[18] SSHIAP 2004,[19] WADNR 2014c[20]

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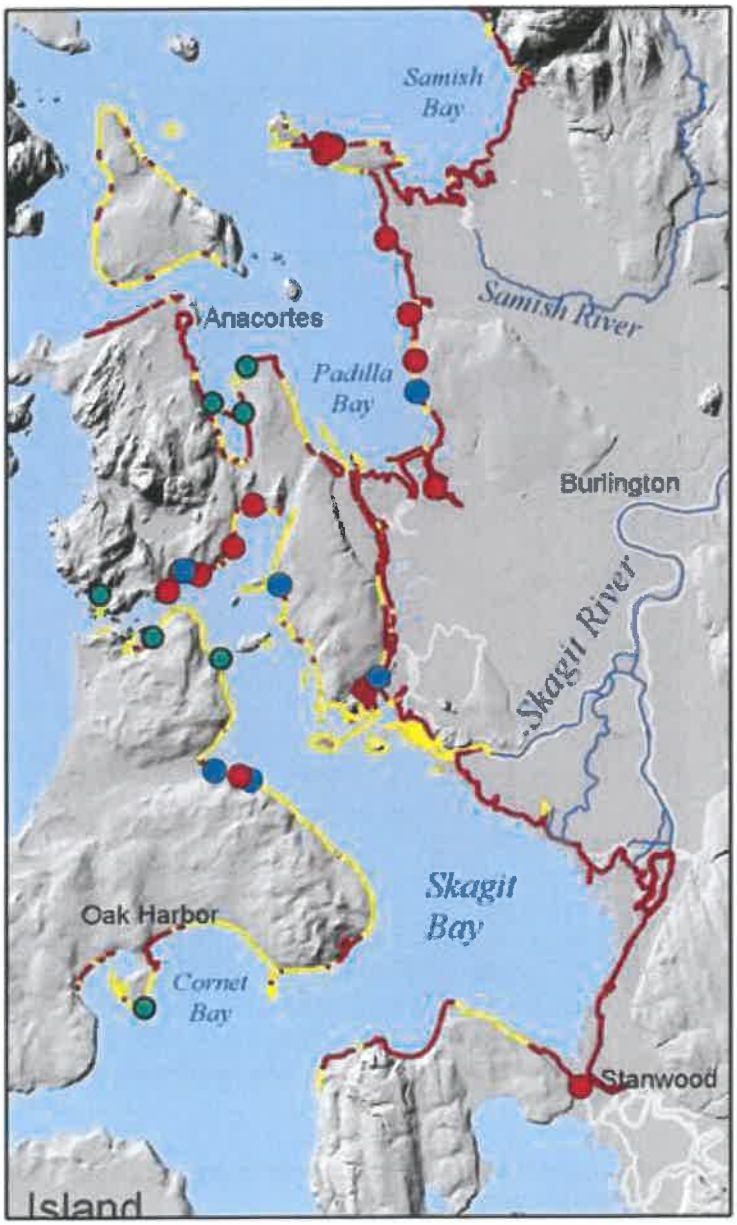
Nearshore Armoring Continues to Impact the Intertidal Zone

Shoreline survey data through 2017 revealed 118 miles of shoreline armoring and modification including nearshore tidal barriers in the marine nearshore of Skagit and Samish river intertidal areas. In 2008, published data for that same region showed 113 miles of shoreline armoring and modification including nearshore tidal barriers.[22,23] It is assumed that the majority of the 5-mile increase is due to improved data, including for areas not previously surveyed.

Skagit and Samish River Marine Nearshore Projects 2014 through 2019: WDFW Permitted Projects and PSEMP Monitored Restoration Projects



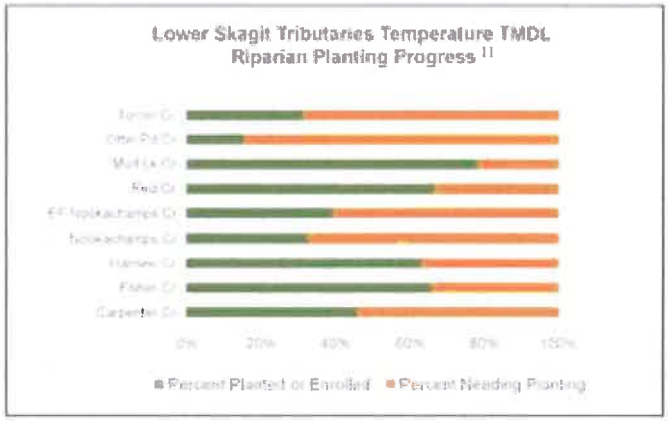
Since 2015, WDFW has issued marine shoreline armoring permits for 22 Hydraulic Permit Applications (HPA) within the Skagit chinook intertidal area. Of those permits, 4 were for new armoring and 18 were for repair or replacement of existing armoring. More ecologically suitable or soft armoring was included in 40% (9 of the 22 projects), and removed in 1 of the 22 projects.[24] Since 2015, there have been 4 nearshore restoration projects resulting in the removal of 4,295 feet of shoreline armoring.[25]

The best opportunity for improving the shoreline is through armoring removal as part of nearshore restoration projects. Another opportunity is the repair/replacement of existing shoreline and these efforts will require continued coordination between state and local permitting agencies to prioritize soft armoring replacement as the repair/replacement option.

Map Data Sources: CGS 2017,[26] PSEMP 2020,[27] WDFW 2020,[28] SSHIAP 2004[29]

High Stream Temperatures Remain a Limiting Factor for Skagit River Chinook and Steelhead Recovery

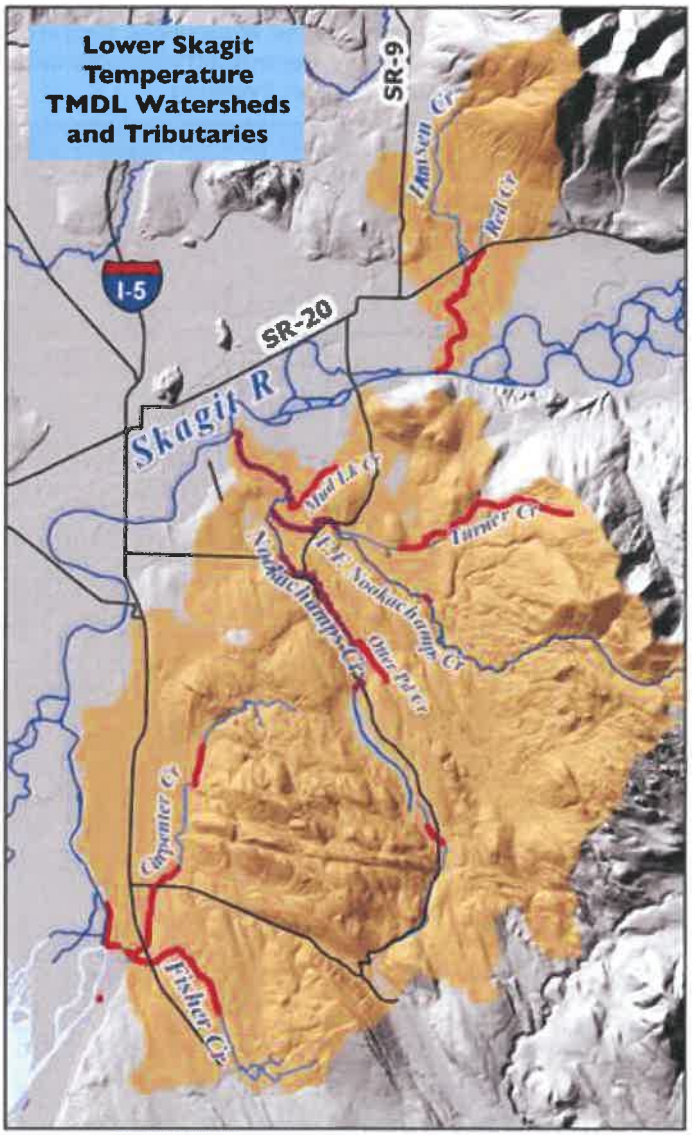
The Department of Ecology's voluntary riparian planting program has failed to meet its 100 percent goal of riparian planting by 2020. This failure has put into serious jeopardy the 2080 goal of temperature compliance for the nine lower Skagit tributaries, as well as the habitat recovery needs for ESA-listed chinook and steelhead.



In 2004, Washington State Department of Ecology established total maximum daily load (TMDL) limits for high stream temperatures on nine tributaries, including chinook, coho and steelhead streams, in the Lower Skagit Tributaries Temperature TMDL. The 2008 Lower Skagit TMDL Improvement Plan charted a path for these nine tributaries to become temperature compliant by 2080 if the TMDL implementation goal was met that "100 percent of all stream miles of these creeks to be protected by riparian shade or enrolled as part of larger creek restoration and improvement projects by 2020."[1] Unfortunately, Ecology has failed to meet its 100 percent goal of riparian planting by 2020.

Ecology has relied entirely on voluntary programs to recover the water quality of these important salmon streams. For two decades, Swinomish has pointed out the insufficiency of this, noting that voluntary programs are part of the solution but alone would never be adequate to reach water quality standards within sufficient time for restoring degraded salmon habitat. Based on a recent LIDAR technical analysis, approximately 50% of overall stream length within the nine-tributary watershed is currently forested or planted in trees. In Nookachamps Creek, the largest salmon stream in the sub-basin that historically has been home to chinook and steelhead, only 30% of creek miles have been planted. That's far short of the 100% goal that was supposed to be reached this year.[2]

What is the consequence of this failure to be only halfway toward meeting its 2020 goal of 100% planting to implement the Lower Skagit Temperature TMDL? It puts into serious jeopardy the 2080 goal of temperature compliance for the nine lower Skagit tributaries, as well as the habitat recovery needed for Endangered Species Act-listed chinook and steelhead. It also makes it far less likely that Lower Skagit salmon streams can achieve the level of climate resiliency needed as temperatures warm and summers become longer and drier. High stream temperatures were identified as a limiting factor to Skagit River chinook survival and recovery in the 2005 Skagit River Chinook Recovery Plan and to Puget Sound steelhead recovery in the 2019 Puget Sound Steelhead Recovery Plan.[3,4]



The 2004 Lower Skagit Temperature TMDL called for average riparian buffers of a minimum 100 feet in width on either side of the stream, assuming water quality would not be further degraded by reduced streamflows.[5] The degradation of riparian vegetation throughout the Lower Skagit river system, and a lack of regulato-

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Map Data Sources: WADNR 2014c,[7] WAECY 2018,[8] WAECY 2014b,[9] SSHIAP 2004[10]

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ry framework to require tree planting for compliance with water quality standards, has allowed higher water temperatures throughout the system to persist, to the peril of salmon and treaty rights.

Efforts to restore riparian vegetation are ongoing, and with some clear successes throughout the Skagit watershed as a result of tribal, conservation district and local nonprofit leadership and partnership. **The real problem, though, is that the pace of restoration has been far too slow – largely because Ecology has been unwilling to create a regulatory framework for enforcing water quality standards for temperature in salmon streams – and so no regulatory action has been taken.** Sole reliance on voluntary efforts has been and will continue to be insufficient to meet water quality standards for salmon streams or the needs of Skagit chinook or steelhead recovery in a timely manner, particularly as climate change creates warmer, drier and longer summers. This is an urgent issue about which Swinomish and its treaty tribe partners have been sounding the alarm for two decades, and the time for regulatory action is undeniable.

Unfortunately the Skagit is not alone – approximately 1,800 miles of salmon streams throughout western Washington are not meeting water quality standards from temperature pollution. To compound this, climate change is forecast to cause dramatic increases in stream temperatures throughout our region over the next 20 to 60 years, without urgent action to plant trees, climate change is going to wreak havoc on recovering salmon for decades and generation to come.

Ecology's new voluntary plan

As a result of Swinomish's efforts, the Puget Sound Partnership's Leadership Council passed a resolution in March 2019 urging Ecology to use all available tools at its disposal, including regulatory tools, to remedy the Lower Skagit Temperature TMDL expeditiously. Swinomish was hopeful that real change was on the way.

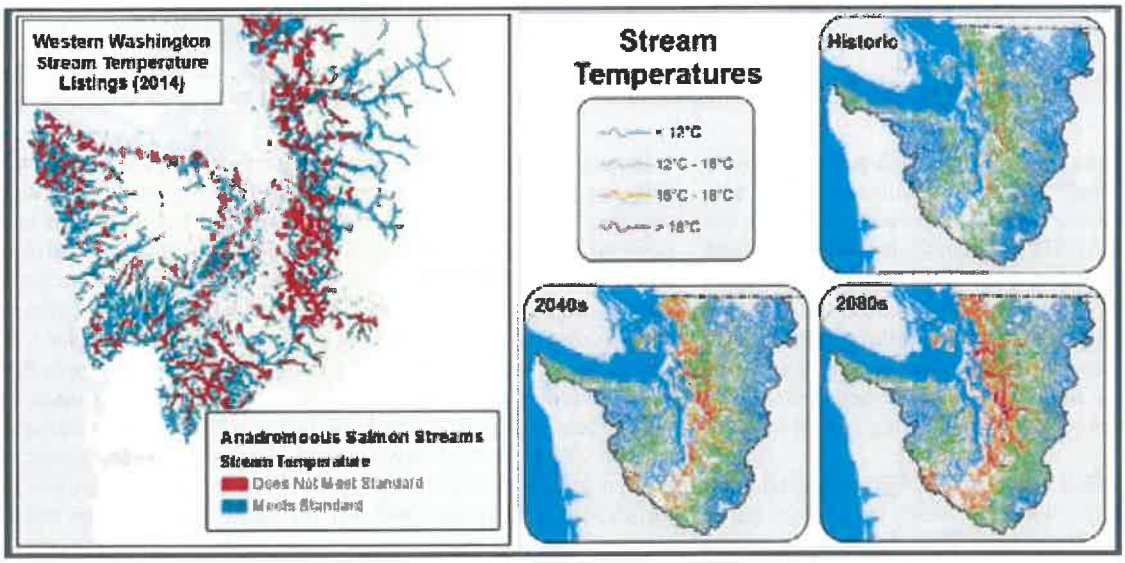
In fall 2019, Ecology held meetings with stakeholders and tribal government representatives to create a new "strategy" to "revitalize regional efforts to reduce water temperatures." Unfortunately, Ecology staff were prevented from discussing or addressing any regulatory solutions - they were given authorization only to discuss voluntary measures despite the clear intent from the Leadership Council resolution. The document produced by Ecology in December 2019 purportedly replaced the 2008 Lower Skagit Water Quality Improvement Plan, but in doing so it maintained sole reliance on voluntary measures, and provided no timeline for achieving the 100% goal of riparian plantings or water quality standards. The new voluntary plan also ignored the worsening impacts to stream temperatures predicted from climate models and recommended no actions to address increasing temperatures and longer, drier, warmer summers as a result of climate change.[6] The Swinomish Tribe strongly objected to the plan.

Gov. Inslee's Centennial Accord Commitment to Climate Resilient Salmon Streams

Gov. Jay Inslee exercised his strong leadership at the 2019 Centennial Accord in both acknowledging the importance of healthy riparian habitats for salmon and clean water and directing all state agencies to work with the tribes on a proposal that will engage current science and chart a new path toward achieving climate resilient salmon streams. Swinomish is hopeful that by working together, the state and tribal communities can take the important, urgent action needed to protect and recover salmon.

The difficult truth of the matter is that the tribes are running out of fish, and we are running out of time to take the action needed to recover the degraded habitat and water quality our fish need to thrive. Swinomish has watched its salmon harvest decline by over 80% in the past decades – no industry has suffered similar losses. Climate change is worsening the impacts to salmon, so it is equitable, timely and just to develop and implement regulatory measures to rapidly recover and protect our streams and salmon resources.

We can make up for lost time and the harm caused to Swinomish, other treaty tribes and the salmon that are our cultural lifeblood, but only if we prioritize action and move expeditiously to implement science-based solutions.



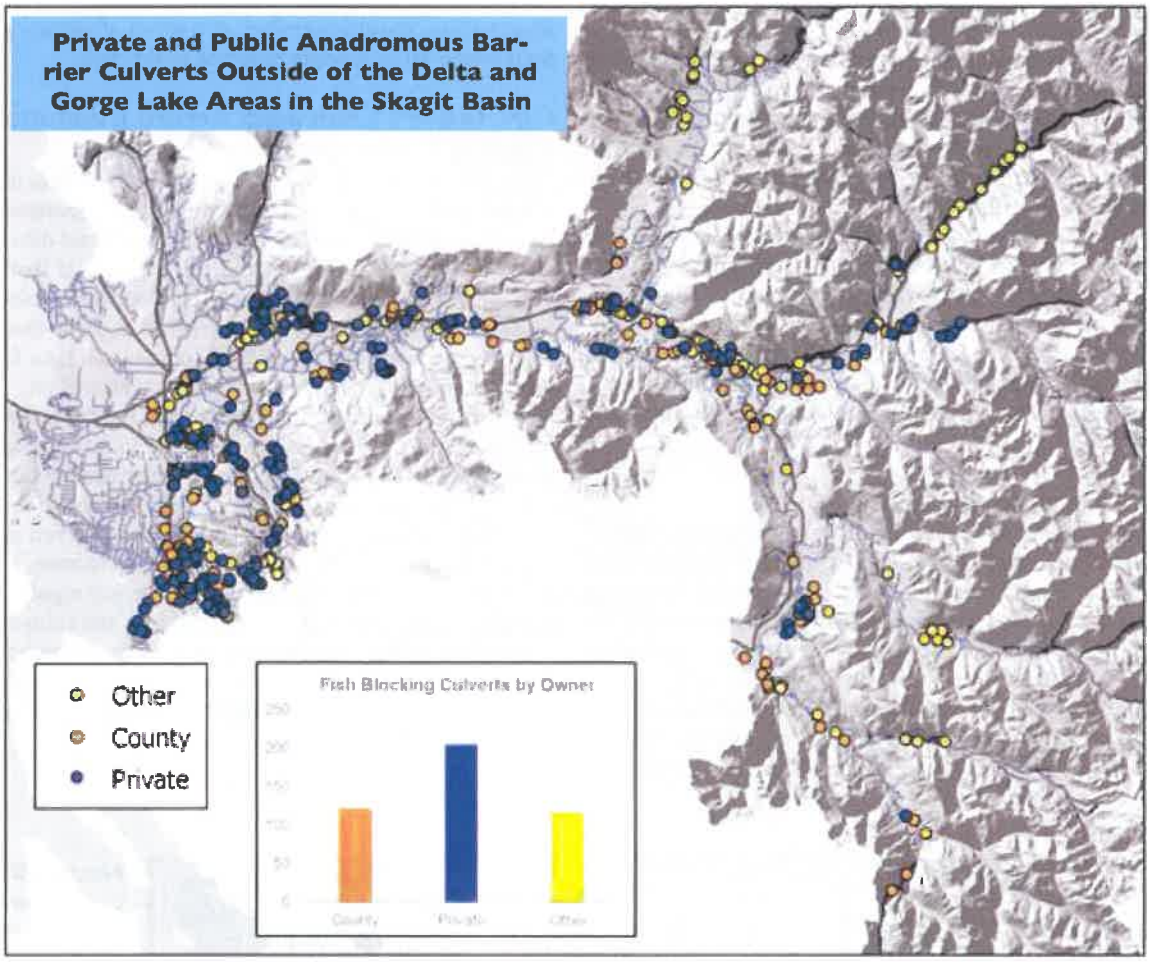
Nearly 1,800 miles of anadromous salmon streams are not meeting stream temperature standards in western Washington. Stream temperatures in Puget Sound are projected to increase dramatically if climate change continues on its current trajectory.

Map Data Sources: ESRI 2020,[12] SWIFD 2014,[13] WAECY 2016,[14] Mauger, et.al. 2015[15]

SWINOMISH INDIAN TRIBAL COMMUNITY

Public and Private Culverts in the Skagit River Watershed Continue to Block Anadromous Salmon Habitat

A recent, comprehensive survey of culvert barriers to anadromous fish passage in the Skagit watershed documented 443 culverts on anadromous fish-bearing streams. Of these, 352 culverts are fish-passage blockages and 91 culverts are unknown but may be fish-passage blockages. Over 74% of the blocking and unknown culverts are either privately owned (204 culverts, 46%) or county-owned (122 culverts, 28%). The remaining 117 culverts (26%) are spread across other public ownerships.[1]



Culverts make up more than 70% of known fish-passage barriers in the Skagit River watershed.[2] This survey, which included participation from the Skagit River System Cooperative (SRSC), the Upper Skagit Indian Tribe (USIT), Skagit County (SKCO), and the Skagit Fish Enhancement Group (SFEG) is the first comprehensive update of these barriers in 20 years. This survey is focused on anadromous fish-bearing streams within a selected survey area, and excludes the Samish River watershed, the Skagit estuary, Fidalgo Island and the portion of the Skagit Watershed upstream of the Gorge Dam at Newhalem due to complicating factors in those areas.[3]

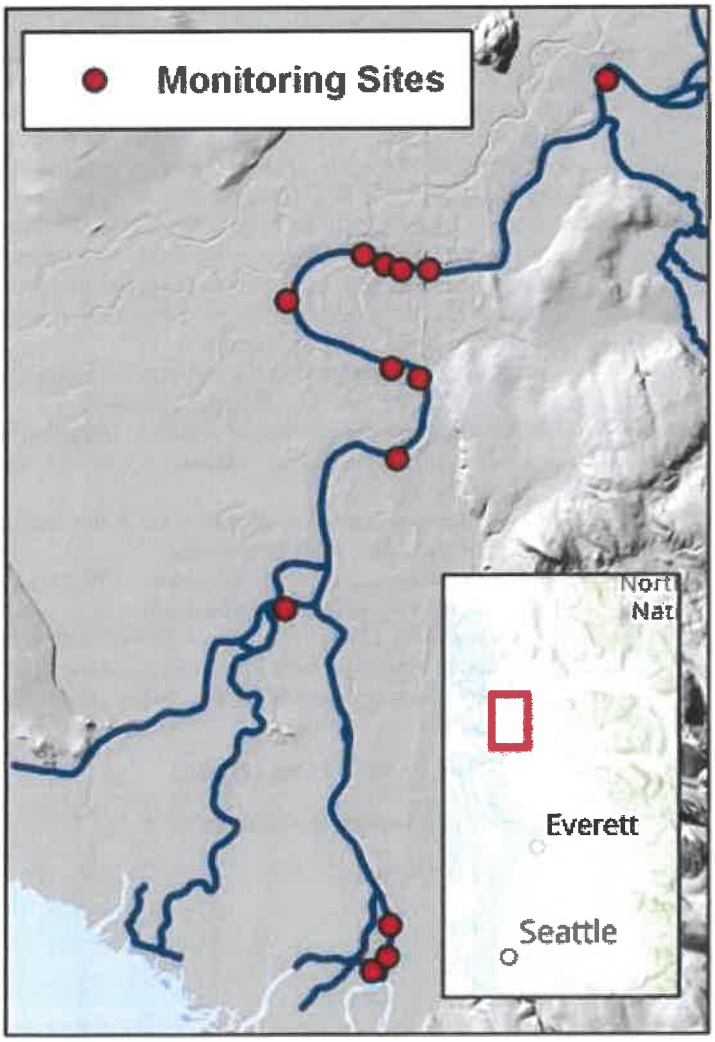
The barrier survey identified 443 culverts, known barriers and unknown but potential barriers within the study area. These barriers are to be considered as a group from which land managers and restoration planners in the Skagit River watershed can strategically locate projects to open up barriers to fish passage. This survey also identified barrier "clusters" to inform land managers and restoration planners where upstream and downstream are barriers located on the same stream system. This allows for strategic planning of multi-culvert removal in locations where up and/or downstream culverts are also blocking anadromous salmon habitat.[4]

The Skagit Watershed Chinook Recovery Plan recommends that each governmental entity identify each culvert on their lands or under their jurisdiction that have man-made barriers to chinook salmon.[5] With the tool now available from this barrier survey, it is even more possible for the culvert barrier owner, regardless of jurisdiction, to take responsibility for fixing their blockage to fish passage, as is required through current Washington state statute.

Map Data Sources: WDFW 2019,[6] SWIFD 2019,[7] WADNR 2014c,[8] SSHIAP 2004,[9] ESRI 2020[10]

Habitat Mitigation Is Partially Offsetting the Negative Impact of Riprap Repair to Riverine Edge Habitat

As part of the 2011 Environmental Assessment the U.S. Army Corps of Engineers was required to complete habitat mitigation for the batched 2007 and 2011 repairs at 60 sites along the lower Skagit River mainstem.[1] Monitoring was conducted at 13 of the 60 sites, and when compared with baseline riprap conditions, the mitigation sites as a whole were found to have offset impacts to riparian vegetation, rearing habitat, refuge habitat and forage habitat for fish. Individual sites partially or not providing functions were most often the result of habitat features not being installed during levee repair.[2]



U.S. Army Corps of Engineers Mitigation Monitoring Sites Along the Lower Skagit River mainstem.

The Corps developed the 2011 Habitat Capacity Mitigation Tool (HCMT) in conjunction with the Environmental Assessment (EA) to have metrics for salmon habitat that could be used as a basis to measure the performance of compensatory mitigation. The habitat focus of the HCMT are rearing, foraging and refuge riverine edge habitat for juvenile chinook, as well as the riparian corridor. Monitoring for the 13 sites resulted in a performance status for each of these four focus areas reported as "functions met (+)", "functions unmet (-)", or "functions partially met (+/-)".[3]

The majority of functions were met, at least partially, for the 13 sites. Functions were not met for rearing and riparian at one site, not for foraging at another site, nor for riparian at two other sites.[4] As a whole, the negative impacts of Corps riprap repair appear to have been mitigated for through the HCMT. This should not be interpreted as restoration or recovery of habitat; this mitigation only means that the riprap repair actions taken by the Corps that negatively impacted riverine edge habitat and riparian habitat in the lower Skagit River were at least partially offset by habitat mitigation. The legacy habitat impacts of extensive riprap along the lower Skagit River mainstem continue mostly unmitigated.

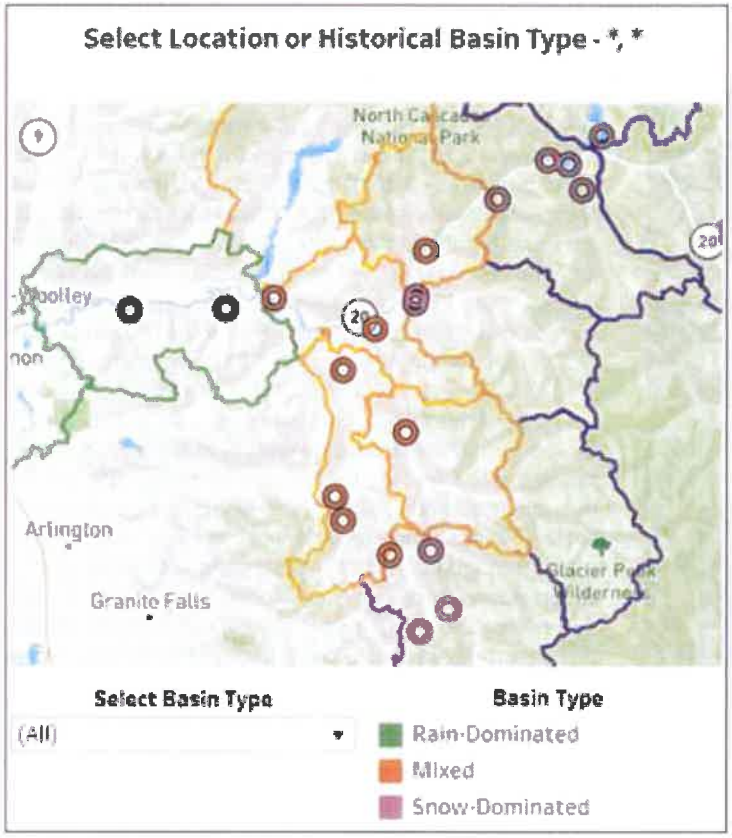
Performance Results for 13 Monitoring Sites[8]

	2017 Results – Habitat Functions			
Site ID	Rearing	Refuge	Forage	Riparian
1-3	–	+	+	–
3-5	+		+	
3-6	+	+	+	±
3-8	+	+	+	–
3-11		+	+	–
12-6	+	+	±	+
12-9	+	+	±	+
12-13	+	+	±	+
12-14	+	±	–	+
17-2	+	+		
17-9		+	±	+
17-16		+	±	±
22-7	+	+	+	±

Map Data Sources: WAECY 2018,[5] USACE 2017,[6] SSHIAP 2004[7]

Climate Change Impacts to Streamflow Will Threaten Steelhead Recovery in the Skagit

Results from climate change modeling for a collection of sites throughout the Skagit River system show increasing winter peak flow and decreasing summer low flow as more future annual precipitation is expected to fall as rain than snow. By 2099, results from an ensemble of models forecast that the 2-year high flow event will increase from its historic average by 22% under a low emission scenario, and by 33% under a high emission scenario. The same ensemble of climate models forecast that by 2099, the lowest 7-day 2-year low flow event will decrease from its historic average by 33% under a low emission scenario and by 45% under a high emission scenario.[1]

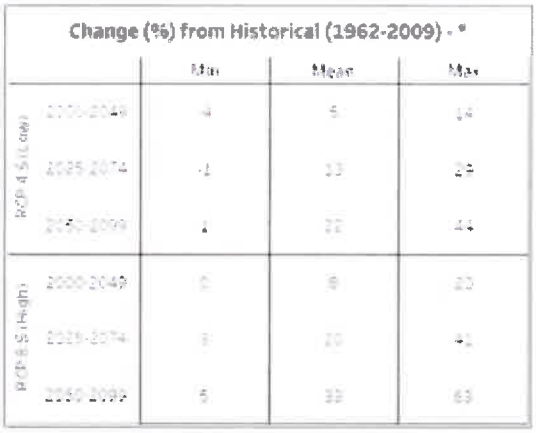


Skagit River steelhead are more susceptible to streamflow changes driven by climate change than some other anadromous species in the basin because they are in freshwater for a longer period of time (over a year in some cases). The changes in summer base flow and in peak winter flow are likely to impact adult steelhead river entry, pre-spawn mortality, spawning, egg incubation and juvenile steelhead rearing.[2] That means Skagit steelhead will potentially be stressed at nearly every point in their freshwater life cycle in the near future.

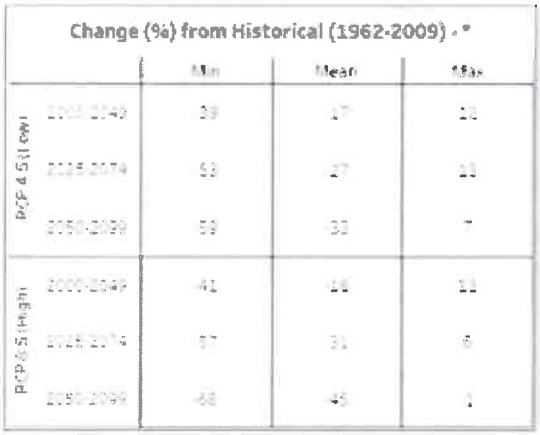
In light of the relatively high impact climate change will have on Skagit steelhead in the freshwater environment, even more needs to be done to increase habitat resilience so that they have time to adapt. Adaptation measures should include all of the following:

- Protecting instream flows and improving flows in the Skagit River by enforcing regulations,
- Restricting permit-exempt wells in areas that are hydraulically linked to waterways with low summer flows,
- Supporting incentive programs for water banking or water rights lease or purchase,
- Protecting and restoring groundwater recharge areas and riparian buffer habitat and
- Improving other hydrological characteristics like floodplains to provide lower energy habitat during peak flows and wetted habitat during summer low flows.[3]

2-Year Peak Flow Events (Q2)



Lowest 7-Day 2-Year Flow (7DQ2)



The Skagit Climate Science Consortium (SC2) worked with the UW's Climate Impacts Group to create an interactive web-based tool that anyone can use to look at the hydrologic impacts of forecast climate changes under different global emission scenarios. Captured here is Mean Monthly Flow averaged for all sites in the Skagit River watershed for water years 2038 through 2067 under low global emission and high global emission climate change scenarios.[4]

Map Data Sources: WAECY 2018,[5] USACE 2017,[6] SSHIAP 2004[7]

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