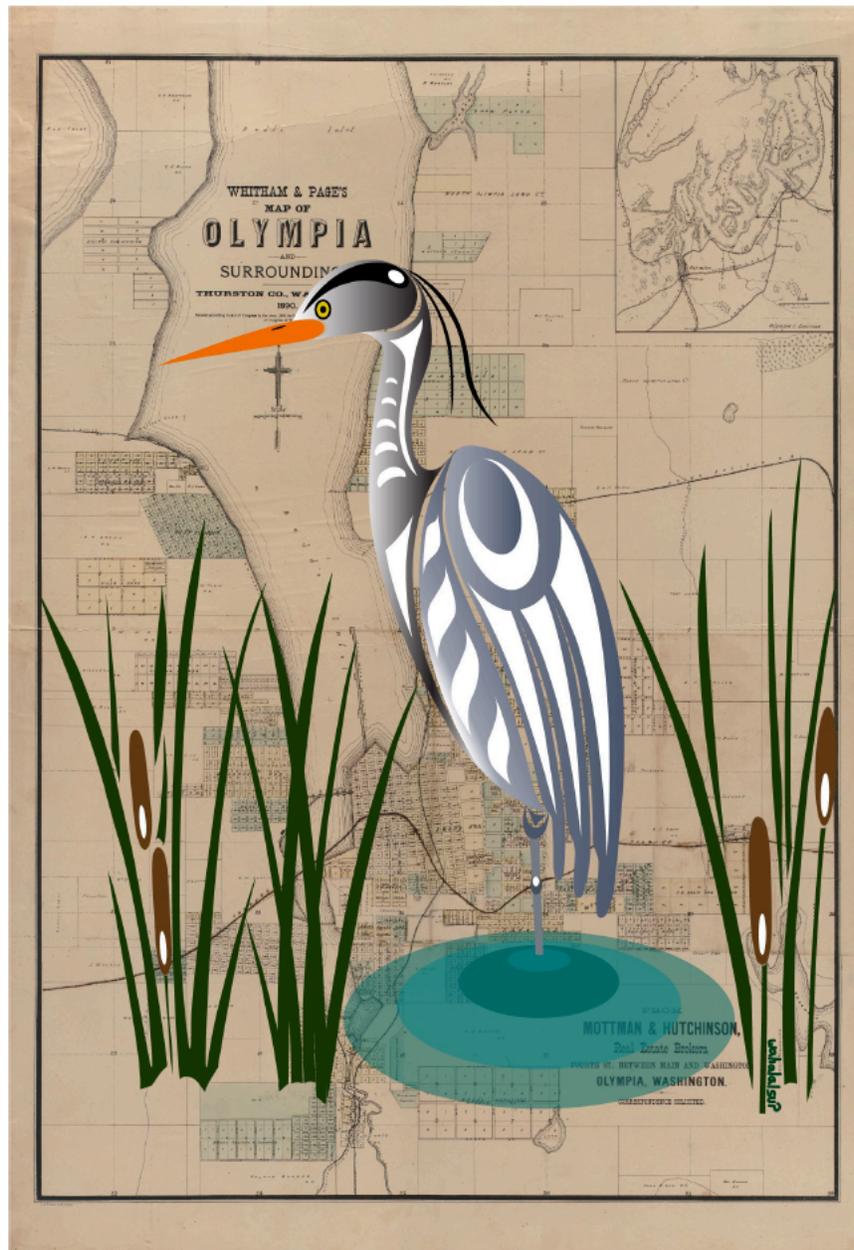


REMOVING BARRIERS



Restoring Salmon Watersheds through Tribal Alliances

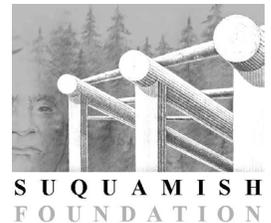
Students & faculty of “Conceptualizing Place: Pacific Northwest
Native Art & Geographies,” The Evergreen State College



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For PDF downloads of Removing Barriers (Parts 1 & 2), see <https://sites.evergreen.edu/RemovingBarriers>

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Removing Barriers: Restoring Salmon Watersheds through Tribal Alliances

“Conceptualizing Place:

*Pacific Northwest Native Art & Geographies” program,
The Evergreen State College, Olympia, Washington, Winter 2021
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Indigenous Guest Artists



“sbəq̣wə? (Great Blue Heron) 1890”

Cover Artist’s Statement, by Joe (wahalatsu?) Seymour, Jr.

“By superimposing the image of the sbəq̣wə? over the 1890 map of Olympia, I wanted to show that even though the land around present-day downtown Olympia has been altered, Nature still exists in the area and that it wants to go back to its original state. This old map of Olympia shows what downtown looked like before it was filled in and what the Deschutes River looked like before the fish dam was installed on the Fifth Ave bridge. By showing what the river looked like before, I’m hoping that people can see what it can look like again, once the fish dam is removed and Capitol Lake is drained. It’s my dream to bring back the estuary to the mouth of the Deschutes and let Nature return to its original state.”

<https://joeseymourart.com>

Views on Fifth salmon art serves as reminder that building stands on Squaxin Island land



Molly Gilmore, *The Olympian* (March 2, 2021): The enormous steel salmon on the façade of Views on Fifth building mark the spot through which the fish swim on their annual journey upstream and serve as bold reminders of the area’s significance to the Squaxin Island people. Designed by Squaxin Island/Pueblo of Acoma artist Joe Seymour, the colorfully lit installation is quickly becoming a symbol of downtown Olympia, and the project has won Seymour the Olympia Downtown Alliance’s second annual Design Award....Three of the salmon — each 19 feet tall — swim upstream, while a fourth circles below, waiting its turn....Seymour has been a professional artist since 2006, working in media from carving and weaving to photography and glassmaking. He painted a mural with Olympia artist Ira Coyne commemorating the 2012 Canoe Journey....Growing up in New Mexico and California, he was steeped in the culture of the Acoma, his mother’s people. It



wasn’t until 2003, when he joined the Canoe Journey to Tulalip, that he became fascinated by the other half of his heritage....He soon began studying art at The Evergreen State College and made the decision to devote himself to art in 2005 after working with glass artist Preston Singletary at The Longhouse. Studying new techniques and tackling new challenges has been a major theme for Seymour. Currently, he’s working on his carving skills and preparing to teach a class on studio art and indigenous culture at the University of Washington. And he wants to do more public art, including painting another mural. “I want to see more Coast Salish art in this area,” he said...

Thanks to other Indigenous guest artists

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Introduction: Removing Barriers

Zoltán Grossman and Alexander McCarty

Across Pacific Northwest Coast Native nations, there are many different stories about Raven. Some of them depict Raven as a trickster, others show Raven as a helper, protector, and provider. One story is about when Raven found the first human beings in a clamshell after a great flood. Raven decided that he needed to protect the human beings and help them survive in this new world. He knew exactly what to do to help them. He picked up the clamshell with his claws and flew up into the sky and soared along the edge of the coastline. He began dropping humans at the mouth of each river he flew over, knowing that they would be able to enjoy the abundance of food provided by these rivers. That is why Pacific Northwest Native communities live at the mouth of each river today (Krise).

For many centuries, tribal peoples were able to harvest and hunt in their ancestral territories (often based on river watersheds), and fish at the mouths of the rivers. These estuaries, built up by sediments deposited by the rivers, have a brackish mixture of freshwater and saltwater, ideal for generating and sustaining life. The keystone species for Pacific Northwest Native peoples are the salmon, with its amazing life cycle of birth in its natal stream, adulthood in the ocean, and miraculous return home to spawn the next generation, and die.

In many ways, the life cycle of the salmon parallels the cycle of Native history in the Pacific Northwest. Like the salmon, Native peoples are dependent on the health of their rivers and ocean, and have survived by fighting upstream, in this case against the coercive power of settler colonialism. Indigenous nations have survived in the face of violence, land thefts, epidemics, forced assimilation, boarding schools, and urbanization, much as salmon have barely survived commercial harvesting, industrialization, habitat destruction, and pollution.

The resilience of place-based and time-tested Indigenous knowledge systems parallels the resilience of landscapes and natural species after centuries of abuse. For both salmon and Native peoples, life in the Pacific Northwest has been a constant struggle to persist, endure, recover, and revitalize, and to remain resilient against overwhelming odds.



Life cycle of a salmon, from eggs to alevin, fry, fingerling, and smolt (Credit: Parker Wong).

This book tells the story of these watersheds and estuaries as a microcosm of the larger story of the resilience of Pacific Northwest Native peoples, and their relationships to the descendants of the settlers. It focuses on barriers to salmon migration (such as dams, dikes, and culverts), and how tribal nations have led the effort to remove some of the barriers in order to restore salmon habitat

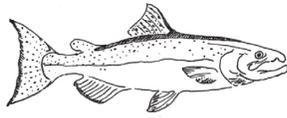
in Pacific Northwest watersheds. Learning the precolonial, colonial, and decolonial histories of the Pacific Northwest is vital to understanding why and how Native nations have fought upstream for the water, salmon, and future generations.

Precolonial Indigenous World

Water needs to flow freely, because water is life. “The waters that run through Indigenous lands are the arteries that feed us—humans and more-than-humans... Water runs through our human veins and connects us to everything. The water that we drink is the water the salmon breathes, is the water the trees need, is the water where Bear bathes, is the water where the rocks settle. Many of our stories foreground relationships to water” (Yazzie & Risling Baldy).

The stewardship of river watersheds has always been of central importance for Native nations of the Pacific Northwest. Since time immemorial, Native communi-

ties had a government system that helped them protect their homelands. This system was called the Potlatch. Through Potlatches, Native communities were able to govern themselves, control their economy, publicly and fairly deal with disputes, pass on oral history and traditions, and manage their natural resources. Through



inherited rights and privileges, in many instances connected to family names, songs and dances, community members earned their

own accesses to shellfish beds, fishing, hunting, and harvesting territories. With these protocols adhered to, there were never any issues related to overharvesting or other environmental damages. Across generations and generations, families had opportunities to build relationships with their environment and become experts in regards to effective uses of its natural gifts.

Although the Potlatch system was hierarchical in structure, it provided opportunities for people to move themselves into leadership positions within



their villages through fostering reciprocal relationships. Makah elder John McCarty said that no one could never take and claim a Chief status during that time, rather the community gave someone that honor because they appreciated his good deeds and were thankful for his ability to take care of his people. For instance, when a Makah Chief had a Potlatch, it was normal for him to be very generous and publicly gift and honor all who attended and witnessed what took place. In this way, Potlatches strengthened community ties. Later on, when those who received gifts from him hosted their own Potlatches, they would make sure to recognize and honor him during protocols and gifting.

Positive intervillage relationships were very important to make this Potlatch system function. In order for a village leader to successfully control the natural resources within his borderlands, it was crucial for surrounding villages to agree on the extent of their harvesting territories, so that they did not unintentionally overlap. Furthermore, when a Potlatch host invited families from other villages, it was normal for him to gift them with enough food and supplies to last them over three days for their travel home. Through this reciprocal act, all benefited. The

Salmon species (from top): Chinook, Chum, Coho, and Pink (Credit: Parker Wong).

ones traveling would have everything they needed for their journey home and, in turn, they had no need to harvest in the Potlatch host's territories. Reciprocity made this system work.

The arrival of European explorers at the end of the 18th century, and fur traders in the 19th, changed the economy of the Potlatch system in ways that benefited local Native communities. Learning how to manipulate the wage-earning economies at first provided opportunities for many Native people to move up the hierarchical ranks within their villages (Raibmon). For more than a century, these new European economies supported the Potlatch system, until the arrival of American settlers.

Treaty Rights and Tribal Sovereignty

As full-scale U.S. settlement began in the Pacific Northwest, Washington Territory Governor Isaac Stevens negotiated a series of six treaties with the Indigenous nations of the region. The Stevens Treaties of 1854-55 extinguished Native claims to 64 million acres, in return for the exclusive tribal use of small reservations, most located near the prime fishing grounds at the mouths of major rivers. Native communities needed guaranteed access to all the species of salmon, the Chinook (King), Chum (Dog), Sockeye (Red), Coho (Silver), and Pink (Humpback), as well as steelhead (ocean-going trout).

In order to survive on these reservations, and maintain their cultural lifeways, the Native nations signed the



treaties only on the condition that they would retain their pre-existing access rights to fish, hunt, dig for shellfish, and gather

plants, berries and roots. The treaties stated that the tribal right to fish in "all usual and accustomed fishing grounds and stations, is...secured to said Indians in common with the citizens of the territory" (Harmon).

The treaties would come to define the relationship between the U.S. government and 20 treaty tribes living west of the Cascades. In the Puget Sound War of 1855-56, some tribes fought the treaties limiting them to tiny reservations away from their "Usual and Accustomed" fishing grounds, many of them at the mouths (estuaries) of rivers. A few tribes (such as Puyallup and Nisqually) won





access to larger and more favorably located reservations. Although in many cases these treaties became detrimental to Native nations, it is important to acknowledge that Native leaders retained their tribal sovereignty when they signed these treaty agreements.

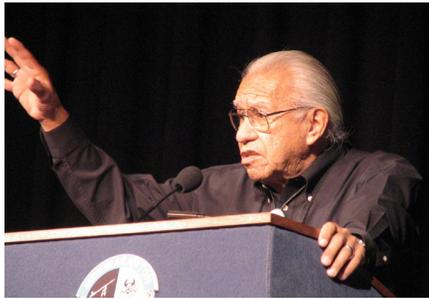
It was not until Native leaders signed the treaties did settler colonialism really take effect in the Pacific Northwest. Shortly after these treaties were signed, the U.S. government enacted a Potlatch Ban very similar to that of Canada’s Indian Act of 1876. In the U.S., Potlatches were frowned upon, but in Canada, they became illegal. Northwest Native communities came under the control of the federal Bureau of Indian Affairs (BIA), which enforced tribal council elections that replaced the Native Potlatch government system.

After Washington entered the Union in 1889, the state government brazenly broke the Stevens Treaties. The tin

can had made commercial fishing a viable economic option for non-Indians, and Pacific salmon stocks began to be seriously depleted. Non-Native fishers harvested the salmon before they could return to the tribes’ “usual and accustomed” places, and the State restricted tribal fishing methods--in the process racializing harvest locations and allocation. The Puyallup lost nearly all of their reservation to the federal policy of allotment (dividing and privatizing tribal lands), and the Nisqually lost access to 70 percent of their reservation when Fort Lewis (now Joint Base Lewis-McChord) was created at the onset of World War I.

In the early 20th century, poor Native families were forced to take jobs in the canneries and hop fields, and later in expanding defense industries. State officials described Native fishers who operated underground as “poachers” and “renegades” who were to blame for declining fish numbers, even as non-Native harvest levels

skyrocketed. At the same time as the landscape became urbanized and industrialized, tribal cultural identity was often treated as less “authentic” than non-Native stereotypes of “traditional” cultures (Raibmon).



Northwest Indian Fisheries Commission (NWIFC) Chairman Billy Frank, Jr. (Nisqually), at the 2010 Native Peoples- Native Homelands Climate Change Workshop in the Shakopee Mdewakanton Sioux Community in Minnesota (Credit: Zoltán Grossman).

In the early 1960s, tribal fishermen challenged imposed state regulations, holding “Fish-Ins” on the Puyallup, Nisqually, and other rivers. State wardens arrested and sometimes attacked Native fishers, and angry commercial and sport fishermen often cut tribal nets, and even

fired rifles at Native boats (Burns). Yet even as public controversy raged around treaty fishing, the tribes never took more than five percent of the salmon harvest.

A 1974 decision by federal Judge George Boldt affirmed treaty rights, and recognized the Native right to a share of the state fishery, “in common” with other state residents (Wilkinson). Heavy ocean trawler fishing had already reduced salmon runs to dangerously low levels, hydroelectric dams frustrated the migration of salmon up key rivers, suburban sprawl destroyed key habitat areas, and clear-cut logging sediments silted up fish spawning beds, yet “white backlash” groups and politicians portrayed tribal fishing as the central culprit in declining fish runs.

By 1979, the U.S. Supreme Court upheld Boldt, and the Northwest Indian Fisheries Commission (NWIFC), chaired by Nisqually treaty rights leader Billy Frank, Jr., had been formed as a prototype for other tribal natural resource agencies around the country, including the Columbia River Inter-Tribal Fish Commission (CRITFC).

Northwest Native Renaissance

In the 1980s, the federal courts took on “Phase II” of the Boldt treaty litigation, in which tribes demanded a voice in regulating logging, dams and agricultural practices that blocked or harmed salmon. The tribes were using the treaties not to overharvest the fish, but to protect the fish from environmental harm, and the power of the treaties brought the large timber and utility interests to the

table (Grossman, 33-63). The treaties could potentially become important legal tools to protect and restore fish habitat.

The tribes and the state slowly instituted a program of “co-management” of off-reservation fisheries and other natural gifts, enshrined in the 1989 Centennial Accord and the 1999 New Millennium Agreement (Washington GOIA). Co-management began to normalize a tribal role in managing, protecting and restoring treaty-ceded territories (NW Treaty Tribes). Washington state also organized Water Resource Inventory Areas based on natural watersheds rather than jurisdictional boundaries, enabling a holistic management of ecosystems without politically dividing them.

The tribal nations of the Pacific Northwest have shown great resilience and self-preservation against the effects of settler colonialism through the 19th and 20th centuries. They’ve put forth great efforts to revitalize their oral traditions and to restore the damages to estuaries and other habitats caused by the misuse of natural resources by others. In the 21st century, Washington’s tribal nations are going through an unprecedented resurgence and revitalization, rooted partly in the treaties. More than any other state, Washington has turned from conflict to cooperation in its dealings with Indigenous nations, because they have so strongly asserted their political, economic, and cultural self-determination.

As NWIFC Chairman Billy Frank, Jr. said, “We have shared our land, water and other resources since the first non-Indians arrived in this region. Today, we need that same kind of sharing so that we can continue to harvest the natural resources that keep our cultures alive and strong” (Frank, 160). Even some commercial and



Chinook salmon in downtown Olympia waiting to pass through the 5th Avenue Dam from Budd Inlet into Capitol Lake and the Deschutes River (Credit: Zoltán Grossman).

sportfishing groups now support treaty cases that restore habitat, such the 2007 Martinez Decision, a key federal District Court ruling directing the State to eliminate culverts that block fish passage.

Challenges remain to tribal treaty rights, particular from sprawl and industrial toxins, hydroelectric dams, and (in the case of Makah) from animal rights groups challenging treaty-backed whaling rights. The climate crisis threatens natural habitat with warmer water temperatures, melting snowpack and glaciers, and shifting species. Several coastal tribes (such as Quinault and Quileute) face increasing flooding, storm surges, and potential sea-level rise, so are moving housing and infrastructure to higher ground (Grossman & Parker, 68-88).



Nisqually canoe arrives at the 2018 Festival of the Steh-chass in Olympia, by the 5th Avenue Dam (Credit: Zoltán Grossman).

At the same time as beginning to restore their local watersheds, some tribal nations in Washington are beginning to revitalize their local economies. The 1988 Indian Gaming Regulatory Act permits tribes to operate casinos if they are within states that allow a lottery. Washington tribes have used this revenue to enhance their own social programs, economic growth, and environmental protection and restoration.

Yet money alone cannot explain the Native Renaissance now underway, which has at its core a cultural resurgence, seen in language teaching, tribal gardens, and the arts. Native youth are increasingly involved in tribal programs and movements that encourage cultural engagement and discourage drugs, alcohol and gangs. The foremost example is the annual Tribal Canoe Journey, in which ocean-going canoes paddle long distances from around the Pacific Northwest, and converge at a different Washington reservation or British Columbia reserve

every summer, followed by a four-day “protocol,” or gifting of canoe family songs and dances. Tribes and First Nations have renewed Potlatch protocols through the Canoe Journey, where host villages invite guests from many nations for sharing traditional foods feasts and creating opportunities for passing on oral traditions, teaching morals, and fostering intertribal allyship.

The Coast Salish Gathering has brought together Indigenous leadership on both sides of the international boundary to protect salmon runs from oil shipping, fish farms, climate change, and other threats in their common waters. In 2009, the U.S. and Canada recognized the name “Salish Sea” to encompass the Puget Sound, Strait of Juan de Fuca, and Strait of Georgia.

Like in revitalizing the environment, challenges remain in revitalizing tribal economies and cultures. The level of awareness of tribal sovereignty is still quite low among the non-Native majority, especially due to the large influx of newcomers who do not yet understand the central role of treaty rights in Washington. State tribal sovereignty curriculum aims to teach schoolchildren about the histories of tribes located in or near the school district, to build a long-term bridge of understanding (OSPI).

Through leading environmental restoration, and strengthening their political, economic and cultural self-determination, tribal nations are providing models of resilience for non-Native communities. In the 2010s, Northwest tribes led successful alliances with fishing and environmental organizations to stop fossil fuel shipping through coastal ports (Grossman, 193-204). Indigenous peoples around the world are developing new models of “environmental justice,” not only using treaty rights and sovereignty to protect the environment, but using their own cultural and spiritual frameworks of building relationships to their lands and waters, and healing natural habitats from the damages inflicted by settler colonialism (LaDuke; Gilio-Whitaker).

Removing Barriers

By decolonizing their ancestral territories, Indigenous nations are benefiting not only themselves, but are “removing barriers” with those local settler communities whose local knowledge is not as deeply place-based or time-tested as ancient Indigenous knowledge, but nevertheless value the integrity of the lands and waters. This cooperation enables tribes and their allies to restore salmon habitat in their watersheds, and in particular to initiate “removing barriers” such as dams, dikes, and culverts, that block the migration of salmon.

Settler colonialism, coupled with corporate capitalism, has transformed the precolonial ecosystems of the region, including the biodiverse forest and cold streams where salmon once thrived. Timber companies chopped down vast native forests, exposing the soil to erosion, causing floods and sediment runoff that silted up the stream gravel beds where salmon lay their eggs in nests (or redds), and exposing the streams to sunlight that warmed the water. Farmers straightened meandering



“Guardian: Fighting” (salmon) and “Guardian: Watching” (heron) sculptures, with steel by Milo White and glass by Lin McJunkin, installed by City of Olympia Art Crossings Program on West Bay Drive, 2021 (Credit: Zoltán Grossman).

streams and installed fish-blocking culverts to make irrigation channels, eliminated small beaver dams that had hydrated the river systems, and erected dikes to turn estuary wetlands into cattle pasture. Industrialization released contaminants into the water, erected fish-blocking dams to provide electricity, and drew millions of workers whose cities and highways paved over precious habitat.

In the 21st century, these ecological threats have intensified by the climate crisis, which causes sudden spring melts of snowpack and glaciers, causing floods and scouring out the redds, followed by summer low flows that are unhealthy for both salmon and farms (Grossman & Parker, 53-67). Dams around the world are also not prepared to hold climate change-induced floods, as the

deadly 2021 India dam disaster tragically showed. As discussed in the first chapter, dams, dikes, and culverts not only block salmon runs, but block the rapid flow of water, raising temperatures in the stagnant reservoir pools behind them, and concentrating unhealthy toxins and invasive species (Hydropower Reform Coalition).

Native resistance to dams played a key role in early Native environmental justice activism in the mid-20th century. A series of Pick-Sloan Plan dams along the Missouri River in the 1940s-50 constituted “a twentieth-century Indigenous apocalypse,” by flooding “more Indigenous lands than any other public works project in U.S. history,” affecting 23 reservation communities (Estes, 134-139). Seneca leaders in New York similarly stood up against the Kinzua dam project in New York (Klein).

Pacific Northwest hydroelectric dams were built both on coastal rivers, and on rivers in the interior Plateau region. A series of dams in the Columbia-Snake waterway have blocked so many millions of Chinook salmon trying to migrate upstream that they threaten to starve orca whales (Mapes 2021b), and bankrupt fishing communities along the Pacific Coast. A vibrant alliance of tribal, fishing, and environmental communities has long called for the breaching of the earthen portions of four Snake River dams to restore salmon habitat (Grossman, 64-97). In 2021, a new plan emerged to breach the four dams, and compensate farming communities that have depended on the artificial pool reservoirs to barge their products to market (Mapes 2021; Idaho Statesman).

Two dams on the Elwha River of the northern Olympia Peninsula were successfully removed in the 2010s, allowing salmon to return to areas where they had been blocked for a century, and revealing a submerged tribal sacred place (Mapes 2013; Fox *et al*). The dam removals also allowed the free downstream flow of sediments to the sea, to bypass the redds and build up the river-mouth estuary, restoring a beach and shellfish-gathering grounds for the adjacent Lower Elwha Klallam Tribe. Billy Frank Jr. wrote in 2011, “The Olympic Peninsula has struggled for years as its fishing and timber-based jobs have disappeared. But removal of the Elwha River dams is changing that. Hope is replacing fear, jobs are being created and more will be coming in the long term... These things tell us that we can conserve our natural resources and create jobs, that healthy salmon runs and a healthy economy can go hand in hand... The Lower Elwha Klallam people have put their treaty rights to work, restoring the Elwha for all of us, Indian and non-Indian... [T]here are many more Elwha dams out there... We all need to make sure that no more dams get in the salmon’s way” (Frank, 178).



Western Washington Watersheds in Chapters

Elwha Watersheds covered in single chapters **White** Watersheds covered in chapter 7 Key dam site

These successes have inspired other, smaller-scale dam removals on the Nooksack and White Salmon rivers in Washington, and plans for dam removals on the beleaguered Klamath River in southern Oregon, and on the former Deschutes River Estuary in downtown Olympia, where the 5th Avenue Dam forms Capitol Lake. Washington tribes and their partners have also tried to offset the negative effects of dams on the Nisqually, Skokomish, and White rivers, by building new fish-passage

facilities and repairing other parts of the watersheds. Concerns about the effects of dams on salmon runs have so far blocked the construction of a new flood control dam on the Chehalis River near Pe Ell, Washington, and motivated cooperation to prevent floods through more holistic ecosystem management. All these watersheds, and examples of tribal leadership in dam removal or mitigation, are discussed in this student-produced educational publication.



Tribes and Dams of the Columbia and Klamath Basins

- Columbia-Snake Basin
- Columbia River Inter-Tribal Fish Commission (CRITFC) tribes
- Other reservations & reserves in Columbia and Klamath Basins
- Klamath River Basin
- Treaty boundaries of CRITFC tribes
- Major dam in basins

©Map by Zoltán Grossman

Watershed Restoration

Due to the Martinez Decision, the State of Washington is finally being forced to repair or remove harmful culverts, and install new culverts that are fish-friendly (such as on Chico Creek in Suquamish territory, also discussed in this publication). The Tulalip Tribes are relocating beavers to “rehydrate” the upper reaches of the Snohomish River, and making plans to mimic beaver dams by storing spring runoff for release during summer low flows (Ghogaie). Tulalip is also the “lead entity” in removing levees and dikes in the river estuary (Winters). In its Nisqually River watershed, the Nisqually Tribe is recognized as the “lead entity” in creating watershed management plans for private farmland owners, and state and federal agencies, together placing three-quarters of the Nisqually River mainstem in protected ownership (Nisqually River Council).



Tribal Canoe Journey arrives at the Lummi Nation in 2019 (Credit: Zoltán Grossman).

Standing in the Nisqually River Delta on a misty afternoon, one can observe a landscape that is healing. After decades of being diked to create pasture, tidal flows are again allowed to bring salt water and aquatic species into old restored channels. After decades of being grazed by cattle, riparian (streamside) vegetation is being brought back to prevent erosion, and sacred springs are protected. After a century of being straightened to drain the wetlands, upstream tributaries of the Nisqually River are being remeandered, and log jams are being installed to create pools for salmon to rest on their long journey back home from the ocean. After decades of declining runs, the salmon are returning to the Nisqually Watershed, because their habitat is finally being restored, and two hatcheries are restocking the river. The landscape is slowly being healed, and made more resilient, through tribal partnerships with non-Native residents and government agencies (Middleton, 185–194).

At first glance, the restoration of the Nisqually, Elwha, Snohomish, Nooksack, White Salmon, and other Pacific Northwest watersheds can be attributed to enlightened Western scientific practices based on sustainability principles. Yet it is the leadership role of the tribal nations, using a creative mixture of Indigenous and Western

knowledge systems, that has led this process of salmon habitat restoration, as a form of “environmental repossession” (Big-Canoe & Richmond). *These Pacific Northwest watersheds are healing because the Native nations are beginning to decolonize the watershed territories they had ceded in the treaties.*

Only because the Indigenous people of the watershed are asserting their self-determination, and strengthening the value of their lifeways rooted in their ancestral lands and waters, are they able to start reversing the damage wrought by decades of harm. The ecosystems may not revert to their natural, precolonial state, but can be slowly revitalized and made healthier by “negating the negation” of settler colonialism. In fighting for the resilience of their watersheds, Billy Frank Jr. and other tribal leaders have convinced their settler neighbors to forge a path away from conflict and toward cooperation. In this era of political polarization and climate and health crises, it is critical to study how “removing barriers”

between communities, and “removing barriers” to tribal sovereignty, have proven to be instrumental to “removing barriers” for salmon fighting to migrate upstream.

Our class and project

This publication on removing barriers to salmon runs was produced by the students and faculty of our Evergreen State College class “Conceptualizing Place: Pacific Northwest Native Art and Geographies.” At Evergreen, most undergraduate students take only one 16-credit class, co-taught by two or more faculty, who interweave their academic disciplines into a holistic inquiry. This structure allows students and faculty to form a learning community, getting to know each other well over one to three quarters, and having time to develop depth and rigor in their studies. Evergreen faculty have the space to do similar work with our undergraduates that we did as graduate students, and to develop interdisciplinary class projects that in some ways could be done only at Evergreen.

“Conceptualizing Place” combined the fields of art, geography, and Native Studies. Both of us come out of a

background in Native Studies, but Professor McCarty also has a degree and decades of experience as a professional artist and Makah carver, and Professor Grossman has a degree in geography and decades of experience as a professional cartographer. We decided to co-teach “Conceptualizing Place,” drawing from a similar 2008-09 course taught with Professor Lara Evans (now a Dean at the Institute of American Indian Arts in Santa Fe). The students in that program produced podcasts about the Nisqually Tribe’s natural and cultural resource programs (Conceptualizing Native Place).

Olympia’s ideal location at the southern tip of the Salish Sea offers students and faculty access to numerous tribal nations. Our lofty plans for the 2020-21 class involved field trips to Native nations on the Washington and British Columbia coasts, but the unfolding pandemic threw a wrench in those plans. Coastal tribes used their sovereignty to defeat the virus, by blocking outside visitors (Ryan). Instead of trips, we decided to use the online Zoom and Canvas platform for our fall 2020 class to remotely teach students digital art and map production and appreciation, in preparation for producing this book in winter 2021.

“Conceptualizing Place” explored historical and contemporary relationships of Pacific Northwest Native peoples to place, using art and geography in a cross-cultural comparative analysis, and as “common ground” for strengthening intercultural communication. The unique status of Indigenous nations can be better understood by highlighting the centrality of territory in Native identity, and the strong Indigenous connections to place (McMaster). These connections can be seen in numerous fields, such as art and material culture, Native national sovereignty, attachment to aboriginal and treaty-ceded lands, the focus on traditional land use and protection of sacred sites, environmental protection, Native climate justice, sustainable planning, and Indigenous migration and symbolic mobility (through community practices such as powwows and canoe journeys).

All of these connections have been expressed artistically and geographically through traditional Indigenous cartographies, artistic “mapping” of ideas using contemporary art practices, digital graphic design, and modern mapmaking techniques. Examination of cross-cultural and cross-disciplinary ideas about land, place, envi-

ronment, and relationship to human cultures offers the opportunity to develop new conceptualizations for the meaning of place, self, and community (Aberly). We have examined how conceptions of land are disseminated through art and objects of material culture, informing our examination with geographic studies and investigation into the sociopolitical uses of mapping.

Students have discovered differences and potential meeting points between Native and Western cultural systems, identified differences within and among diverse Tribes and First Nations, and developed an understanding of Indigenous peoples’ ability to define and set their own social, cultural, and spatial boundaries and interpretations (King). Students have developed a greater awareness of Indigenous cultures, but also of aspects of culture that may be determined and protected by Native peoples themselves, and methods of meeting contemporary crises (such as climate change) that draw from Indigenous knowledge and methodologies (Whyte).



Great Blue Heron in Olympia’s Budd Inlet (Credit: Zoltán Grossman).

In fall quarter 2020, we introduced students to historical geographies and worldviews of Pacific Northwest Indigenous nations, and literacy in graphic representational systems for geographic data, as well as basic visual literacy skills in the northern Formline style of Indigenous art (Holm). Afternoon digital workshops trained students in the design and production of artwork or maps in Adobe Illustrator. Both the artwork and the maps were inspired by and strengthened a watershed-based perspective of Pacific Northwest landscapes. We had the invaluable assistance of Evergreen’s Media Services staff, particularly assistant director Vito Valera, who helped train our students in Adobe Illustrator (Conceptualizing Place 2020).

In winter quarter 2021, Valera trained the students in Adobe InDesign, and we formed student teams to assemble text, artwork, maps, photographs, and other graphics into the chapters of this educational publication. We listened to guest speakers from the Nisqually and Squaxin Island Tribes, as well the Native artists Lillian Pitt, Joe Feddersen, Joe Seymour, and Corky Clairmont. Students also built on their visual literacy skills in Pacific North-

west Indigenous art, with a particular focus on the Coast Salish art style (Blanchard & Davenport; Brotherton; Wright & Bunn-Marcuse). We discussed the difference between art appreciation and cultural appropriation, by considering the significance, source, and similarity of the artworks. We collectively decided project specifications, and student teams worked online through the pandemic. Most students in this project have never actually met each other face-to-face. Some were able to visit their research sites to take photos, and others relied on existing photos (Conceptualizing Place 2021).

Through cultural art appreciation and visual literacies, students learned to create Formline style designs that honor the First Nations of the northern Pacific Coast, and learned about Coast Salish design to honor the artistic practices of local tribal nations of the Salish Sea region. Other students learned to tell stories through cartography and created maps about watersheds they researched in case studies. We are proud that for this self-published book, students produced 42 original artworks or maps, as visual narratives of the watershed stories.

Whether through art, maps, or text, the students sought to tell the unique stories of Pacific Northwest watersheds, and the tribes and allies who have protected and healed them. We hope this book raises public awareness on the need to support and collaborate with the people of the rivers, for the benefit of all living things and our future generations.

Faculty

Alexander Swiftwater McCarty (Makah) has taught Native Studies and Visual Arts at The Evergreen State College Olympia campus since 2014. He earned his Master in Teaching degree at Evergreen in 2002, and taught for several years at Chief Leschi Schools in Puyallup, Washington. His teaching and visual arts interests include Pacific Northwest Native regional design, woodcarving, and printmaking. He completed public works in 2013-15 for the Tacoma General Hospital's new Rainier Tower, and in 2015-18 was the lead designer and carver of the west elevation of the Fiber Arts Studio that was built on Evergreen's Indigenous Fine Arts Campus. He lives in Olympia with his wife and two children, and enjoys working in his garden, camping, surfing, and ocean fishing. <https://alexmccarty.org>

Zoltán Grossman has taught Geography and Native Studies at The Evergreen State College in Olympia since 2005, studying the intersections of cultural nationalism, natural resources, and militarism. He is a longtime community organizer, was a co-founder of the Midwest Treaty Network in Wisconsin, and earned his Ph.D. at the University of Wisconsin-Madison in 2002. He is past co-chair of the Indigenous Peoples Specialty Group of the Association of American Geographers, author of

Unlikely Alliances: Native Nations and White Communities Join to Defend Rural Lands (University of Washington Press, 2017), and co-editor of *Asserting Native Resilience: Pacific Rim Indigenous Nations Face the Climate Crisis* (Oregon State University Press, 2012). He lives in Olympia with his wife, and enjoys biking, gardening, hiking, and exploring back roads. <https://sites.evergreen.edu/zoltan>

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Klamath River from the bridge at Weitchpec, California, with Yurok Nation offices on the left (Credit: Zoltán Grossman).

1. Dams, Dikes, and Culverts: Blocking the Flow of Life

Jansan Helligso and Alex Marroquin

For centuries, industrial civilization has been altering the world to suit human needs. We have harnessed the power of the elements, from the rays of the sun to the currents in the oceans. We have built infrastructure that allows us to control our environment and have elevated ourselves above the role of an Earth inhabitant. There are consequences to these actions, as our efforts in the name of “progress” have led human beings to manipulate the natural world beyond recognition.

Our waterways do not flow like they once did. They have been altered to benefit industry, and not only has the environment greatly suffered, but so too have the peoples that have lived with and relied upon these waterways since time immemorial. This chapter will introduce how the building of dams, dikes, and culverts has impacted our waterways and fish habitats and affected the people that depend on them.

Dams

Construction and Function of a Dam

Dams are structures that span across running waterways, such as streams and rivers, and their main purpose is to hold back and store water in reservoirs. Human beings have been building dams for centuries and have used a variety of materials to do so. Dams are used to hold back the power of rivers in order to create water storage and prevent flooding, by use of the reservoirs created by the structures. Dams can also divert water for uses such as agricultural irrigation and drinking water. With the advent of electricity, many dams are now built for generating electrical power (National Geographic Encyclopedia 2019).

By installing water wheels at dams, human beings have been able to operate mills to grind grains, or power saw

into electrical power (National Geographic Encyclopedia 2019). Hydroelectric dams produce massive amounts of energy. The Grand Coulee Dam alone, which is located on the Columbia River at the Colville Indian Reservation, produces 6,480 megawatts of electricity. Since the dam’s completion in 1942, it remains the largest concrete structure in the U.S. (Power Technology).

At one point, perhaps, the dams along the Columbia River served a purpose, but today they are outdated, and often in need of repairs. The cumulative repair cost for the Grand Coulee Dam has yet to be paid off, and more than fifty years after its completion, the original construction cost remains unfulfilled (U.S. Bureau of Reclamation).

Using “Clean” Energy

A popular belief is that dams are free of greenhouse gas (GHG) emissions and so are clean, renewable sources of energy. However, studies conducted in the past 20 years have tested these claims and found that regardless of purpose, artificial dams and reservoirs are major contributors to GHG emissions (Hudson). Studies conducted across multiple countries, such as the U.S., China, Canada, and Brazil, have found that by artificially flooding large portions of land teeming with terrestrial life, the plants and trees that essentially drown decompose in ways that converts their biomass into carbon dioxide, nitrous oxide, and methane gases (Deemer). Although methane has a relatively short lifespan as a GHG, it is one of the greatest contributors to climate change because of its ability to powerfully accelerate the warming effect in the atmosphere. Quantifiably, methane is several times more dangerous as a GHG than carbon dioxide. Similar research into human-constructed dams has also found that 79% of GHG emissions by reservoirs is methane (Hudson).

Art piece displayed in background: “Adversary,” Artist’s Statement by Jansan Helligso: “This painting is meant to represent the challenges that salmon face. To reach their spawning grounds, they must travel upstream, and so the waves are against them. As the waves grow larger, the salmon reach their largest adversary: the dam. I designed the layout of the painting to represent a Coast Salish spindle whorl. I was so inspired by the stories carved onto the whorls that came to life as they were spun. I would like to imagine that if my painting were spun as a whorl, then it would tell the story of the salmon leaping over the dam, and finding their way back home. The design elements that I used are also Coast Salish, and I hope that I was able to honor this lively and beautiful art form” (Credit: Jansan Helligso).

Meditation on The Dalles Dam

By Gail Tremblay for Lillian Pitt

***Electricity is humming in a spider web of lines
as copper wires cased in rubber cross the land;
what sorrow builds in this sound that only whines***

***where the thunder of water no longer combines
with a wild rush of salmon so close at hand?
Electricity is humming in a spider web of lines.***

***Where fish runs were rich, everything declines.
No one explains how a body can withstand
The sorrow that builds in this sound that only whines.***

***Fishermen stood on scaffolds amid the steep inclines
of rock; water foamed before the flow was dammed
so electricity could hum in a spider web of lines.***

***Rocks watched while men made strange designs
To swell the river to places no rush of water planned.
What sorrow grows when the new sound only whines?***

***The bodies of old ones wash out of ancient shrines—
how can the spirits of the dead learn to understand
the electricity that hums in a spider web of lines.
What sorrow builds in this sound that only whines?***

Geographic Impact of Dam Placement

Dams impact river geography in multiple ways, and each of these methods has its own effects on the environment (American Rivers). Typically, the larger the dam, and the larger the water reservoir it creates, the more influence it has on the environment.

When a dam blocks a running waterway, it creates a water reservoir above the dam, and can reduce the water below the dam to a trickle (Stahl). While we might think that the water storage in these reservoirs means that we

have more water available, the opposite is actually true. Reservoirs have more surface area than running rivers, so more evaporation is occurring from the surface of the water, particularly in regions where the temperature is warmer, such as eastern Washington (see Snake chapter). The larger surface area of the reservoirs also means that when sunlight hits the water's surface, it increases the temperature of the water, which is harmful to fish (Stahl).

Further downstream from a dam, the geography is changing in different ways. The dam captures sediment that would typically flow further downstream and be deposited along the river's course as it flows to the ocean. Without that sediment deposition, rivers begin to take a new shape. They erode their banks without depositing new sediment to compensate for sediment loss, and so they pick up speed. Like a speeding train, the water barrels towards the end of the river system, often scraping the surrounding land down to the bedrock (Stahl; Poff & Hart). The decrease in sediment diminishes the estuary wetlands around the mouth of rivers, and this is hugely detrimental, as the carbon dioxide that was stored in those wetlands gets released back into the atmosphere as a greenhouse gas (Stahl).

How Salmon Have Been Affected

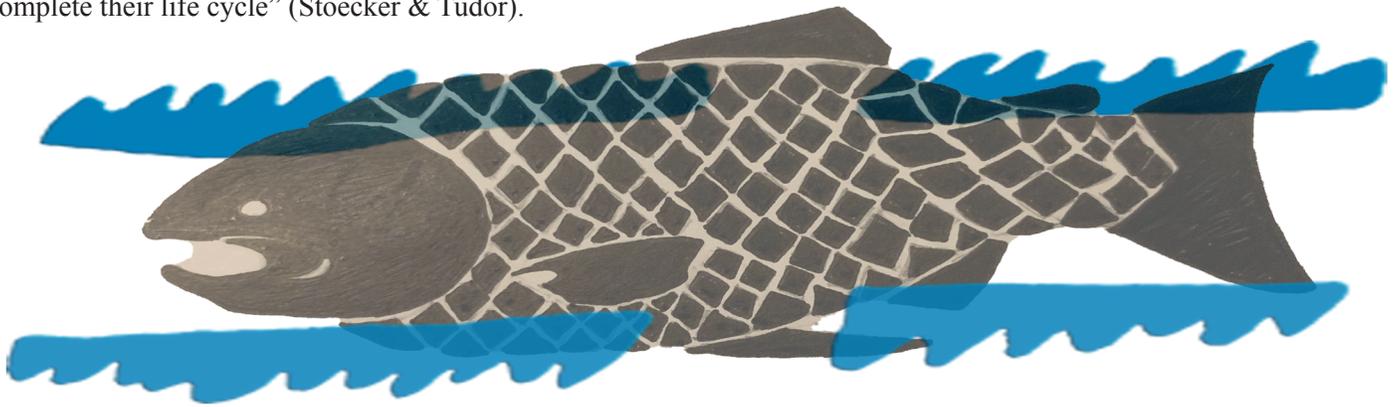
Salmon are a keystone species not only in their native waterways, but also within the Indigenous cultures of the Pacific Northwest. As long as tribes have thrived in their waterways, salmon have been central to Indigenous economies, diets and spirituality. Thousands of Indigenous peoples once traveled to communities along the Columbia River to trade, feast, participate in games, and observe ceremonies such as the First Salmon Feast (CRITFC). Indigenous artist Lillian Pitt recounts how her ancestors, the River People near Celilo Falls, traditionally honored salmon: "Salmon were considered sacred, and every year after the first salmon was caught, thanks would be offered to the Creator before the first bite could be eaten" (Pitt).



Professor David Montgomery of the University of Washington explains the reciprocal relationship salmon share with rivers: “If you think about the way a river works in a landscape it essentially functions as the circulatory system. It drains the waste products off of the land and that sediment is basically what structures habitat in rivers and then once it gets to the coast, it builds beaches. It creates offshore environments. That flow of material is incredibly important ecologically. . . . but there’s another aspect to rivers in terms of flow back upstream that most people don’t tend to think about in the Northwest, that’s greatly mediated by salmon. When salmon leave their native streams, they are little fish. When they come back a couple years later, they are huge. They put on 90%-95% of their body mass in the marine environment. What that essentially means is that a large fish run, the kind of fish runs we had historically in the Northwest, you can view as a nitrogen pump that’s basically scavenging food out of the oceans and bringing it back on land [feeding] bugs, the trees in the forest. They feed the eagles, they feed the bears, essentially fertilizing their own world. Anything that blocks a river, like a dam does, limits their access to a part of the world that they [salmon] need to complete their life cycle” (Stoecker & Tudor).



this” (Frank, 9). As a result of the environmental changes caused by dams, ecosystems suffer, or are destroyed altogether (Stahl). Billy Frank, Jr. wrote on the urgent issue of salmon resource loss: “it is getting harder every year to put our tribal fishermen on the water. While careful harvest management by the tribal and state co-managers is making a strong contribution to the recovery of wild salmon, the keys to rebuilding those runs have always been to protect and restore salmon habitat. Yet day after day we see salmon habitat being lost and damaged, and little being done to stop or fix it” (Frank, 258). Frank continued, stating: “The lack of action on protecting and restoring habitat has gotten to the point that we can no longer make up for declining salmon runs simply by reducing harvest. Those days are gone. Even if we stopped all salmon fishing everywhere in western Washington, most weak wild salmon stocks would still never recover. There simply isn’t enough good quality habitat to support them” (Frank, 259).



Indigenous elders can recount family stories of so many fish in the river that it seemed you could cross the rivers on their backs (McKenzie). As Northwest Indian Fisheries Commission (NWIFC) Chairman Billy Frank, Jr. recalled, “Many times when I was growing up, I would listen to my father tell stories of once-abundant salmon runs in the Pacific Northwest. He would explain the importance of salmon to all Indians in a way that captured my imagination and changed my life. Before he died at the age of 104, he told me I had a responsibility to protect the salmon for all Indian people. I have tried to do

Animal species that have spent millennia evolving to their specific habitats cannot adapt to the abrupt and severe changes that are brought about by dams (Stahl). The physical barrier of dams, the changing of waterflow downstream, temperature changes in the water, decreased oxygen levels, and the shifting of the landscape are just some of the obstacles that salmon face as they attempt to migrate upstream to their ancestral spawning grounds (Stahl; Deemer et al). In some areas, fishery populations have been destroyed altogether.

“Of Water, Wave, and Salmon I”; Artist’s Statement by Alex Marroquin: “These pieces are based on original Purépecha motifs of water and fish. When we talk about infrastructure of colonization and its impact on the natural world, we are discussing a global issue spanning ethnicities, nations, and communities. It is because of this I felt obligated to include artwork from my Purépecha heritage of Michoacán, Mexico” (Credit: Alex Marroquin).

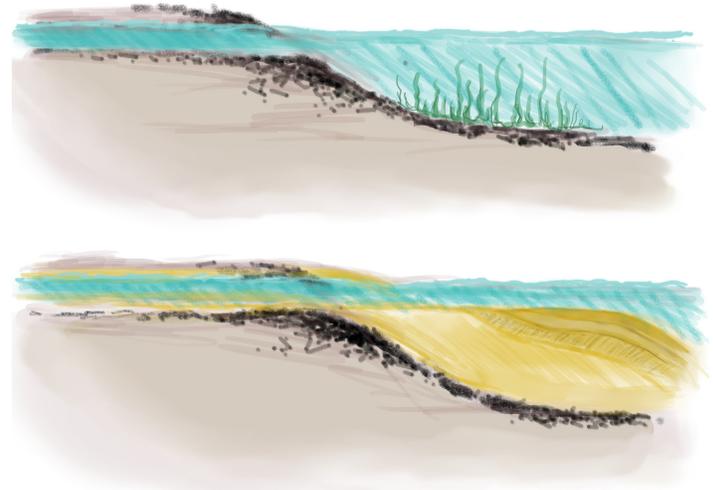
The number one factor in the extinction of species is habitat loss (Stahl). The habitat loss caused by dams means that the responsibility of the decreasing salmon populations is directly traceable back to human actions. And if the salmon go extinct, we will have no one to blame but ourselves and our own actions. As Frank concluded, “We all need to work harder to make sure the salmon has a good home when he returns. We don’t want to ever find ourselves contemplating a Last Salmon Ceremony” (Frank, 259).

What Happens When a Dam is Removed

Typically, when a dam is removed, an excavator is used to slowly dismantle the structure. On rare occasions dynamite is used during deconstruction to unsettle a dam’s foundation (see White Salmon chapter). The purpose of dam removal is to restore river ecosystems that are otherwise damaged by the structure’s presence (see Nooksack chapter). Using dynamite is often counterproductive to restoration because of the potential for further habitat destruction. Often, small dams are removed very quickly with no pause in deconstruction.

Sometimes dams have to be removed slowly, layer by layer, over periods ranging anywhere from weeks to years (American Rivers). Sometimes it is more efficient to remove a dam’s earthen berm than the structure itself, allowing rivers to naturally flow around the dam. This is called a controlled breach; an uncontrolled breach is an accidental failure in dams (KDA). Uncontrolled breaches are possible when there is structural damage created by a natural disaster, which can devastate communities downstream (ABC; Walsh).

A dam undergoing a controlled breach. Removing the earthen barrier will allow water to once again flow freely downstream (Credit: U.S. Fish and Wildlife Service).



Above: river sediment at the estuary mouth of a dammed river.
Below: sediment layers after dam removal (Credit: Jansan Helligso).

One such breach occurred in 2021, when Himalayan glacial meltwater burst through a dam in India, killing at least 177 villagers (Regan).

In any case, careful planning must be implemented before deconstructing dams (American Rivers). Sediment released from reservoirs potentially alters the state of any downstream ecosystem (Grant). Washington’s Elwha Dam (see Elwha chapter) initially needed to be manually breached so enough build-up would release initially needed to be manually breached so enough build-up would release over time, and formerly submerged land could dry before project crews began using heavy equipment and vehicles (American Rivers).

Dikes

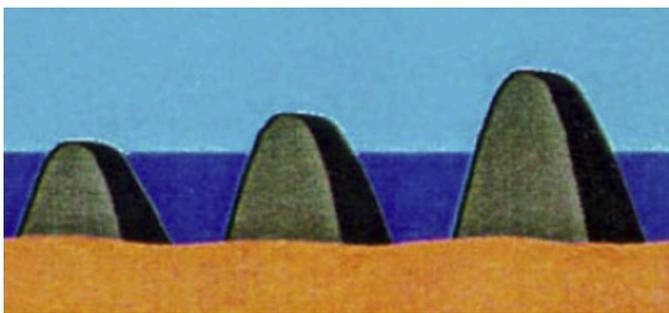
Construction and Function of a Dike

Water dikes are barrier walls that are artificially constructed. They wall off oceans, lakes and rivers, holding back water and controlling water flow (National Geographic Encyclopedia 2012). Dikes are typically made from natural materials such as stone, timber, and sand, and concrete is also commonly used (Applied River Engineering Center).

The main purpose of a dike is to prevent flooding, but it can be used to separate sections of water from the main body. These smaller sections can then be drained and filled in to create land, which is often used for agriculture, particularly cattle pasture for grazing (National Geographic Encyclopedia 2012).



Above: A graphic depicting how dikes can be placed perpendicular to the water current to halt the flow of water. Below: A profile look at the structure of a dike and how this structure interacts with the water below the water surface, flowing from the left (Credit: Applied River Engineering Center).



Dike Land Use and Impacts

Dikes can range from several to hundreds of miles long, and have been used to create residential, agricultural, and industrial spaces (National Geographic Encyclopedia 2011). While dikes can be used to mitigate the effects of climate change-induced seen with coastal flooding,



Circa 1930 photograph that illustrates part of the process of building a dike (Credit: Applied River Engineering Center).

building is harmful to the riparian ecosystems. Delicate habitats that are often “ideal” for dike conversion, such as wetlands, estuaries, and swamps, are already heavy with sediment and so easier to convert into farmable land (Nguyen et al).

Wetlands in the form of river estuaries and deltas (estuaries extended by sedimentation) provide important space for young salmon to acclimate to the salinity of the ocean before fully migrating from freshwater to saltwater. The abundance that is found in these wetlands also gives the young salmon opportunity to grow and develop before they venture out to the sea (Troutt).

These estuarine habitats are incredibly rich in their diversity of fauna and flora, so the loss of these lands to agriculture is devastating to the plants and animals that depend upon them for their survival. Converting vital



Circa 1930 photograph that illustrates part of the process of building a dike (Credit: Applied River Engineering Center).

habitat spaces into agricultural land has a negative impact on all wildlife that depend on the coastal sanctuaries of different kinds of wetlands. Not only do salmon lose their habitat, but pesticides and animal waste runoff make their way into those spaces. The water becomes contaminated, and sediments and nutrients that were once carried into the wetlands by free-flowing water no longer enrich those spaces (Nguyen et al).

What Happens When a Dike is Removed

Dikes in the Pacific Northwest have harmed estuaries necessary for several stages of salmon's life cycle. This puts dikes in direct violation of treaty rights (NWIFC), and thus many have been removed to recover wetland habitat (see Nisqually chapter). In 2011, the Nisqually Estuary was finally restored after a nearly 12-year project that removed more than two miles of artificial dikes (USFWS).

As Billy Frank Jr. wrote in 2007 about the removal of dikes on tribal and federal former pasture lands in the Nisqually Delta, "Estuaries are lifelines to birds, mammals, native plants and our great Northwest salmon. They are nurseries where young salmon grow and gain strength to begin their perilous ocean journey. Returning adults rest and eat their last meal there as they await the rains that signal the time to expend their last ounce of energy to reach their ancestral spawning grounds."

Frank continued, "Development has swallowed or altered more than 80 percent of the historic estuarine habitat in Puget Sound. That loss continues today. That's one reason why the tribes are so active in estuary restoration and protection, and why they're leading the effort to create new estuarine habitat.... We're not doing this

doing it for the long-term health and vitality of everyone and everything living here — including you" (Frank, 123-124).

Culverts

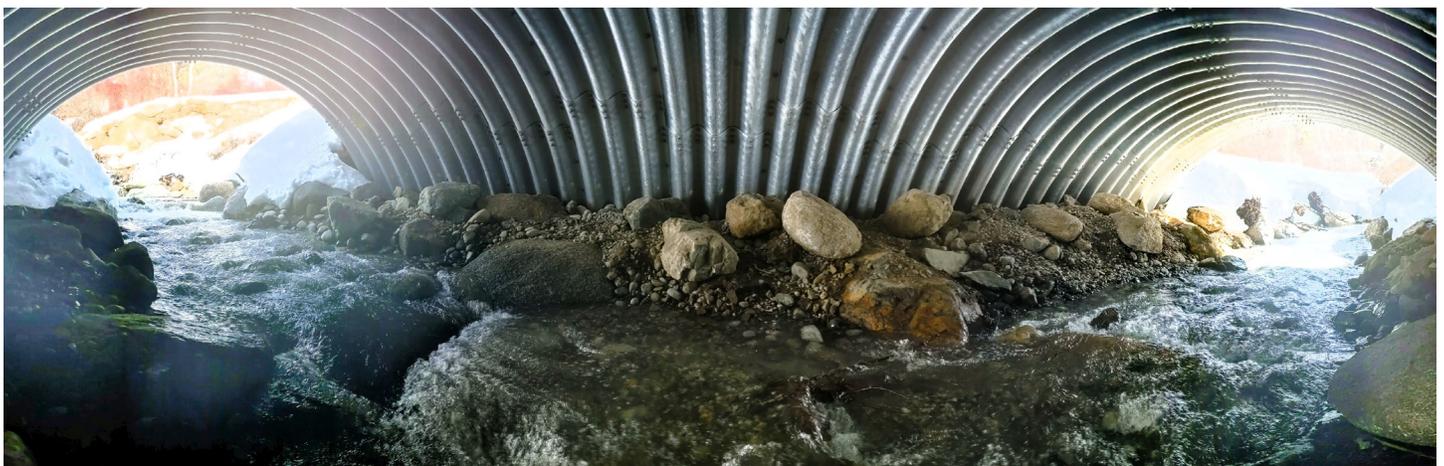
Construction and Function of a Culvert

Culverts are a part of transportation infrastructure, providing tunnels beneath roadways and railways that water passes through. They typically go along the natural flow of a waterway, and act as a passageway so that the streams can retain mobility as roadways traverse them (Rahman, 2).

The most common types of culverts are pipe, box, and arch culverts. Culverts are typically constructed of concrete and steel so that they are strong enough to support the land and traffic above them (Rahman, 2). The section of the culvert that points downstream is called the "culvert outfall," and the height of the outfall from the bottom of the culvert to the level of running water is an important figure for maintenance and ecological studies (Zwirn).

The design of a culvert has a major effect on the velocity, or speed and power, of the water that passes through it. Culvert design can determine if the environment around the culvert is destroyed as a result of bad design, or if the environment is able to maintain itself as a result of environmentally friendly design (Pavlick). In all cases, "attempts should be made to make stream crossing structures 'transparent' to watershed processes when they are installed. In other words, the channel and floodplain will function as they did prior to the stream crossing installation" (Zwirn).

Panorama taken from the inside of a culvert. There is a downward gradient from the left side to the right side (Credit: Jansan Helligso).

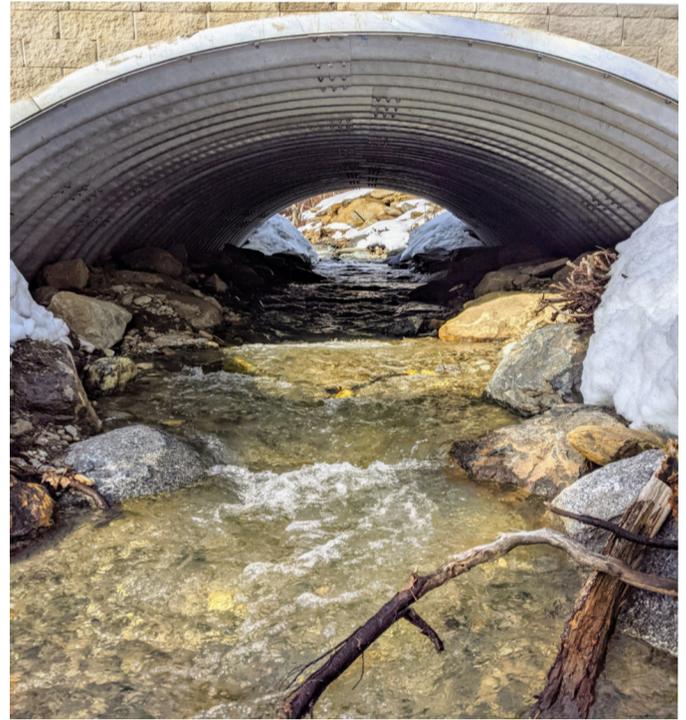


Treaty Rights and the Culverts Case

During the mid-19th century Washington tribes retained their sovereign status by entering treaty agreements with the U.S. government (NWIFC). Most significant of the agreements between nations was securing the tribes' "right to take fish at all usual and accustomed grounds and stations....in common with all citizens of the Territory" (Wilkinson, 10-12). For more than a century these agreements were infringed upon by local and state governments, as well as federal bodies responsible for upholding these agreements. Judge George Boldt upheld the treaties in 1974, and defined 50 percent of the harvestable salmon catch as belonging to the tribes (Crowley). Tribes took action after Boldt's ruling in 1974, and founded the Northwest Indian Fisheries Commission, a coalition of 20 western Washington treaty tribes (NWIFC). In the following decades, tribes used their treaty rights to protect fish habitat for the benefit of all Washington residents (Frank, 225).

One of the first use of treaties has been to take action against harmful culverts. More than 1,500 Washington culverts had become so derelict they were interrupting salmon migration (Du Bey). This led to the "Culverts Case" and the 2007 Martinez Decision, when U.S. District Judge Ricardo Martinez ruled in favor of the tribes and held that the State's lack of culvert maintenance

Below: A culvert where the outfall point is too high for salmon passage upstream, resulting in a devastating fish kill as the salmon become trapped below the culvert (Credit: Washington Department of Fish and Wildlife).



This culvert was repaired in 2020 by the Washington Department of Fish and Wildlife to allow for the safe passage of fish going upstream. The culvert gradient is shallower than the stream gradient above and below the culvert entrance, which allows the water to flow slower and with less force, preventing sediment erosion (Credit: Jansan Helligso).

impeded salmon migration, so constitutes a violation of the treaties (Du Bey).

Billy Frank, Jr. wrote in May 2013 in his NWIFC column "Being Frank," "The state of Washington must fix fish-blocking culverts under state-owned roads because they violate tribal treaty-reserved fishing rights...The court found that more than 1,500 state culverts deny salmon access to hundreds of miles of good habitat in western Washington, harming salmon at every stage in their life cycle. . . The salmon can't wait. At the pace that the state has been repairing its blocking culverts, there would be few, if any, salmon left by the time all were fixed. Martinez's ruling will result in hundreds of thousands more salmon returning to Washington waters each year. These salmon will be available for harvest by everyone who lives here, not just the tribes."

Frank continued, "We could have avoided the suit if the state followed its own laws. One of Washington's first laws on the books requires fish passage at any blockage in creeks and rivers. Instead, the state chose to largely ignore the problem along with the tribes' treaty rights, which depend on salmon being available for harvest..."

This isn't something new to the tribes. The state's approach has long been to ignore treaty rights even if that means ignoring the best interests of all of its citizens... We prefer to cooperate rather than litigate to achieve salmon recovery. But if our treaty rights can be used to re-open these streams and enhance wild salmon populations, that's a win-win for all of us" (Frank, 255-257).

What Fish-Friendly Culverts Look Like

In 2009, the *Seattle Times* shared a story about tribal and NWIFC efforts to advocate for an appropriate response from the state for replacement culverts: "More than 1,000 culverts between the Columbia River and British Columbia, most of them owned by the Washington

Department of Transportation, are designed so poorly or in such ill repair that they block or limit access by fish to hundreds of miles of streams. While the state slowly has been working to fix them, U.S. District Judge Ricardo Martinez ruled in 2007 that treaty rights required it. He urged the state and tribes to agree on plans. But negotiations stalled after months of talks while the economy collapsed, sending both sides back to court. For a weary tribal fisherman who has been at this as long as Frank, it all feels a bit too much like dithering. 'I'm 78 right now and still in the courtroom all day, still talking about fixing the salmon problem,' Frank said. 'It never seems to get done, and we're running out of time'" (Preston).



Culverts are an essential part of road infrastructure, and give us the ability to pass over small waterways without having to travel miles to find natural crossing zones. Yet even the most environmentally friendly culverts impact the ability of wildlife to navigate stream environments

How Salmon Have Been Affected

because of a culvert's effect on local geography. This is true even when they do allow for fish passage (Bates). Throughout the Pacific Northwest and British Columbia, which are both prime salmon habitat, there are thousands of miles of roads in forested regions that cross over running waterways (Zwirn). Not only is poor culvert design an obstacle for migrating salmon, but in many areas a lack of culvert maintenance leads to further problems for salmon, as culverts break down and become impassable. Debris can wash into the metal grates of culverts, essentially creating a mazelike dam inside the culvert that fish have to traverse. Increased outfall heights at downstream ends of culverts turns what used to be a tunnel into a

"Of Water, Wave, and Salmon II" (Credit: Alex Marroquin)

barrier that cannot be crossed (Pavlick; Zwirn). As mentioned earlier, the "transparency" of a culvert is essential in determining its effect on salmon migration. The more transparent a culvert is to the environment, the less effect it will have on the passage of salmon travelling upstream (Zwirn).

In addition to habitat changes caused by a culvert's presence as a physical barrier, other obstacles come forth (Bates). With the increased water velocity and temperatures, and erosion of sediment that can be caused by culverts, there is a loss of salmon spawning habitat, rearing habitat for young salmon, and a decrease in food production (Bates).

These issues impact not only salmon, but all fish and wildlife that depend on the abundance and diversity found in stream habitats for their survival.

Geographic Impacts of Culvert Placement

Culverts are placed perpendicularly under the roadways, so the road can act as a bridge. A culvert that is well designed should allow water flow and wildlife to pass easily though it, especially going upstream. Badly designed culverts can have severe impact on the surrounding environment (see Chico Creek chapter). A culvert that is too small can limit waterflow, or the water can dip below the bottom rim of a culvert entirely, blocking anything from moving upstream.

Water being forced through a too-small culvert can also increase the speed of the waterflow downstream, which leads to erosion and scouring of the water banks, washing away sediment that lies in streambeds. This lowers the water level downstream even further, making the culvert-outfall height an even larger distance for fish and other aquatic species to traverse as they travel upstream (Pavlick), as well as destroying the habitats that rely on the sediment that accumulates along a stream (Zwirn).

Poor placement or installation of a culvert can also put the surrounding area at risk of flooding if the culvert is too narrow. Roadways that block waterways and only allow for small amounts of waterflow through culverts are at increased risk of being washed out during higher water levels, as water is forced above the culvert in order to keep flowing. A heavy rain season can be devastating to roadways where culverts do not properly allow for the flow of water (Rahman; Pavlick). Sediment flow carried by streams is another obstacle that culverts face, and are not adapted to handle (Pavlick). David Troutt, the Nisqually Tribe Natural Resources Department Director, highlighted the situation of the Interstate-5 running along the Nisqually Estuary by describing elevated roadways and railways functionally as dams holding back water, and culverts as the chokepoints for getting through these “dams” (Troutt).

Some of the key aspects of making a culvert fish-friendly are the size and slope (or gradient) of the culvert, stream water velocity and depth, and culvert placement (University of Wisconsin-Extension & Wisconsin Department of Natural Resources). An effective solution for these issues is to lower the gradient of the culvert. This allows for water to flow through the culvert passage at a greater depth and slower pace.

Decreasing the water velocity in this way helps reduce erosion downstream. Ensuring that the mouth of the culvert is wider upstream can help with preventing debris

from being washed into the culvert mouth and blocking it (NOAA).

Conclusion

The technology of dams, dikes, and culverts to change natural waterways may seem revolutionary at times, at the scale that human beings change the environment. But we are discovering that the consequences in altering our waterways are dire for the animals and people that depend on the water. It is irrefutable that all life depends on water. For the salmon to go from the mountains to the sea, and back again, the waterways must be open to them. Without the salmon, the lives of all those who depend on them for sustenance, survival, and spirituality will be in great jeopardy. If life is to flourish again, the waterways must be open and free.

As the Hopi leader Vernon Masayesva has said, “According to our creation story, only water existed at the dawn of time. From water came land; from land and water all forms of life were created, including mankind. Because all life comes from the same source, we are all interconnected, and I am as much a part of the clouds as they are a part of me...” (LaDuke).

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2. Nisqually: Restoration and Healing

Vanessa Harriss, Tristan Glaser, and Madelain Stier

The Nisqually have been stewards of the Nisqually Watershed since time immemorial, and as such are protectors of the salmon, and the other life that the Nisqually River and its estuary nourishes. Nisqually tribal history, including the 1854 Medicine Creek Treaty, and subsequent Puget Sound War, laid the foundation for the many modern-day milestones the Nisqually Tribe have achieved in recent decades. The 1974 Boldt Decision in federal court recognized Nisqually treaty rights and made possible salmon sustainability projects that are still being implemented in the 21st century.

Milestones such as the creation of the Nisqually National Wildlife Refuge, and the removal of dikes from the former Brown and Braget farms during estuary restoration, changes in practices of the Alder and La Grande dams, and repairs to salmon habitat and riparian zones, all draw from the history of Nisqually resistance to colonialism and the Tribe's current efforts to heal the Nisqually Watershed and estuary through decolonizing its homeland.

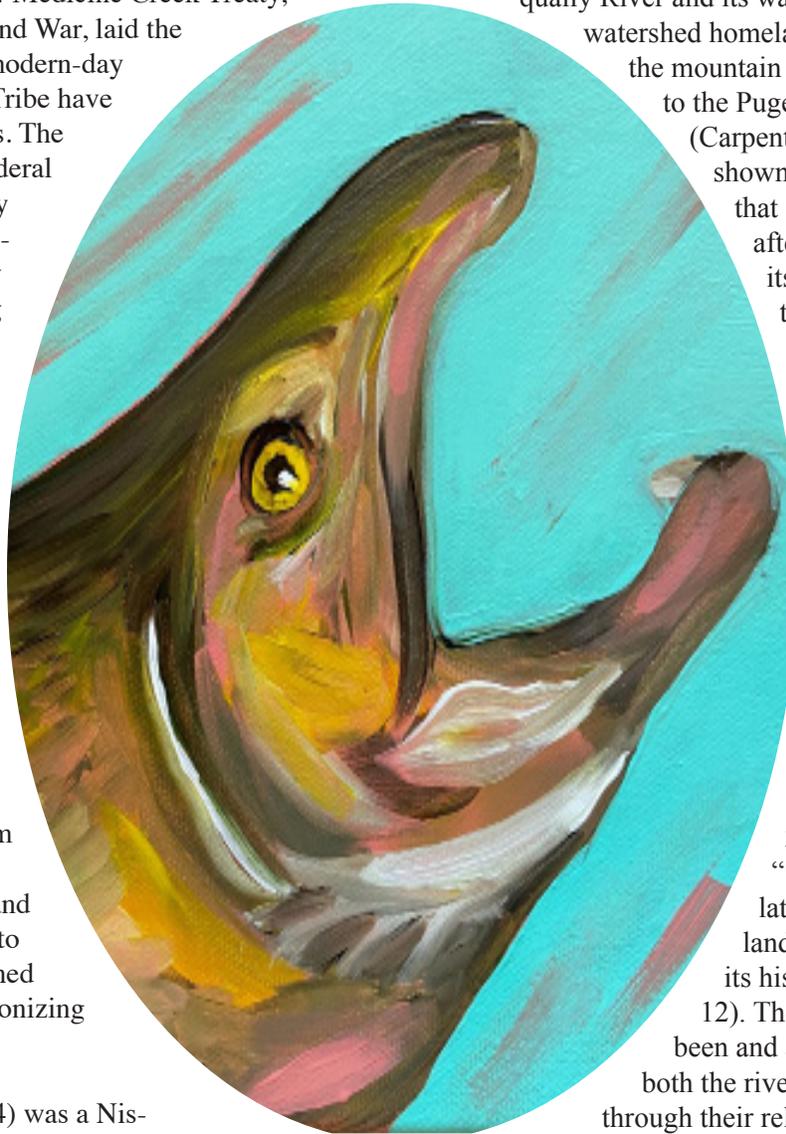
Billy Frank Jr. (1931-2014) was a Nisqually treaty rights leader and first Chairman of the Northwest Indian Fisheries Commission (NWIFC). Two years after his passing, the Nisqually National Wildlife Refuge was named after him, to honor his leadership in restoring the estuary. He once said, "I don't believe in magic. I believe in the sun and the stars, the water, the tides, the floods, the owls, the hawks flying. The river running, the wind talking. They're measurements. They tell us how healthy things are" (Frank).

Nisqually tribal history

The Nisqually of western Washington are people of the river and grassland, having been connected to the Nisqually River and its watershed for generations. Its watershed homeland stretches from Tacobet, the mountain most recognize as "Rainier," to the Puget Sound in the Salish Sea (Carpenter, 9). The Nisqually have shown throughout their history that land and water that is looked after will always give back to its people. As guardians of the watershed, the Nisqually Tribe looks after salmon and other aquatic species and pays close attention to development and how it may affect the river and its inhabitants.

The Nisqually River flows from its origin in the Nisqually Glacier on 14,000-foot Mount Rainier to its estuary in the Nisqually Reach of the Puget Sound (Middleton, 2). The tribe called itself "Squalli-absch" which translates to "people of the grassland," referring to the prairie on its historic reservation (Carpenter, 12). The Nisqually people have been and always will be people of both the river and grasslands, expressed through their relationship to the river and its surrounding environment, through their pre-colonial history of fishing, hunting and gathering food.

Hunting was an important part of the Nisqually Tribe's pre-colonial lifeways. Animal hides and bones would be utilized for clothes and tools, and whatever pieces of meat that did not get eaten were dried and stored for winter (Carpenter, 66). Salmon made up a great part of the Nisqually Tribe's diet then and remains an important food today, as well as a sacred cultural symbol of the



"Chinook" acrylic painting (Credit: Vanessa Harriss).

Nisqually people. Relationship to place also played a significant role when gathering edible plants and berries such as “roots, bulbs and stems of the numerous kinds of plants that grew in the Nisqually River watershed formed an important part of the Indian diet” particularly the starchy camas bulb from the prairie (Carpenter, 68). The Nisqually’s close relationship to place, and the plants and animals that made up their diet, offers insight into how they valued the traditional ways of living.

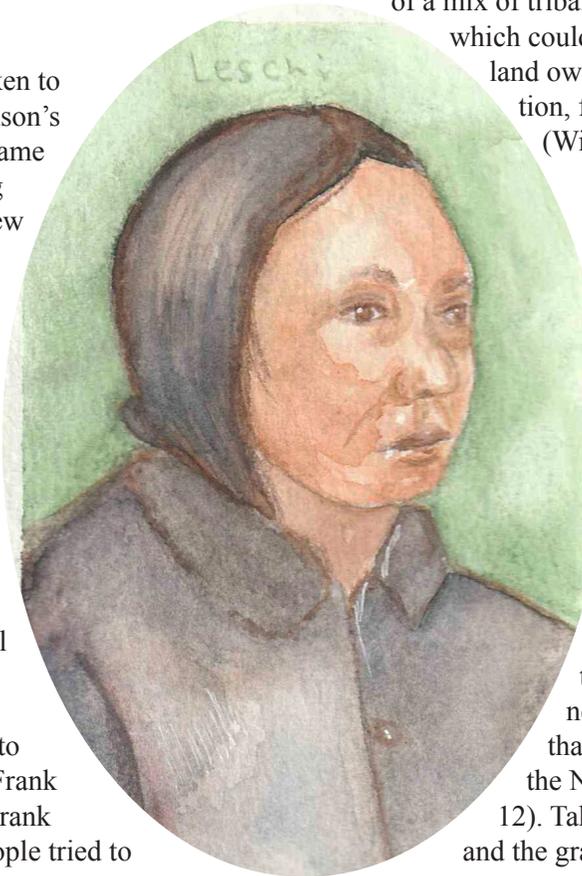
Medicine Creek Treaty

The Nisqually way of life was shaken to the core with the arrival of the Hudson’s Bay Company, when “the British came in 1833 to establish a fur-collecting fort at the mouth of the Sequatchew Creek, just about a half-mile east of the Nisqually River delta” (Carpenter et al, 7). The arrival of American settlers in the 1840s brought disease epidemics to the tribe, such as smallpox and measles, as well as violence, war, and assimilation. Most settlers looked down on the Nisqually way of life, including language, religious practices, place names, and the tribal relationship to natural resources, insinuating that the tribe was not utilizing all its resources properly because the people chose to only take what they needed. Billy Frank Jr, recalled what his father Willie Frank told him of those times, “These people tried to teach us that our way of life was not good. [...] Our smokehouses were bad. Taking only what we needed was bad. Offering back to the deer and the bear was bad. Our religion was bad” (Wilkinson, 9). Other settlers established trading and kin relationships with their Nisqually neighbors, and were persecuted for doing so (Kluger, 167-84).

The first Governor of Washington Territory, Isaac Stevens, started the Northwest treaty-making process with the signing of the Medicine Creek Treaty in the Nisqually Estuary in December 1854. The treaty included the Nisqually and neighboring tribes, including the Puyallup and six Squaxin peoples (Carpenter et al, 7). This treaty-making process would not go as easily as Stevens had imagined, especially after appointing “friendly Indians” as chiefs, despite this not being customary to the tribes. These “friendly Indians” Stevens appointed to the

treaty negotiations were Nisqually tribal leaders Leschi, his brother Quiemuth, and their brother-in-law Stahi. All were expected to be complacent and sign the original treaty Stevens had drafted (Carpenter et al, 24). However, this was not to be the case.

Stevens decided that despite having a translator who speaks the Lushootseed language of the Coast Salish tribes, that instead he would have negotiations done in Chinook Jargon, a very limited trade language made up of a mix of tribal languages, French, and English, which could not “possibly speak to sovereignty, land ownership, fishing rights, assimilation, freedom, or the futures of societies” (Wilkinson, 11).



“Chief Leschi” watercolor portrait (Credit: Vanessa Harriss).

Puget Sound War

The Medicine Creek Treaty would include the taking of almost all tribal land and the forced relocation of the tribes of the South Puget Sound. Stevens meant to move the Nisqually people away from the river to a reservation on a forested slope just west of the Nisqually River Delta, where “the thickly wooded land gave no access to the river for fishing and took in none of the broad, sweeping prairie that characterized the watershed and that the Nisqually people loved” (Wilkinson, 12). Taking the Nisqually away from the fish and the grassland plants would have led to the eventual erasure of the tribe. Leschi and Quiemuth were among the Nisqually representatives meant to sign the treaty. Leschi would be the first to dissent and refuse to sign the treaty, but an “X” put on the treaty falsely signified his approval (Wilkinson, 12).

This dissent would lead to a nine-month “Puget Sound Indian War” in 1855-56. There were many casualties in this war on both the Native and the U.S. side. The Nisqually warriors knew the terrain and were able to hide out in the woods as the governor’s “Volunteer” militia fired upon them (Wilkinson, 15). Chief Leschi was an effective military leader as “a powerful orator with a commanding presence: he carried himself well—accounts typically emphasize his penetrating gaze” (Wilkinson, 14). Militia atrocities were directed against Nisqually civilians, particularly in the Mashel Massacre of many women and children. Willie Frank Sr. recounted

what he heard of the 1856 massacre, “Those Indians at the massacre, they were... up on the hill looking down at the place where the Mashel runs into the Nisqually. [...] There was a woman carrying a baby on her back and they shot her. [...] Some of the young got away—climbed up the hill on the other side of the river. I don’t know how many they killed, but there were a lot of them” (Wilkinson, 17). Federal Indian agents sent Native male civilians, women, and children to internment camps on Squaxin Island and Fox Island, where they would face disease, water shortages, and unsanitary living conditions (Carpenter et al, 8).

In the 1856 Fox Island Agreement, Governor Stevens relented by shifting the locations of the Nisqually and Puyallup reservations, enabling them to remain near their fishing and gathering grounds. This decision would be conditional on the surrender of dissenters, including Quiemuth and Leschi. Both brothers met a tragic end, all while being blamed for the start of the war because of their refusal to sign the original draft of the Medicine Creek Treaty. Chief Leschi became the first person to be executed in Washington Territory, on the charge of the murder of a militiaman, though the attorneys defending Leschi “argued that the killing...was an act of war, not of murder, and contended that Leschi didn’t do it anyway” (Eckrom, 154). Leschi was tried and eventually executed in 1858 outside Fort Steilacoom, as the Army would not permit a questionable execution inside its fort (Wilkinson, 18).

Leschi was exonerated of these charges post-mortem by a state historic court in 2004 (Blee). This verdict for

Leschi’s exoneration “concluded that on October 31st, 1855 a state of war existed between the federal Territory of Washington and several Indian tribes, including the Nisqually Indian Tribe. A.B. Moses was a combatant in

that war as a member of the Territorial Militia, and his death occurred in this war, and therefore Chief Leschi should not, as a matter of law, have been tried for the crime of murder” (Blee, 381). Leschi’s execution would mark the ending of the shooting wars and would mark the start of the Nisqually people’s introduction into the world of colonial assimilation.

Through Chief Leschi’s dissent and leadership, the Nisqually people had won the small victory of securing their reservation on the Nisqually River and prairie. Here they would have access to the salmon and starchy camas bulbs that would sustain them through the shortages to come. One of the most significant parts of the Medicine Creek Treaty was Article Three which reads: “The right of taking fish, at all usual and accustomed

grounds and stations, is further secured to said Indians in common with all citizens of the Territory, and of erecting temporary houses for the purpose of curing, together with the privilege of hunting, gathering roots and berries...” (Library of Congress, 3). Article Three would ensure that the Nisqually

Tribe would be able to sustain themselves. Governor Stevens did not offer this out of the kindness of his heart but as a way to reduce the federal government’s responsibilities, and to ensure the Nisqually people would remain a discrete entity (Wilkinson, 12). The Nisqually Tribe, however, would remain a formidable entity in western Washington and would continue to exercise its treaty rights.



“People of the River” Artist’s Statement by Vanessa Harriss: “The Nisqually Tribe of Washington State have always been known as salmon people, not only through legend or fishing but through the relationship they have with the salmon. The focus for this digital piece was on the people of the Nisqually Tribe, I wanted to highlight that it is the people who are keeping the salmon alive and I wanted to show how the salmon are a sacred part of their lives. Color and shape were important elements in this design, with the blue robe representing the river, and the yellows contrasting to give a feeling of warmth” (Credit: Vanessa Harriss).

Rush of New Settlers

After the Medicine Creek Treaty and Puget Sound War, a frenzy of American settlement came to the Nisqually Watershed to claim land, harvest timber, and build farms. In 1883, the Northern Pacific Railway built the first transcontinental railroad to reach the Pacific Northwest, as Governor Stevens had originally proposed (Noberg). Another railroad was built along the eastern edge of the estuary. Logging and commercial farming were the two key industries of the Nisqually Watershed, and both profoundly impacted the estuary and watershed. Logging was prominent along the upper reaches of the Nisqually River around Elbe, Ashford, and Eatonville. When settlers began to log alongside streams and rivers, it exposed vegetation to more sunlight and raised water temperatures to a level unhealthy for salmon. Soil erosion along the rivers and creeks from logging also buried many gravel spawning nests for the salmon. When Washington became a state in 1888, the state government began to pass a series of laws restricting tribal fishing and favoring non-tribal fishing. (Cohen).

In the late 1800s, farmers worked to create farmland and cattle pasture in the watershed and near the estuary. Settlers dug trenches, straightened meandering creeks into irrigation canals, and created dikes to force the draining of wetlands to make farming and cattle rearing possible. While this work created more farming opportunities, it also removed pools and log jams essential for salmon reproduction in the Nisqually River and its tributaries. One of the most harmful projects transformed land in the Nisqually Delta, where sediments from the river had built up wetlands extending into Nisqually Reach.



Logging along the Nisqually River near Elbe, early 1900s (Credit: Kinsey Photo).

thousands of acres of land to farm and graze cattle, by taking away essential tidal mudflats for the area's wildlife. Brown was celebrated by many in the Olympia area in the early 1900s due to the success of his farm. He took advantage of the U.S. Postal Service's parcel system in 1913 to start shipping goods produced from his farm to local consumers (Jungmeyer). Meanwhile, in 1917, Pierce County condemned 70 percent of the Nisqually Reservation, and forcibly evicted its tribal residents on the eastern side of the river, to make way for the construction of Fort Lewis (renamed Joint Base Lewis-McChord in 2010) (Dotson).

Many other dikes were dug along the Nisqually River to reduce flooding and to create dry land in riparian areas to support farming. In the same era, the Nisqually Watershed also faced the damming of the Nisqually River mainstem to generate hydroelectricity. Power utilities in Tacoma and Centralia needed more energy for the rapidly expanding areas around the watershed.

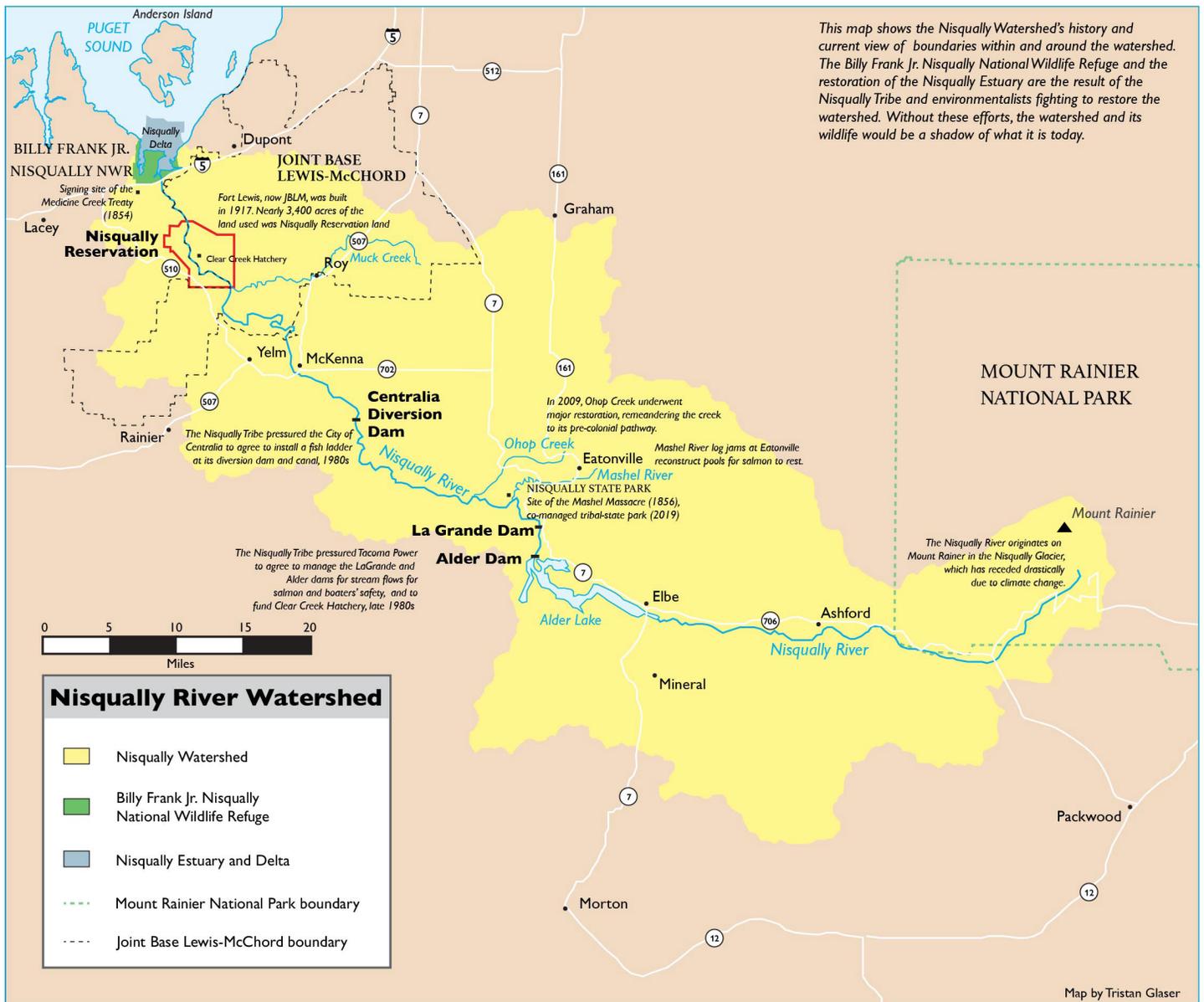
In 1912, Tacoma City Light completed the 45-foot La Grande Dam, upstream of the Mashel River confluence. After World War I, energy was at a premium and was needed more than ever to power factories and war industries in the area, leading Tacoma City Light to build the Alder Dam that impounded the Alder

Lake reservoir (Norberg). These dams provided power by releasing large surges of water when power was needed in large volumes. The salmon and fishing families of the Nisqually suffered immensely from the dams. Unstable water levels made it difficult for the salmon to travel upstream and destroyed their spawning sites, and Nisqually fishers were threatened with drowning during the unannounced dam releases (Wilkinson, 67-70).

In 1929, the Centralia Light Department built a 6-foot-high diversion dam, to move water from the river into a canal and through a generating station. More water was taken from the Nisqually mainstem, which made it very difficult for the salmon to swim upstream towards spawning sites. The dam also lacked screening to stop fish from swimming into the canal and being killed in the power generator. The City added a fish ladder

Building of Dikes and Dams

In 1904, Seattle lawyer Alson Brown bought 2,350 acres in the Delta on the western bank of the Nisqually River. Brown very quickly built a four-mile-long dike to dry out the mudflats, and turn his newly acquired land into fields (Noberg). It took a few years for Brown to see benefit in the construction of his dike, but soon he had



Map of the Nisqually Watershed. The estuary and the Billy Frank Jr. Nisqually National Wildlife Refuge is where much of the story of the watershed and its restoration has been told. Further upstream are Ohop Creek and the Mashel River, where numerous restoration projects have taken place (Credit: Tristan Glaser).

and screens in 1955, but it was too little, too late. Fish populations had fallen drastically, and at least one run of spring Chinook had gone extinct (Norberg). Through the 1950s and 1960s, tribal members, led by Billy Frank Jr. and others, led “fish-ins” to assert their legal treaty rights in their “usual and accustomed” places.

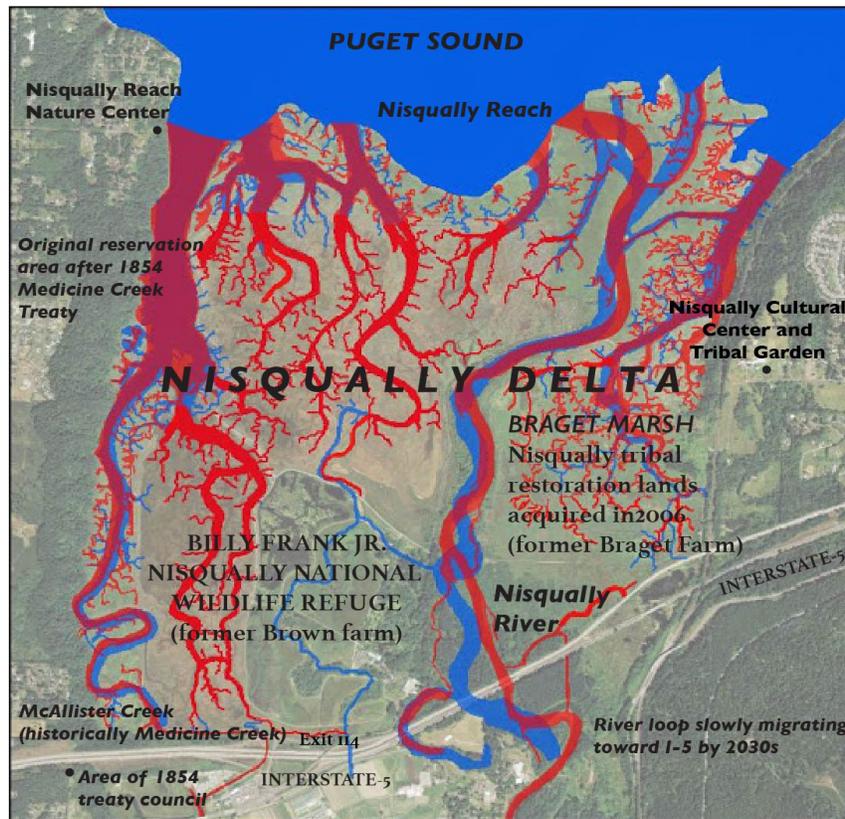
Pushing the Watershed to the Edge

In 1965, the plans for the development of the Nisqually Delta reached new heights, when blueprints were released by the Ports of Olympia and Tacoma for a deepwater port. The Olympia Chamber of Commerce recommended acquiring the vast majority of the Nisqually Delta to be a part of the industrial port. The plan was met with strong opposition, led by the Nisqually, as

they realized how detrimental an industrial port would be to an estuary already harmed by erosion and dams. Officials for the development project justified a deepwater port by stating that only one of the existing regional ports could hold the largest cargo ships. Local farmers, hunters, fishers, and environmentalists in the area joined the Nisqually Delta Association to halt the construction of the port, including Ken Braget who owned the farm on the eastern half of the Delta. Together with the tribe, they saw the major impact that this superport would have on their livelihoods, whether it be losing land without proper compensation, reducing already weak fish and wildlife numbers, or simply destroying the beauty of the Nisqually Delta (Fogel).

The state Department of Game bought land to slow plans for the port’s development and in 1966 began purchas-

ing Nisqually Delta tidelands, which was used to create a fish and wildlife management area (Norberg). In January 1974, tribal members and environmentalists celebrated when the U.S. Department of the Interior purchased the former Brown farm on the west side of the estuary for \$1.75 million. Using the 1,300 acres from the purchase, the U.S. Fish and Wildlife Service created the Nisqually National Wildlife Refuge. Additional acreage was added with the help of the U.S. Army and State Department of Game. The refuge was crucial in maintaining a safe and healthy habitat for wildlife and fish in the estuary. (USFWS).



Map of Nisqually Estuary tidal flows, with historical flows in blue and renewed tidal flows in red, and relabeled with key restoration sites (Credit: Tristan Glaser and the Nisqually Tribe).

Restoring the Watershed

The following month, on February 12, 1974, federal Judge George Boldt reaffirmed the treaty rights of Native tribes in Washington to fish in their usual and accustomed spots. Under the Medicine Creek Treaty and other treaties, tribes had been allocated 50 percent of the annual fish catch in the region. The tribes could now regain a foothold in their fishing areas, where they had been squeezed by settlers who had greater access to modern technology and legal support from the state government. The Boldt Decision and the concurrent creation of the Nisqually National Wildlife Refuge, were essential in the fight to restore the Nisqually Estuary and watershed.

Ken Braget's 400-acre dairy farm on the eastern bank of the estuary had been sought after by the Port of Tacoma for a shipping harbor, real estate companies for housing, and the U.S. Fish and Wildlife Service so it could expand the Wildlife Refuge. Braget refused to sell his farm to all buyers. But in 1994, he agreed to sell his farm to the Nisqually Tribe for \$4.25 million, under the condition that he be allowed to continue living there. In 1996, a dike on the Braget farm was breached, as a part

of a project to restore 12 miles of tidelands. In 2000, Congress allocated funds to the Tribe to finalize the purchase of the farm, and when Braget passed in 2006, the Tribe acquired the property and began to restore a further 140 acres (Norberg). Braget's farmhouse was turned into the tribal Cultural Committee Headquarters, and the Nisqually Tribal Garden and canoe shed is located above the renamed Braget Marsh (Ransom).

The Nisqually National Wildlife Refuge, in collaboration with the Nisqually Tribe, finished its own major restoration project in

2009-11 (USFWS 2011). The project, which cost around \$13 million, removed a dike that Alson Brown had built on his farm in 1904. This dike removal turned 762 acres of fields back into tidelands, increasing the salt-marsh habitat of the entire South Puget Sound region by 50 percent. The project required the moving of 350,000 cubic yards of dirt and rock, and miles of exterior dikes (Dodge). The restored area totaled 140 acres, and it is the biggest estuary restoration on the West Coast of the United States. "This is hugely important for fish and the overall health of Puget Sound," said Nisqually Natural Resources Director David Troutt (Troutt).

This particular restoration project was beneficial for salmon, as the newly restored tidelands are vital feeding grounds and resting areas for young salmon before entering marine waters. Shorebird species and waterfowl species will also take advantage of the new tidelands. Other restoration projects to revegetate the estuary have been widely successful in creating better habitat for salmon. In 2007-09, 42,000 native trees and shrubs were planted at the mouth of the Nisqually River, totaling around 50 acres (Yil-me-hu 2016). These efforts by the Nisqually Tribe, the U.S. Fish and Wildlife Service, and conservation groups have greatly increased the health of the estuary over the past 15 years alone. In 2016, Congress renamed the wildlife refuge as the Billy Frank

Jr. Nisqually National Wildlife Refuge, celebrating his lifelong commitment to Native rights and the health of the Nisqually Watershed.

Watershed Stewards

The Nisqually River Council is an organization (formed in 1987 by the Nisqually River Task Force) that is made up of members from timber, agriculture, and hydropower corporations, business members, the Nisqually Tribe, and community members. The Nisqually River Council designed the Nisqually Watershed Management Plan with the intention to “provide for a balanced stewardship of the area’s economic resources and cultural resources” (Nisqually River Council).

The Nisqually River Council (NRC) has also been a key asset in the restoration process of the Nisqually Watershed which “encompasses a broad range of land uses and jurisdictions – rural communities, national and state parks and forests, public and private timberlands, municipal hydropower projects, farmlands, Mount Rainier, the Nisqually Indian Reservation, Joint Base Lewis-McChord and the Billy Frank Jr. Nisqually National Wildlife Refuge” (Nisqually River Council).

The Nisqually River Council’s mission is “to create sustainability in the Nisqually Watershed for current and future generations by developing a common culture of environmental, social, and economic balance among governmental and community partners”

(Nisqually River Council). The NRC develops status reports to present baselines of data on the Nisqually Stewardship Plan to inform future planning. The data it has collected has shown that the Nisqually Watershed Stewardship Plan has had positive impacts on the Nisqually watershed. It celebrates “the remarkable successes in restoration, recreation planning, and innovative

resource management achieved under NRC leadership over the last 30 years. Where necessary, it also identifies challenges, concerns, and gaps in existing data to help guide future study” (Nisqually River Council).

Ohop Creek

More than a century ago, Scandinavian settlers had turned Ohop Valley into land for agricultural use and in turn nearly depleted habitats for salmon such as Coho, Pink, Chinook, and trout such as Steelhead and Cutthroat.

The farmers had straightened the meandering creek into a straight irrigation canal, devoid of pools for the fish to rest. Ohop Creek is a major tributary of the Nisqually River, stretching almost eight miles through the Ohop Valley, and is critical to fish because of its riparian spawning grounds. The Nisqually Land Trust, Nisqually River Foundation, Pierce County Conservation District along and the Nisqually Tribe have contributed to the Ohop Restoration Project, which “has involved hundreds of volunteers through the years. Since 2009, over 700 adults and 2,200 students have contributed over 6,000 hours and planted approximately 15,000 trees and shrubs in the Ohop Valley” (Yil-Me-Hu 2017).

The Nisqually Chinook Salmon Recovery Plan, developed in 2001, proposed several projects to aid in restoring Chinook salmon. The Nisqually Tribe is the “lead entity” in developing the plans. One of the projects is the Lower Ohop Valley Restoration Project, which consisted of floodplain restoration and the replanting of indigenous plant species to help

revegetate the banks and prevent erosion. The floodplain restoration, along with removal of dilapidated and condemned structures, completely diverted parts of the creek by adding width to it while making it shallower. Phase 1 of the restoration project focused on the Middle Ohop in 2009-17, using heavy equipment to re-meander the creek and restore pools and log jams. Phase 1 consisted of



Billy Frank Jr. Nisqually National Wildlife Refuge, the western section of the Nisqually Estuary (Credit: Vanessa Harris).

restoring 52 acres of forest lands and agricultural farming land back to its original pre-settlement to increase the riparian habitats for spawning salmon (Yil-Me-Hu 2015-16).

Mashel River

The Mashel River is located by Eatonville, near Mount Rainier, and is another key part of the Nisqually Tribe’s restoration plan. The Mashel River “is one of only two tributaries to the Nisqually River where chinook salmon spawn.” The Mashel River has undergone a huge restoration to help promote the spawning of Chinook salmon. The Nisqually Land Trust, the Nisqually Tribe, and the Puget Sound Enhancement Group have worked extremely hard to create several log jams on the Mashel River to give salmon a place to spawn. “This is only the most recent project to address limited salmon habitat on the Mashel River,” said David Troutt, natural resources director for the Nisqually Tribe” (Northwest Treaty Tribes). In 2019, the Tribe and the state partnered to open the new Nisqually State Park, protecting the site of the 1856 Mashel Massacre (Banse).



Ohop Creek Restoration, 2013 (Credit: Zoltán Grossman).

Alder and LaGrande Dams

The Alder Dam and LaGrande Dam have always impeded the treaty rights and the safety of the Nisqually Tribe. In the 1980s, the Tribe filed two actions against the dam’s utility owners, one against the City of Tacoma and one against the City of Centralia, and won both lawsuits. Centralia had to install a fish ladder at its dam and new fish screens at its diversion canal. The City also agreed to maintain two salmon rearing ponds, in addition to the 3.2 million dollars to be used for tribal fisheries management (Wilkinson, 77).

In the late 1980s the Nisqually Tribe also reached a settlement with the City of Tacoma. which “agreed to op-

erate Alder Dam to provide satisfactory stream flows for salmon and to cease using the facility for peaking power” (Wilkinson, 78). As partial compensation, Tacoma “agreed to pay the Tribe a minimum of \$453,000 annually for the operation and maintenance of the Clear Creek Hatchery” (Wilkinson, 78).

Currently the Alder and LaGrande dams work in cohesion to benefit the salmon (Tacoma Public Utilities 2020c). The LaGrande Dam works to “enhance river flows by releasing water from LaGrande Dam to improve the habitat for Chinook and Coho salmon spawning downstream of the dam” (Tacoma Public Utilities 2020b). “The top priority is maintaining downstream river flows at or above a set minimum level. When natural river flow is less than the required minimum — mostly during summer and early fall — additional water must be taken from Alder Lake to achieve the minimum downstream flow. This helps improve habitat for salmon and steelhead. It is worth noting that our minimum flow is greater than what would naturally occur without the dams” (Tacoma Public Utilities 2020a).

Nisqually Tribe Clear Creek Hatchery

The Nisqually Clear Creek Hatchery, built on reservation lands confiscated to build Fort Lewis in 1917, is one project where the Nisqually Tribe can ensure the future of the salmon that run in the Nisqually River. The Nisqually fishing weir works in cohesion with the Nisqually Clear Creek Hatchery to help sort fish, and to release dead salmon carcasses back into the river to help give rich nutrients back to salmon and other inhabitants of the ecosystem. The Tribe works with the Army on restoration projects on its stolen reservation lands inside Joint Base Lewis-McChord, the name of Fort Lewis since 2010 (Dotson).

Lessons Learned from the Nisqually Watershed

The restoration of the Nisqually Watershed, from habitat repairs and dam fixes in the Nisqually River's upper reaches, to the removal of dikes in its estuary, has been a success story that has reverberated throughout North America. Recent Nisqually history shows how tribal leadership can lead an effort to protect an Indigenous homeland, and in turn benefit and regenerate the ecosystem and begin to reverse the harm done to the people and land by settler colonialism.

Nisqually leaders such as Billy Frank Jr. played a key role in the 1974 Boldt Decision, which reaffirmed treaty rights and laid the groundwork to undertake restoration efforts. By negotiating with the dam owners, constructing the Clear Creek Hatchery, collaborating with the U.S. Fish and Wildlife Service and the Braget Farm in estuary restoration, and returning the Ohop and Mashel waterways to a more natural state, the people of the river and grasslands has shown how to stand up for the salmon against colonial development, and how to shift the opinions and actions of their non-Native neighbors and governments toward sustaining the salmon. It is very rare for a tribal nation to be recognized as the "lead entity" in making restoration plans for the federal, state, and local governments to follow.

As Billy Frank Jr. always pointed out before his passing in 2014, much more needs to be done if the salmon and the people are to survive: "As the salmon disappear, so do our tribal cultures and our treaty rights. We are at a crossroads, and we are running out of time" (Loomis). All co-inhabitants of Pacific Northwest watersheds need to take action in solidarity with the Nisqually and other tribes in the restoration projects that will lead us into a better future for the salmon, for the other animals and plants, and for us all.

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Mashel River log jam in Eatonville (Credit: Zoltán Grossman).

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Billy Frank Jr. Nisqually National Wildlife Refuge, the western section of the Nisqually Estuary (Credit: Vanessa Harris)

3. Elwha: Reclaiming a Lifesource

Annabelle Anderson and Anthony Grandberry

For millennia, the Elwha River has been known by the Indigenous Klallam people to be bountiful with life. The water itself has been described to have a personality, with speedy currents, spunky rapids, and a cold freshness sourced from the Olympic Mountains. The river begins at its source, the Elwha Finger, then races down the mountain valley, and reaches the Lower Elwha Klallam Tribe's reservation where it empties into the Strait of Juan de Fuca in the Salish Sea.

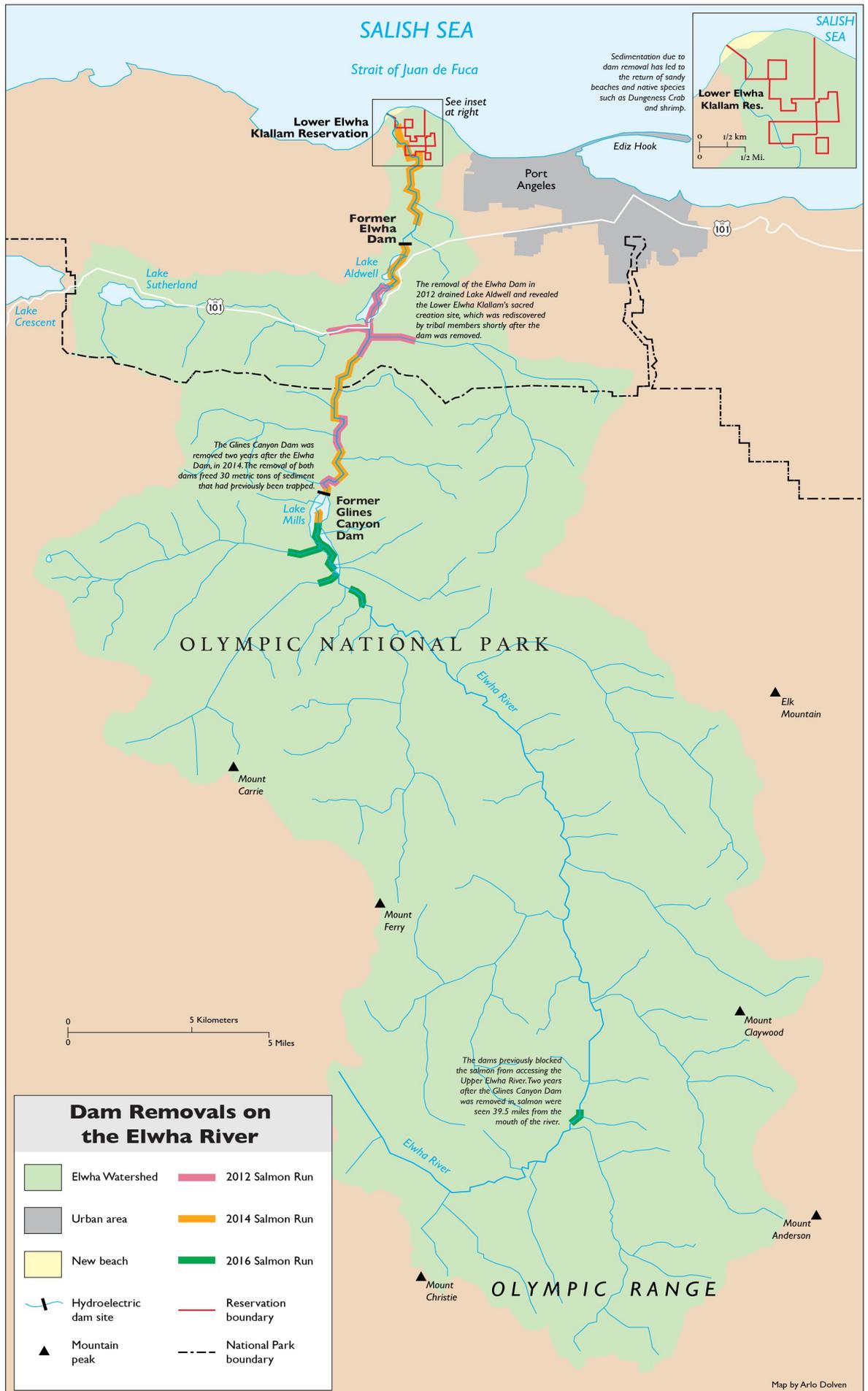
The river had always been an asset for providing essential resources to the Klallam as well as the intricate food web of the Elwha Valley's plants and animals. Its riparian environment is abundant with willow, alder, and Western Red Cedar trees. The land surrounding the river is home for elk, deer, black bears, cougars, coyotes, snowshoe hares, and otters. Many of these animals

depend on the river as a primary food source of fish. The Elwha is a lifeline for Chinook, Chum, Coho, Pink, and Sockeye salmon, as well as Steelhead and Bull trout (Gussman & Plumb).

This environmental richness was interrupted for nearly a century, as two dams were constructed to provide hydroelectricity to the settler communities growing near the Elwha. The Lower Elwha Klallam Tribe spent a century battling the Washington state government and the Olympic Power Company for the restoration of the natural environment that was lost by these dams. After decades of resistance and public hearings, the dams were finally demolished in the 2010s. Because of the Lower Elwha Klallam Tribe and its perseverance to resist the functioning of the dams, the Elwha Watershed now has a chance to rejuvenate its salmon population, and restore



The Elwha Dam draining water from Lake Aldwell in preparation for dam removal in 2011 (Credit: Leslie Dierauf).



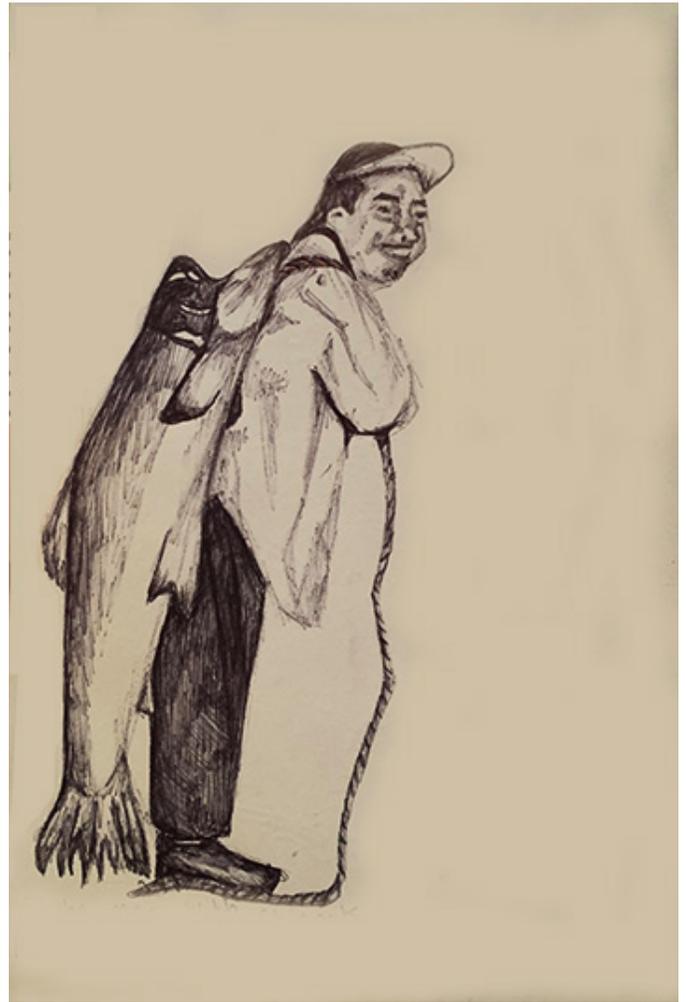
This map displays the Elwha Watershed on the northern Olympic Peninsula, before and after the removal of the Elwha and Glines Canyon dams, highlighting the restoration of salmon runs above the removed dams (Credit: Arlo Dolven).

sediment distribution to rebuild sandy beaches abundant with shellfish. The story of the Lower Elwha Klallam Tribe leading the successful alliance to dismantle the Elwha dams has inspired Indigenous peoples around the region and world.

Lower Elwha Klallam Tribe

The fish play a central role in the lives of Lower Elwha Klallam people, beyond being a staple food in their diets. The river is considered their lifeblood and was the producer of life in the Klallam creation story. It provides spiritual awareness, food, transportation, recreation, and a unique beauty to the valley landscape. The river supports the foundation for the cultural traditions of Lower Elwha Klallam people, who fish and gather shellfish in their “usual and accustomed” grounds at the river’s mouth.

The river is the center of Lower Elwha Klallam cultural lifeways, but it is not the full extent of Klallam (or S’Klallam) territory. Before western colonization, the homeland of the Klallam stretched from the Hoko River to the Hamma Hamma River, and Klallam seasonally migrated between these river valleys and the Olympic Mountains (Sadin & Vogel, 11). Klallam people have specific fishing and harvesting techniques with inten-



Ballpoint ink study of a Lower Elwha Klallam man holding a huge Chinook salmon, photo courtesy of Jamestown S’Klallam Tribe (Credit: Milo Nauman).

tions of utilizing each part of the fish. Lower Elwha Klallam Tribe Chairwoman Frances Charles observed, “The Elwha is our livelihood. We have a lot of ties and connections in our bloodstream to that aspect of it” (NWIFC). This symbiotic and reciprocal relationship between Klallam people and the Elwha River has existed for thousands of years.

Effects of American Colonization

The first European explorers arrived in the Elwha Valley around the 1790s (National Park Service). In the 1850s, American settlers arrived in Klallam territory and began to inflict deep and long-lasting harm on the Klallam community. Large numbers of Klallam people died from European diseases, as settlers progressed in stealing their land. In 1853, Klallam lifeways were deeply altered when colonial settlers established Washington Territory under their new elected governor, Isaac Stevens. In 1855, Stevens traveled to the northern Olympic Peninsula to negotiate a land cession with the Klallam, Skokomish,



“The Changer,” a mythical being who has created the salmon, releasing them and reviving the river (Credit: Courtesy Linda Wiechman, Lower Elwha Klallam Tribe).



Olympic Power Co. power plant above the Elwha Dam, circa 1914 (Credit: Ashael Curtis).

Working conditions in Elwha Dam construction

Local settlers beamed with excitement for the construction of the Elwha Dam. Hundreds of men, young and old, were hired to build the dam in 1911, and the working conditions proved to be relentless. The workers set up in forest camps and endured harsh, bitter cold weather. They used the limited tools available to them such as sledgehammers, shovels, pickaxes, spar poles, and rigging. The men were not provided any sort of personal protective gear, from helmets to safety ropes for scaffolding. The men would work on open platforms held up by cables, exposed to the powerful river below them. Hundreds of workers lost their lives in the making of the Elwha Dam. Cables would often snap, and workers would frequently lose their balance at such great heights.

As they worked themselves in often cases to death, Thomas Aldwell expressed great concern for the dam construction. He paid no attention to the deadly working conditions but chose to criticize the work ethic of the carpenters. He sent many telegrams complaining about the poor quality and slow work pace of the dam construction, often mentioning that the workers were wasting materials and making little progress. In *Elwha a River Reborn*, Mapes wrote, "A story in a February 17, 1911 newspaper clipping...unfortunately, with no name on the newspaper—provides a look at just one casualty: 'Man falling in stram has no more chance than he would if falling off to high building' notes the headline...He was the second employee to drown in the river in three weeks. As for Aldwell, he was in a state over the poor quality and slow pace of the dam" (Mapes 2013, 58-59).

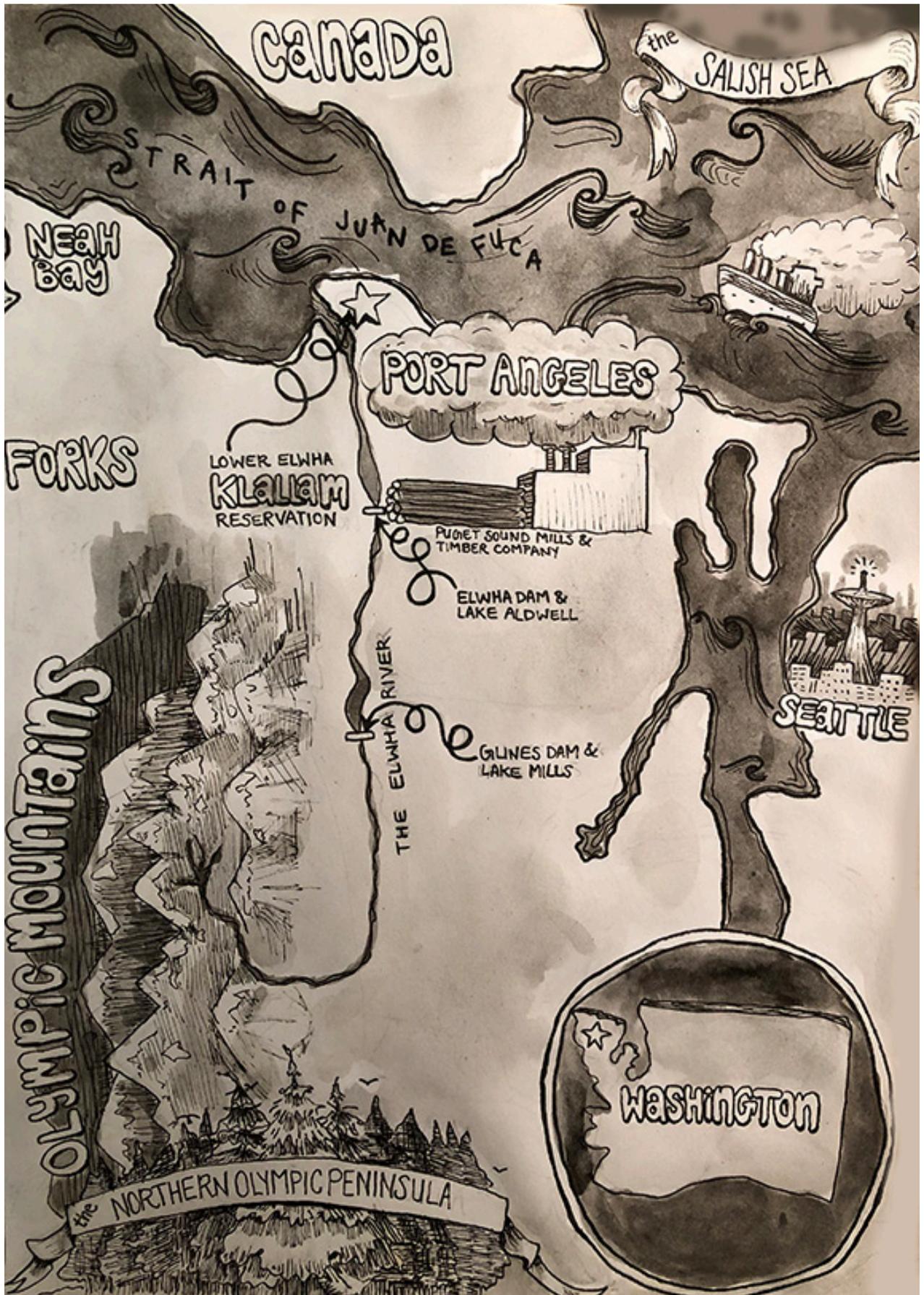
and Chemakum tribes (Sadin & Vogel, 22). After discussing the cession, the three tribes agreed to sign the Treaty of Point No Point, which stated that they would cede their original homelands, apart from tiny parcels of land that are a miniscule portion of their original territories. When the treaty was signed, the United States government promised that the Klallam would have a safe place to live and that tribal access to fish would be protected. Contrary to his negotiations with the Klallam people, Stevens attempted to move them out of their coastal villages into the Skokomish Reservation on Hood Canal. They refused to move from their coastal homeland, but nearly all of it was still surrendered and opened up as public land for non-Natives to settle and claim. Three small Klallam/S'Klallam reservations were established at Lower Elwha, Jamestown, and Port Gamble.

The Olympic Power Company and dam construction

In the early 1900s, entrepreneur Thomas Aldwell moved to the northern Olympic Peninsula from Canada and was astounded by the power of the Elwha River. He saw it as an economic opportunity, and began to harness plans to tap the waterflow as an electric energy source. Aldwell founded the Olympic Power Company in 1910 and began planning the construction of the Elwha Dam five miles from the mouth of the Elwha. As local settlers began building the dam, Lower Elwha Klallam people would persistently protest the construction of the dam on the building site, despite being ignored, mocked, and attacked (Gussman & Plumb).

Elwha Dam construction was completed in 1913. The 108-foot-tall dam provided electricity to the growing timber mill town of Port Angeles, and formed the Lake Aldwell reservoir. In 1927, the Glines Canyon Dam was built eight miles upriver from the Elwha Dam, stretching 210 feet tall and forming the Lake Mills reservoir. The combination of the two dams provided electricity to nearly 15,000 houses and businesses until 1949, when most northern Olympic Peninsula industries turned to the Bonneville Power Authority (BPA) for their power, aside from the Washington Pulp and Paper Company's mills in Port Angeles (Sadin & Vogel, 47).

Although many industries benefited from the dams, the environmental damage caused by the dams was much more significant. The construction of both dams flooded 800 acres of the Elwha River Valley, including the Lower Elwha Klallam Reservation, displacing many tribal members (Logan, 68). The longest lasting damage from these dams was the barricading of the salmon



Stylized map of the northern Olympic Peninsula depicting the Elwha Watershed in relation to well-known areas of Washington State (Credit: Annabelle Anderson).

runs. When constructing the dams, Aldwell mitigated the law requiring the installation of fish ladders by opening a very inefficient fish hatchery (Sadin & Vogel). Consequently, the dams completely blocked fish passage, cutting off access of 93 percent of the spawning habitat for anadromous (ocean-going) fish (Mapes 2013, 19).

Because of the dams, millions of young salmon were not able to reach the ocean. *Seattle Times* reporter Lynda Mapes expressed the impacts of salmon run declines:

“The son of Bill McMillan, a storied angler and conservationist, John is a native of Western Washington who has fished all his life. ‘I’ve spent fifteen years fishing 300 days a year...Now I’ve reached a point where the fish aren’t doing well enough, and I don’t even want to do it anymore’” (Mapes 2013, 20). Numbers of salmon rapidly declined until only landlocked fish were found in the Elwha above the dams. Lower Elwha Klallam leader Russell Hepfer stressed his concern about losing the salmon when he said, “If we lose our fish, we lose our tradition. We lose our treaty. We lose our sovereignty. There’s so much at stake” (NWIFC).

The salmon were not the only marine species to face the consequences of the dams’ construction. The sandy shorelines around the mouth of the river had been used by Lower Elwha Klallam people for collecting shellfish for thousands of years. The dams prevented sediment transportation from the Upper Elwha, ceasing the distribution of sand to the Lower Elwha, transforming it into a rocky shoreline. Without sandy shores to inhabit, the population of shellfish disappeared with the salmon (Northwest Treaty Tribes). The loss of sediment distribution also greatly reduced spawning areas for salmon. The Elwha and Glines Canyon Dams suffocated 70 miles of spawning habitat for the salmon, and blocked the passage of important sediment, making the Lower Elwha Klallam Tribe suffer greatly.

Taking action

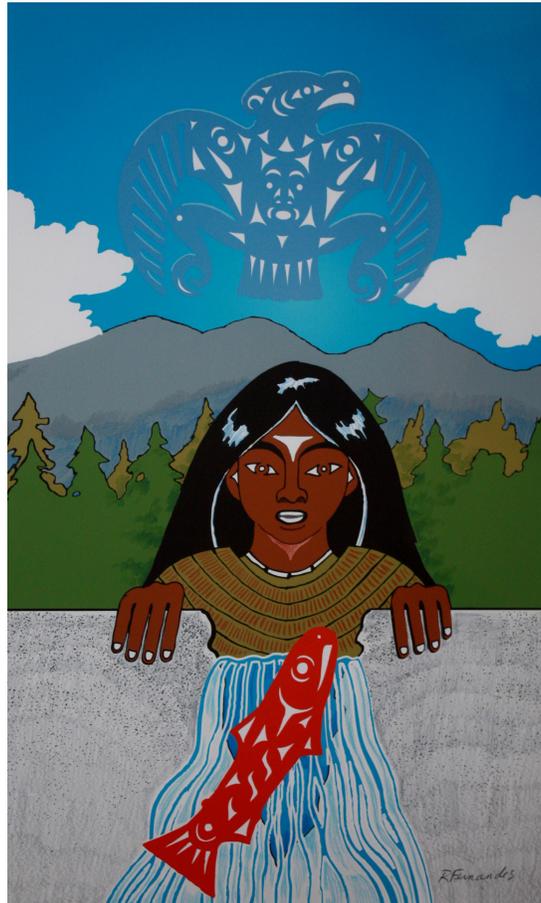
When Northwest Native peoples saw significant numbers of fish dying, they raised their voices, but they were viewed as inferior so they were rarely heard. The Lower Elwha Klallam people were the first to oppose the construction of the dams, and the first to criticize the damage caused by them, but they were later joined by others. In the late 1970s, writer and conservationist Tim

McNulty began his interest in the Elwha River and its dams after reading a series of articles by *Seattle Post Intelligencer* reporter Bruce Brown.

Brown’s novel, *Mountain in the Clouds: A Search for the Wild Salmon*, sparked public interest in bringing salmon back to the Elwha River. The idea of removing the two Elwha River dams was at first viewed as incomprehensible, but environmental activist Rick Rutz continued to mention the idea to other environmental activists (Gussman & Plumb).

The Glines Canyon Dam’s 50-year license was also up for renewal in the 1970s. As part of the renewal process, the company that owned the dam needed to address the fisheries’ restoration. The company’s

solutions were building new hatcheries and trucking fish around the dams (Gussman & Plumb). In 1986, the Lower Elwha Klallam Tribe intervened in licensing proceedings before the Federal Energy Regulatory Commission (FERC), which was overseeing the license renewal process, and requested the denial of the application as well as the removal of both dams (Blumm & Erickson, 1053). The Glines Canyon Dam was in Olympic National Park, violating a 1921 Act against licensing industrial infrastructure in a national park (Gussman & Plumb).



“Lady of the Mountain Breaks the Dam”: A mythical woman tears down the dam so that the natural world returns (Credit: Courtesy Roger Fernandes, Lower Elwha Klallam Tribe).



“The Mouth of the Elwha River”: The river braids down like hair, into the Salish Sea (Credit: Anthony Grandberry).

Former Washington State Governor Dan Evans had been aware of the number of fish in the Elwha before the dams were built, by listening to tribal stories, leading him to oppose renewing the dam’s relicensing (Gussman & Plumb).

Rick Rutz brought together the Seattle Audubon Society, Olympic Park Associates, Friends of the Earth, and the Sierra Club Cascade Chapter to discuss how to remove the dams. In 1991, the four organizations, with Trout Unlimited, filed suit in federal court challenging its jurisdiction to relicense the Glines Canyon Dam. Congress could take actions that courts cannot, such as drafting legislation to remove the dams and brainstorm ways to keep the mill running while not despoiling the water supply to the City of Port Angeles. The Elwha River Restoration Act passed Congress in 1992 and was signed by President George H.W. Bush. In 2001, the dams were purchased for nearly \$30 million by the United States Department of the Interior (Gussman & Plumb).

There was a halt to the removal process after Senator Slade Gorton blocked the “too expensive” funding. As much as there was support for dam removal, there was also widespread public opposition. Citizens expressed their apprehensiveness towards the removal of the dams due to possible economic risk and the loss of a comfort-

able lifestyle. The key local concern was not wanting Lake Aldwell and Lake Mills to disappear. A citizen’s advisory committee was formed which contained mostly civic leaders who did not have any industrial or ecological experience. Former Port Angeles Mayor Glenn Wiggins strongly expressed his opinion on dam removal when he said, “I was really shocked that anyone would consider taking those dams out. We had these two beautiful lakes, and I thought ‘this is a piece of God’s heaven’, and they want to take this out?” (Gussman & Plumb). Locals were not ready to let go of a familiar and comfortable status quo. Although the lakes were human-made, the masses of clear, stagnant water brought joy and nostalgia for summer days passed at the lake.

Elwha Project Manager Brian Winter’s priority was to provide facts that showed what the watershed would look like if the dams were removed, and what it would look like if the dams were not removed. Members of the citizen’s advisory committee were persuaded in favor of removing the dams after hearing the arguments, and they reached a consensus by 2011, so removal could finally begin after a decade’s delay (Blumm & Erickson). The fact that the Elwha and Glines Canyon Dam removals would be the first time large dams would be removed in history was both a challenge and attraction to removing them.

Dam Removal

Not only should the dams have never been built, but they should have been continually monitored to keep them from killing millions of fish. Scientists studied the Elwha River to gain as much information as they could before the dams were removed, so they could gain a better understanding of how the restoration would unfold. They collected information on fish, sediment, plants, and soils that were there. Riverscape snorkel surveys studied the entire 45-mile river within a week, counting fish and measuring the habitat. Scientists surgically inserted radio transmitters into fish, so they could track their movements (Mapes 2013, 19-31).

After years of in-field studies and negotiations, the dam turbines finally stopped on June 1, 2011. The reservoirs of Lakes Aldwell and Mills were drained in preparation for dam demolishment. The lakes were fully drained by July 2011, and deconstruction began in September, which proved to be a lengthy and expensive process. The Elwha dam was gone by 2012, and the Glines Canyon Dam was dismantled by 2014. The first Chinook salmon returned to the river in March 2012, after having disappeared for nearly a century (Mapes 2013, 116-117).

Benefits after dam removals

The goals of the dam removal were to restore the Elwha River as much as possible to its natural free-flowing state, but that goal may take many decades. The recovery process of the Elwha has been divided into distinct



Glines Canyon Dam after the breaching process began in 2014. Water that was once held at bay now flows freely through this dam, carrying sediment and debris with further downstream (Credit: National Park Service).



Female Chinook salmon found swimming in the Elwha after the Elwha Dam was put out of service, 2011 (Credit: National Park Service).

stages: preservation, recolonization, local adaptation, and establishment of viable, naturally spawning populations (Mapes 2020). There have been many benefits to the dam removal, one of them being an increase in the count of salmon and trout. As of 2016, the fish count had increased by more than 300 percent (Gussman & Plumb). The fish are now able to travel to the ocean and back by themselves, without hitting a massive wall of concrete. Even in death, the fish benefit more than a hundred other species in the food chain by providing marine-derived nutrients to freshwater natal streams.

A great surprise that arrived with the dam removal was the repopulation of summer Steelhead trout, which were believed to be completely extinct in the Elwha Watershed. *Seattle Times* reporter Mapes wrote: “The return of a summer Steelhead thought to be lost to the river was a shocker. Steelhead in the river today were thought to be only winter Steelhead, descended from Elwha River stock bred in the Tribe’s hatchery. But after the upper dam came down, scientists in 2016 started seeing something new: summer Steelhead that genetic analysis showed are aligned with natural origin Rainbow Trout from the upper reaches of the watershed” (Mapes 2020). Along with the Steelhead, the numbers of returning adult Chinooks are the highest since the late 1980s, with a 2019 count reaching over 7,600 (Mapes 2020).

The quality and size of the watershed has also shown obvious improvements, as the aquatic habitat is increasing in size and freshness. The delta at the rivermouth has expanded with new sediment deposition, increasing the total area of estuary habitat. The intertidal zone has expanded, which is very important for juvenile salmon, who need brackish water for a proper transition between fresh and saline water (Foley et al 2017, 558).



The Elwha beginning to return to its natural, free-flowing pattern three years after the dismantling of the Elwha Dam in 2015 (Credit: Zoltán Grossman).

By July 2012, the Elwha carried half a million tons of sediment downstream, equivalent to 50,000 dump truck loads (Nicole, 434). Scientists implemented Rod Surface Elevation Tables (RSETs) in various areas near the former dam sites. RSETs are an effective and non-destructive method utilized to measure incremental changes in surface levels in tidal/intertidal wetlands. Sediment deposition onto the coastal shorelines was greatest during the second and third years after dam removal, with eight RSETs exceeding 800 mm and three exceeding 500 mm of deposition, adding vastly to beach habitat (Foley et al 2017, 558-559).

Large Woody Debris (LWD) has proven to be an essential catalyst for proper sediment deposition and the marine ecosystem. LWD provides sediment retention and proper rest and spawning ground for the fish. Returning salmon and trout lay their eggs in the intertidal zone, so it is extremely important that there are areas of plentiful sediment with low risk for erosion. Because the river is now free, and because the Lower Elwha Klallam Tribe constructs effective log jams, fish can now spawn in intertidal zones with fewer obstacles. Along with providing abundant spawning areas, LWD has aided the redevelopment of the sandy beaches, and is “a major component of the backshore defined as the extreme inland limit of the beach only affected by waves during exceptional high tides or severe storms, and previous studies suggest that it actively builds this area...often exceeding depths of ten feet” (Rich et al, 306).

Revegetation is taking place in the large sediment deposits left behind above the dams. The Elwha revegetation team conducted a plan to plant 400,000 of 80 various successive native species in the newly unflooded areas of the Elwha River Valley, unsure of how successful the transplants would prosper. To their

pleasant surprise, the plants had a 92 percent survival rate (Logan, 70). These promising results have brought more hope to a future of abundant riparian vegetation along the Elwha.

Lessons of the Elwha

Since dam removal, Lower Elwha Klallam tribal members are once again able to reconnect with their ancestral territory. After more than a century of much of their homeland being flooded, Lower Elwha Klallam people were able to revisit a rock where they traditionally believed the Creator bathed and blessed their ancestors. The sacred place has had a human presence for at least 8,000 years (Leach). They are revitalizing their ancient practices of caring for the fish in return for the fish taking care of them. They continue to install log jams in areas of the river and its tributaries, so the salmon have places to hide and rest. Hepfer stated, “The fish don’t have a voice, so we must be their voice” (NWIFC). Lower Elwha Klallam people can for the first time practice their essential cultural traditions with support from and partnerships with local non-Native communities.

The Lower Elwha Klallam have led a political and environmental alliance that holds global significance, as curators of the first successful large dam removal in the United States. They endured centuries of genocide, displacement, and violent backlash from American settlers. The Lower Elwha Klallam people were the first and strongest advocates for their birthright to fish in their homeland, the Lower Elwha Valley. They proved that they did not need any power from U.S. government officials to spread national awareness of how the state government and industries were destroying their ecosys-



Billy Frank, Jr. (1931-2014), Chairman of Northwest Indian Fisheries Commission, with Lower Elwha Klallam Tribe Chairwoman Frances Charles at the Elwha Dam removal celebration in 2011 (Credit: John Gussman).

tem. They were the first to object the construction of the dams, and they followed through consistently until the dams were put out of service.

During the Dam Removal Groundbreaking Ceremony in 2011, Northwest Indian Fisheries Commission Chairman Billy Frank Jr. proudly said, “When you say the Elwha people are strong, you’re damn right they’re strong” (Gussman & Plumb). Without the strength and resistance of the Lower Elwha Klallam Tribe, the Elwha River may have never been freed, and the sight and sounds of salmon inhabiting the river would have likely been a distant memory.

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Flocks of gulls at the mouth of the Elwha at the estuary on the Lower Elwha Klallam Reservation, 2015 (Credit: Zoltan Grossman).



Two Pink salmon swimming in the Elwha after dam removal (Credit: National Park Service).

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4. Skokomish: Collaborative Restoration of an Obstructed River

Amanda Flegel and Hunter Herman

Peering out of the glaringly white sky sat the ankles of the mountains, timid and soft as they rose from the edge of the lake. The trees that accompanied them were coated in a delicate layer of snow. Below, the water glowed its familiar, icy blue hue, lapping the edges of the lake a good twenty-five feet below its summer level. The once slippery rocks were worn and tired from the endless touch of their watery counterparts. They were rounded and soft in their slumber, breathing themselves to life on the crisp air of that January afternoon. The wind blew solemnly across the lake, rippling the surface, bringing with it the thick smell of winter.

Today, the lake was eerily silent. Its vastness was glaring in the meager overcast light that the Olympic Range allowed in the winter. Long gone were the echoes of the noisy salmon seeking summer refuge in the lake's cool waters. Long gone were the trills and songs that no one would remember. The ghosts of the trees that were cut nearly a hundred years ago breathed their solemn bodies to life, thankful for a moment of fresh air before being submerged once again in the springs' glacial rush.



Cushman Dam #1 formed Lake Cushman's artificial reservoir when it was built in 1926. Here the dam wall, electricity transfer areas, and some of the fish transport system are visible (Credit: Amanda Flegel).

Once a natural body of water, Lake Cushman is now an artificial reservoir, expanded by a dam installed on its southern shore in 1926. Today the lake is about five times its size prior to European settlement of the area (NPS). The people whose ancestors lived on this land continue to reside on it and take care of the area despite hardships they have faced from American colonization. Before U.S. dominance of the area, the Twana-speaking people, now known as the Skokomish Tribe, lived up



Lake Cushman is a pristine-looking lake, but the dams that expanded it wreaked havoc on salmon populations and the people of the river (Credit: Hunter Herman).

and down the eastern shore of the Olympic Peninsula along Hood Canal, and consisted of nine different communities that collectively spoke the Twana language (Skokomish Tribe). The Lake Cushman Dams project caused negative changes to the Skokomish River by altering the North Fork's outflow, releasing sediment into spawning areas, hindering salmon migration, and dangerously reducing fish numbers.

Cushman Dams #1 and #2 became a topic of debate even before their construction. Settlers and politicians argued amongst each other over the location of the dams, rising water levels, cost of construction, and damages the dams would ultimately cause to the budding Skokomish Basin timber and iron industries (Seattle Star). In the 1920s, the Skokomish Tribe was not consulted about dam construction, even though the dams would impact its reservation lands and treaty fishing rights. At the end of the century, the Tribe filed two lawsuits against the City of Tacoma and the Washington State government, both of which had varying outcomes for the Skokomish people. Today, the Skokomish have teamed up with numerous organizations and agencies to fight for fishing rights, restore their estuary, rebuild important habitat,



Fishing has been and still is a center to Skokomish way of life (Credit: Amanda Flegel).

and return salmon to the Skokomish River, while the Cushman dams remain in place (Skokomish Watershed Action Team).

Colonization of the Skokomish Basin

Skokomish was the largest of the nine Twana communities, its name translating to “big river people,” referring to the Skokomish River and its basin. The Twana lived up and down the shore of Hood Canal, migrating to food sources in the warmer months and returning to more permanent villages in the winter. Skokomish people relied on the harvest of salmon and other fish species, along with shellfish from Hood Canal, to live both physically and culturally (Online Highways).

In 1792, European settlers and the Twana people first made contact, which resulted in a devastating bout of smallpox that took the lives of many Twana. In the early stages of contact, the Skokomish traded with Europeans, mostly for weapons and clothing. In 1852, Lake Cushman was encountered by treaty interpreter B.F Shaw, and named after his friend Orrington Cushman, a logger from Maine (Lang). In 1855, settlers began to inhabit the shores of the lake, drawn by the pristine beauty and job opportunities. The signing of the Treaty of Point No Point occurred in the same year. The treaty created a 5,000-acre reservation at the mouth of the Skokomish River where all nine Twana communities were told to live together and were collectively renamed the Skokomish Tribe (Skokomish Tribe).



A Skokomish basket. Basketweaving is central to Skokomish traditions, though materials have become harder to find and even impossible in the region (Credit: Wikipedia).

Colonization had an effect not only on the people who lived on Hood Canal “since time immemorial,” but also the land where they had thrived. Railroads and logging access roads were built on both the South and North Forks, and the riverbank was diked. These changes shifted the flow of the river, deposited sediment over spawning areas, and destroyed the dikes and dams, resulting in flooding and landslides that still persist today (Kaiser). Diking and diverting the river’s flow resulted in the loss of diversity among plant species that the Skokomish people used for their traditional works, including a sweetgrass species used in basketmaking (NPIHB). Bruce

subiyay Miller, a traditional carver and basketweaver of the Skokomish Tribe, recollected the noticeable changes in the environment throughout his lifetime: “at that time, you actually only had to go across from the little house she [his aunt] lived in down by the marsh she lived in to gather materials. Now none grows there at all. That’s how much the environment changed” (NorthWest Indian News).

Cushman Dam Project

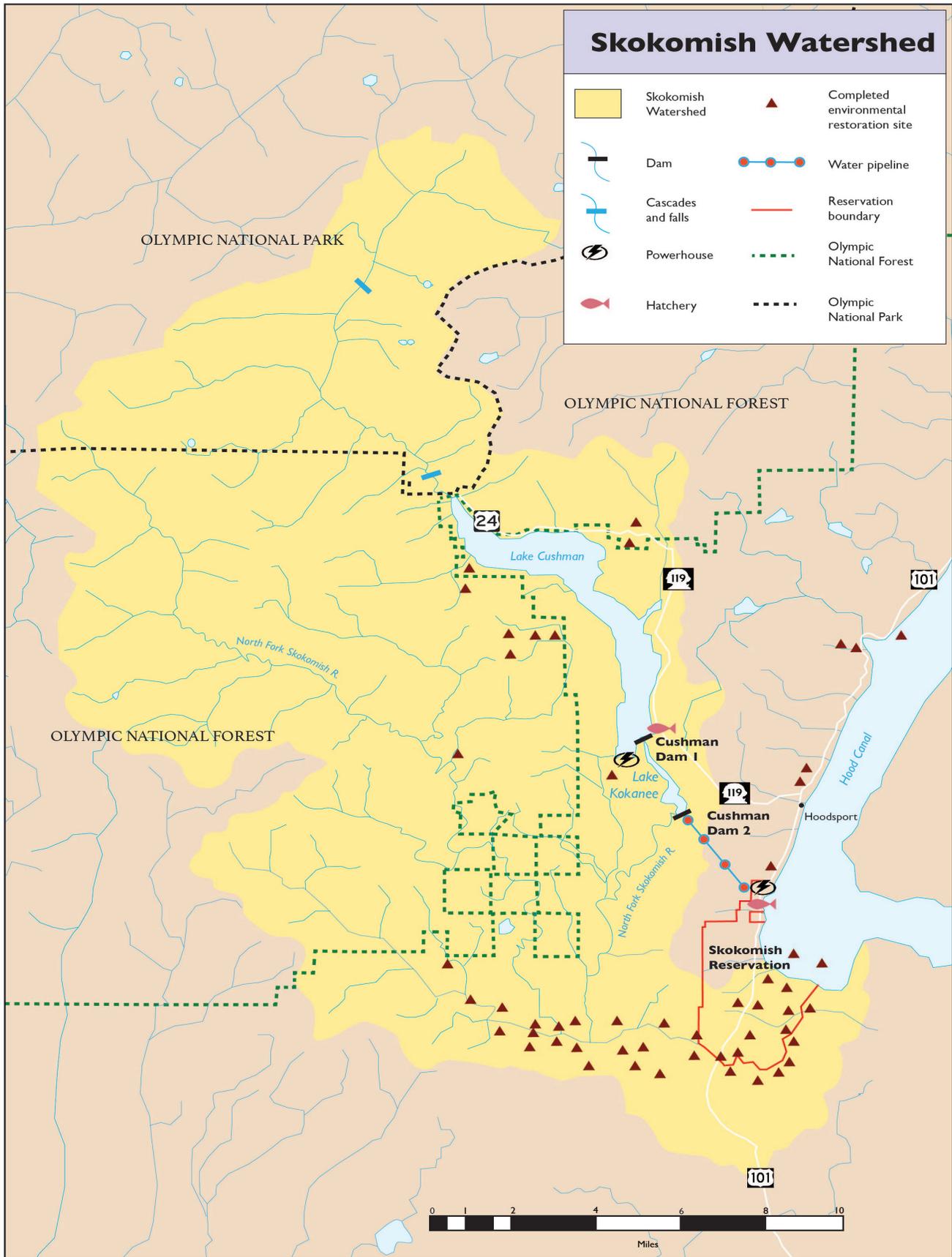
In the early 19th century, Lake Cushman was primarily used for hunting and fishing outposts and cabins. Iron deposits were discovered in the lake valley in 1888, prompting settlers and prospectors to set their sights on Hoodspout and the Skokomish River (LCMC). In 1890, a road was constructed between Hoodspout and Lake Cushman, enhancing the lake’s reputation as a resort



The Antlers Hotel began as a hunting cabin, but soon added to the unique draw of the Skokomish Basin as a resort area (Credit: Washington State University).

destination for hunters, fishermen, miners, and later, tourists and families. In 1899, Russell Homan erected the Antlers Hotel on the west shore of the lake, solidifying Lake Cushman as a resort destination (NPS).

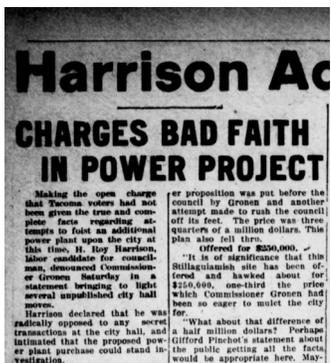
In the new state capital of Olympia, arguments over powering the cities of Seattle and Tacoma were beginning to get heated. In Seattle, some believed that purchasing the Hebbs power site on the White River may be the best idea for cheap hydroelectricity, while others argued against it. Edwin L. Blaine of the Seattle City Council believed that the city must do anything in its power to acquire a cheap option for hydroelectric power, whether it be the Hebbs site or Lake Cushman. He con-



This map details the Skokomish Basin with tributaries and both forks. It highlights the two Cushman Dam sites along with the powerhouses, water transport pipeline, and fish hatcheries, all of which were subjects of the relicensing decision in 1999 that the Skokomish Tribe opposed. The map also highlights areas where the Skokomish Watershed Action Team (SWAT) has collaborated successfully to restore the Skokomish Watershed. In 2016, SWAT reported that over 50 environmental restoration projects had been completed in ten years (Credit: Amanda Flegel).

cluded that Seattle taxpayers would soon forget the large amount of their money spent on a power plant if the plant could produce 40,000 horsepower of electricity, and proposed condemnation as the best option (Seattle Republican). In 1912, the City of Seattle bought the Lake Cushman power site from a Mr. Wickstrom for one million dollars (Washington Standard 1912).

Throughout this entire period, the Skokomish people were never consulted regarding their insights into the project, even though the North Fork was a crucial spawning area for salmon. The natural Lake Cushman “was a significant cultural site, the dams inundated spiritual sites and had an immediate impact of the fish runs and the elk herds” (Northwest Indian Fisheries Commission and Salmon Defense). The City of Tacoma’s Commissioner of Light and



Power Hamilton Gronen pushed for the Cushman site to be purchased by the City after the Council expressed its dislike of the site, mostly based on financial returns the site may generate for the City. Gronen told the Tacoma City Council “that he would be able to cut light cost in Tacoma materially, and that all the cost of the new plant could be met from the light department’s reserve fund and from operating revenues” (Tacoma Times 1917b). Gronen’s push was shady, because he did not inform the public of certain aspects of his desire to acquire the Cushman site,

resulting in public distrust of Gronen and the Tacoma City Council (Tacoma Times 1918b).

In 1920, the City of Tacoma decided to acquire the site and announced its plan to erect the 235-foot tall dam after condemnation suits were cleared on the site’s power title (Kennewick Courier-Reporter). Settler backlash to the proposition ensued, as the dam would flood nearly an eight-mile stretch of land and significantly lower Skokomish River levels, on the North Fork that drained out of Lake Cushman. The timber industry was a very critical source of income for workers who chose to reside in the Skokomish Basin, and they sued the City of Tacoma on account of losses of water for timber

floating and of damages to their homes, land and income (Washington Standard 1920). The courts settled the suit, issuing damage costs to settlers totaling up to \$35,000.



Timber workers marked where the newly dammed Lake Cushman would flood and chopped the trees within that area in preparation. Today, the nearly 100-year-old cut stumps are still visible either below or above the lake’s waterline (Credit: Hunter Herman).

In 1924, the building of Cushman Dam Number One began at a spot called Ranger’s Cabin on the southeast end of the lake (Washington Standard 1921). The dam was completed in 1926. In preparation for the lake’s enlargement into a reservoir, timber workers cut the trees within the flood zone. Their trunks can still be seen in the lakebed nearly one hundred years later. The waters of the lake slowed and rose, flooding settlements and fishing cabins. The lake swallowed the Antlers Hotel and a Skokomish summer village beneath its watery depths (Kaiser).



Cushman Dam #2’s powerhouse was built in 1930 and sits on Skokomish Reservation land near Potlatch on Highway 101. The powerhouse sources water from the large water diversion pipeline from Lake Kokanee and Cushman Dam #2 (Credit: Amanda Flegel).

The initial Cushman hydroelectric project cost nearly seven million dollars to complete, including the dam, powerplant, a huge water diversion pipeline to the powerplant, and power lines to Tacoma. In total, the first Cushman dam produced 75,000 horsepower for the city (Washington Standard 1921). In 1930, the second Cushman dam was installed downstream from the first, creating a new reservoir named Lake Kokanee (Tacoma Public Utilities a). Both dams posed a major threat to salmon as they reduced the flow rate of the North Fork significantly by creating sand bars, unnatural flows, and warmer temperatures for salmon returning upriver to spawn. Soon, the run of spring Chinook stopped returning to the Skokomish River (Dunagan 2019). The Skokomish people could not exercise their treaty rights when there were no fish to be caught, the shellfish were too contaminated to eat, and the river they had lived on forever slowly became a trickle of its former self.

Dam Relicensing Fight

In 1974, the Cushman Project's 50-year federal license was set to expire, much like the Elwha dams in the same decade (see Elwha chapter). The 1924 license had

covered both dams and powerhouses (Tacoma Public Utilities). At that time, the Skokomish Tribe and other affected parties voiced their concerns about the environmental degradation caused by the dams. At that time, the licensing authority Federal Energy Regulatory Commission (FERC) ordered studies to determine any problems with the dam. These studies dragged on for more than 20 years. Then in July 1998, FERC issued a license to the Cushman Dam. Immediately the tribe and other parties appealed the new license (Tacoma Public Utilities b).

In order to stop the license, the Skokomish Tribe filed a federal District Court lawsuit in November 1999 against



Because of heavy sedimentation of the Skokomish River from road and dam development, the Skokomish Basin's flooding has become worse, forcing spawning salmon to cross over flooded roads to get upstream (Credit: Steven Rosenow).



The Skokomish Estuary on Hood Canal is a crucial part of the river for salmon habitat and became one of the main focuses of SWAT for collaborative restoration efforts (Credit: Wikipedia).



Titled "What Lies Below", this digital art piece highlights the effects of the Cushman Dams on the salmon and people who depend on the North Fork of the river. It represents the beauty of Lake Cushman while revealing detrimental effects to the Chinook salmon and Skokomish people (Credit: Hunter Herman).

Tacoma and the U.S. government for damages caused by the Cushman Dam. The Tribe stated in the lawsuit that tribal pastures and orchards had been damaged and ruined from the flooding. Flooding caused by the dam also ruined septic systems and contaminated wells (Dunagan 2016a). One of the most detrimental damages to the Tribe's way of life was the diminished fish and marine life from various dam impacts, such as blocked salmon migration, polluted shellfish beds, and flooded fish hatcheries. "I remember this river being beautiful and calm and the kids playing in it, and I just know it was a living for some of our people," said Diane Gouley, a Skokomish tribal member (SWAT). The District Court released the U.S. government as a defendant in the lawsuit. The City of Tacoma and Tacoma Power, however, were found to be liable.

While the lawsuit was making its way through the courts in 2003-04, the Skokomish Tribe and its neighbors noticed extreme changes in the Skokomish River. The Skokomish River had begun to see large annual floods, and in some years multiple floods occurred. This flooding was caused from an increase in gravel and other sediment in the river, largely due to landslides on unmaintained logging roads (SWAT). Sedimentation of the river decreased the total volume of water that the river could hold, resulting in massive damages to land, housing, and the environment (Czuba). Residents and businesses realized that without immediate cooperative action, they may lose the ability to work and live in the place they all loved (SWAT).

There was no time for more studies, or debates among politicians, about what should be done. Action had to be taken if the residents were to remain in the Skokomish Valley. Beginning in 1997, agencies and groups with the same goal of restoring the Skokomish River had begun their work separately from each other, creating a divide and distrust among the different groups and residents of the Skokomish Basin. Finally in 2004, members from different groups came together to begin collaborative restoration work. Working together was difficult at first, but everyone agreed on what needed to happen to begin restoration on the river. However, getting to a collaborative solution was where the work needed to be done among the involved parties. The first project was funded by a U.S. Forest Service timber sale. The money raised was enough to remove 30 cubic yards of debris and sediment from a stream crossing and help the Forest Service with road decommissioning. After the project was complete, a sustained team effort was born.

Skokomish Watershed Action Team

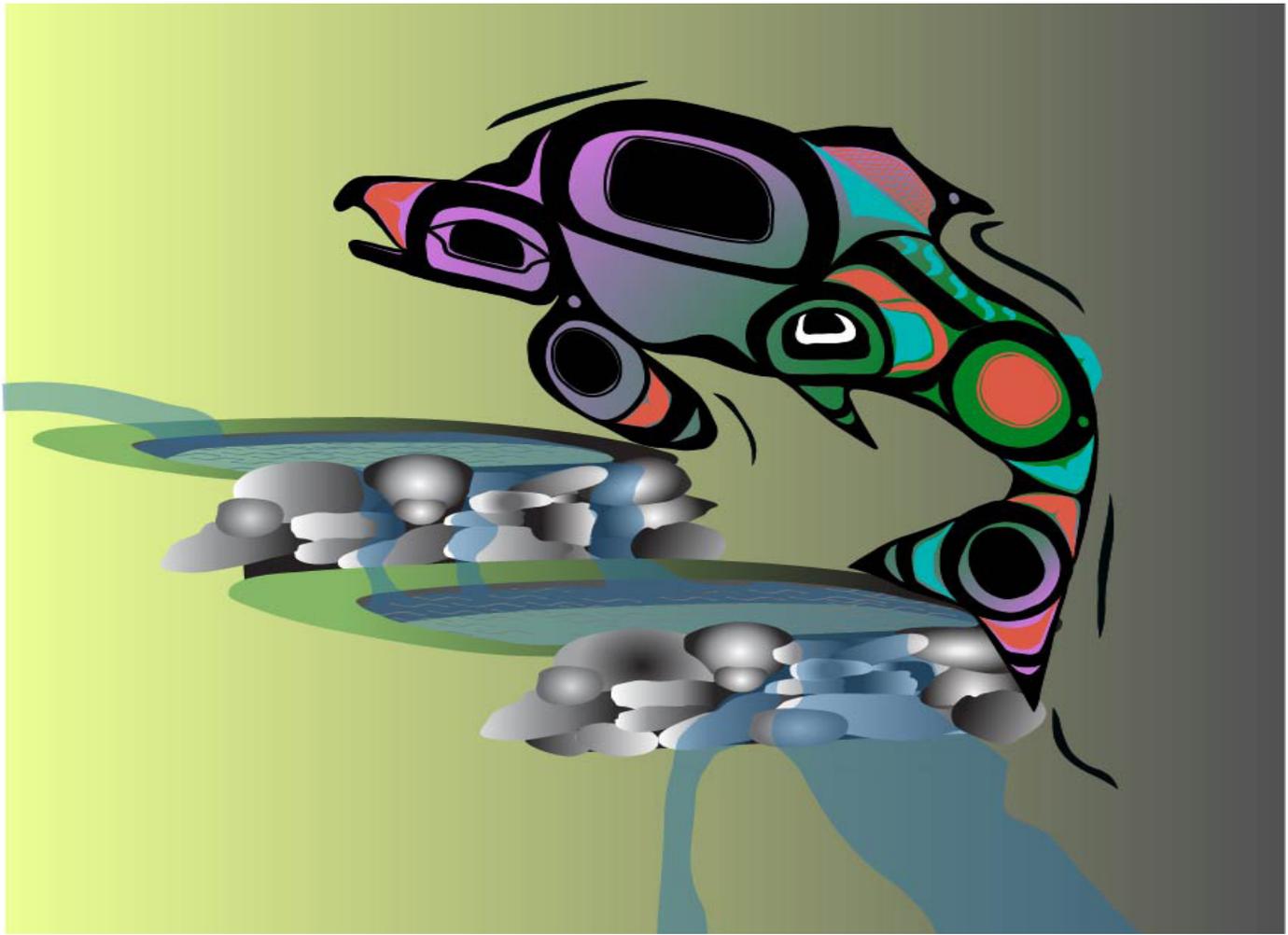
The success of the coordinated project propelled the formation of the Skokomish Watershed Action Team (SWAT). Through the formation of SWAT, Native and non-Native neighbors could combine resources and gather experts in various fields such as forestry and marine biology. This collaboration allowed for larger-scale projects to be done with coordination of funds and labor. SWAT includes more than 20 entities, including the Skokomish Tribe, Olympic National Forest, Mason Conservation District, Wilderness Society, private landowners, and timber agencies. The Tribe was the driving force to creating and upholding SWAT, whose main purpose is to identify goals and objectives based on different skills, backgrounds, opinions, and viewpoints that SWAT members carry with them, to come to the best possible solution to restore the watershed (Hood Canal Coordinating Council, 1-8).



The Skokomish Tribe's push for collaborative restoration efforts on the river was a turning point in the environmental health of the Skokomish Basin (Credit: NOAA Fisheries).

Around the time SWAT was coming together in 2004, the State of Washington was itself beginning to acknowledge and recognize it was time to act. Governor Cristine Gregoire said about the Hoodspout area and the Skokomish River, "It is a crisis, in my opinion. It is a crown jewel, but it is in serious danger. We should all be very embarrassed" (Ammons).

In 2007, SWAT developed and published "Restoring the Skokomish Watershed, A Three-Year Action Plan." SWAT's initial action plan identified 42 projects and estimated it would take \$48.6 million to complete them. These first projects were aimed at reducing flooding, improving water quality, and aiding in the recovery of endangered fish species. SWAT also did education



“Journey Upstream” is an art piece of a male Pink salmon and artificial resting pools that were implemented as part of the settlement between the Skokomish Tribe and the City of Tacoma regarding fish habitat restoration on the North Fork, including the Cushman Dam fish passage facilities (Credit: Hunter Herman).

and outreach work with the community. Educational events were organized, such as the Skokomish Tribe’s “Skokomish Estuary Earth Day” at Hood Canal School, to spark the kids’ love and connection to home. SWAT’s action plan stated, “The collaborative watershed restoration plan for the Skokomish River is dedicated to the children of future generations, so they may know the river as much as their ancestor lived” (Anderson et al 2007, 3, 5, 11).

Through SWAT’s outreach, this commitment has become more than just words. The formation of a group as dedicated and diverse as SWAT is a level of restorative collaboration that has rarely been witnessed in a Washington watershed. The Skokomish Tribe’s Natural Resource Manager Joseph Pavel acknowledged that SWAT members do not agree on everything, but despite their differences have pushed to continue to work together to restore the Skokomish Watershed (SWAT). Members of SWAT agree that they would not be at the level of restoration that SWAT has achieved on the watershed if involved parties had not begun collaboration.

Settlement Agreement

After the completion of SWAT’s initial fundraising and restoration projects, in 2016 it decided it was time to look back at its successes, and to develop a new action plan. SWAT estimated in that the decade of 2006-16, \$86 million had been spent on restoration projects in the Skokomish Watershed. The new five-year plan highlighted 11 projects and estimated they would cost approximately \$28.1 million. SWAT made progress on these projects until 2020, when the COVID-19 pandemic slowed the restoration work. The updated plan also stated that SWAT wants to achieve its goals to “(1) preserve the watershed’s unique cultural and historical resources, (2) enhance the existing fisheries and agricultural industries, (3) promote recreation and tourism in the watershed, and (4) build healthy and safe communities” (SWAT).

In August 2007 the Skokomish Tribe and Tacoma, with the State of Washington and the U.S. government, began to negotiate a settlement agreement. An agreement was

reached after close to a decade in the courts in January 2009. In the settlement agreement, the Skokomish Tribe received \$12.6 million in a one-time cash settlement, and some lands were turned over by Tacoma Power (Tacoma Power, 1). In addition to the onetime payment, the Tribe will receive 7.25 percent of the value of energy produced at Cushman Powerhouse No. 2. This income not only enriches the Skokomish tribal economy, but can be used in part to fund continued restoration and land management projects. The fish, shellfish, and hundreds of other species that call the Skokomish Watershed their home also had their lives enriched. Tacoma Power agreed to open a hatchery and help return the fish to the Skokomish River. Upstream and downstream fish passages through dams, Sockeye hatchery, and a Spring Chinook, Coho and Steelhead hatchery were opened as a result of the lawsuit (Tacoma Daily Index).

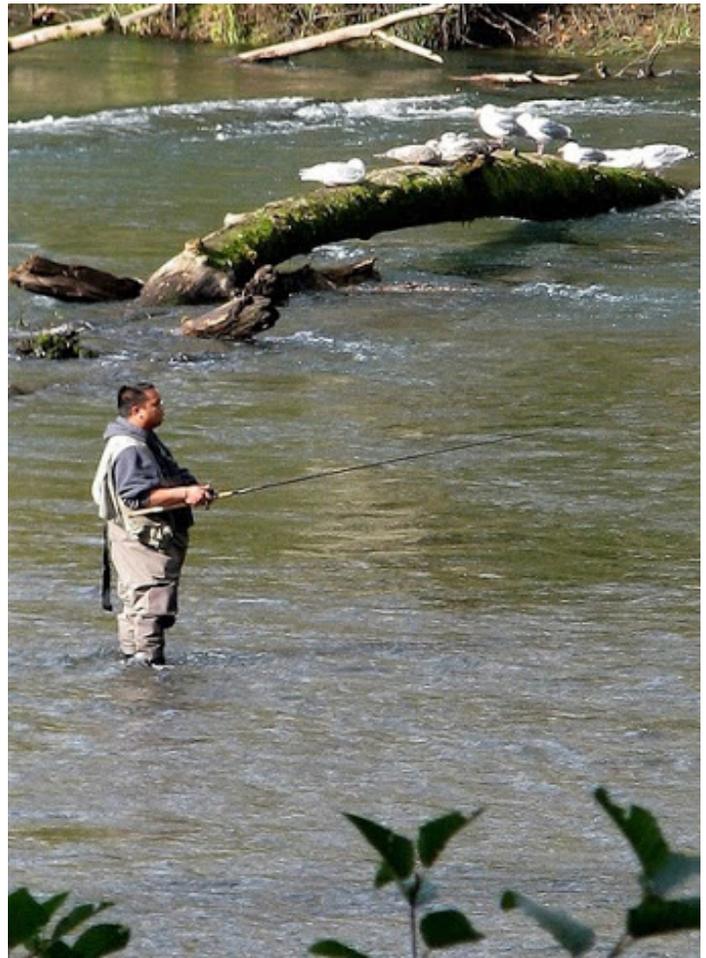
New Fishing Conflicts

In recent years, the Skokomish Tribe has become embroiled in a new fight with sport fishermen and the Washington Department of Fish and Wildlife (WDFW) over the boundaries of the reservation and the fishing rights of the sport fishermen. During fishing seasons, sport fishermen have flocked to a 3.5-mile stretch of the river on the south bank of the Skokomish River. The Skokomish Tribe argues that this is its traditional land and part of the reservation.



Tribal members continue to fish in usual and accustomed places, according to the Treaty of Point No Point of 1855 (Credit: Jon. D. Anderson).

In 2016, the U.S. Department of the Interior (DOI) sided with the Skokomish Tribe, citing a 1971 federal memorandum which stated that the entire width of the river belonged to the Skokomish Tribe, so fishing remained closed to the public. Anglers protested this decision, contesting the reservation boundary. In 2018, the WDFW wanted to reopen salmon fishing in the Skokomish River but was unsuccessful in talks with the Skokomish Tribe. In 2020, WDFW asked the DOI to reconsider and reverse its ruling. In October 2020 the sportfishing organization Fish Northwest filed a lawsuit in federal court, stating the WDFW has not been adequately representing its interests since the 1974 Boldt Decision (Walgamott



Fishing still stands as a vital part of Skokomish livelihood. The Tribe and allies work hard to keep the river healthy and traditions alive in the face of an obstructed river and continuous attacks by non-Native fishers (Credit: Mik).

2020a). WDFW and federal and tribal attorneys filed motions to deny the lawsuit. It remains to be seen if this renewed conflict over fishing will have an impact on cooperative efforts in fish restoration. As of now it has not, and it will ultimately be up to the U.S. District Court in Seattle to rule on the matter (Walgamott 2020b).

Lessons Learned from the Skokomish

SWAT and other organizations, such as the Hood Canal Coordinating Council, have had success and proven results that restoration work can offer Mother Nature room to heal and to rebound. Neighbors have witnessed salmon and other fish return to the Skokomish Estuary, as well as to the North Fork of the Skokomish River after 90 years of absence (Sailor, 1). While celebrating the successes so far achieved in the restoration of the Skokomish Watershed, it is important to remember that Northwest salmon runs are still in dire straits. The Skokomish Tribe fought against the

City of Tacoma and the State of Washington to uphold its treaty rights, making strides to return what had been taken. The City of Tacoma came to an agreement with the Tribe to incorporate salmon passage, habitat restoration, and hatcheries on the North Fork of the river, while FERC reinstated the licenses to the dams for another fifty years. Even though the Cushman dams remain in place for the foreseeable future, the Skokomish Tribe and allies have shown remarkable collaboration across Native and non-Native fronts, inspiring the public that unlikely alliances can be the most valuable. Native and non-Native fronts, inspiring the public that unlikely alliances can be the most valuable.

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5. Chico: Restoring the Place of the Chum Salmon

Bridget Marsch-Grím

Situated on the Kitsap Peninsula, just 17 miles west of Seattle, the Chico Creek Watershed stands as a unique success story for salmon stream restoration and collaboration between tribal and non-tribal partners. One of Puget Sound's largest native salmon-producing creeks, Chico sees an average of 30,000 spawning fish annually (Northwest Treaty Tribes 2010a). Despite impacts of pressing development, concerted restoration efforts over the past two decades have resulted in excellent terrestrial and in-stream conditions (Ostrom). Sometimes referred to as "Kitsap's Elwha" (Farley), Chico Creek offers a model for similar restoration projects throughout the Pacific Northwest. However, as long as culverts remain along Chico Creek, as much as 15 percent of returning fish will fail to reach spawning grounds (Farley).

The clear, cool waters of Chico Creek's tributaries flow from Green Mountain, Kitsap Peninsula's second-highest point, into the natural reservoirs of Wildcat and Kitsap lakes. Streams from the lakes flow through what are today some of the last remaining old-growth forests in the region, creating cool and shaded spawning habitat ideal for Chum and Coho salmon, and Steelhead and coastal Cutthroat trout populations. For millennia, the creek braided and meandered across the floodplain before flowing out into Chico Bay and Dyes Inlet. However, with European settlement in the late 19th century, much of the area surrounding Dyes Inlet became farmland. As the community grew through the 20th century, a road network was built, with culverts restricting the stream at every crossing.

In the 1960s, State Route 3 (SR 3) was built to prepare for the booming development that would come in the following decades. Rapid growth of the nearby Naval Submarine Base Bangor and Puget Sound Naval Shipyard, as well as construction of the Kitsap Mall in the 1980s, would transform the landscape and sleepy central Kitsap County community into a bustling metropolis. Of the multiple culverts dotting Chico Creek, the concrete single box culvert running under SR 3 at the mouth of the stream posed the greatest impediment to fish passage, the highest safety risk for the highway, and the largest

engineering challenge for restoration.

For more than 20 years, tribal and non-tribal community members have worked to remove culverts and restore habitat throughout the lower watershed. Relationships between tribal, state, and county government agencies have been both collaborative and contentious at times. In 2001, the Suquamish and 20 other Washington tribes sued the State of Washington, asserting the urgent need



State Route 3 is Kitsap County's main arterial. In addition to being a major impediment to salmon passage, the 400-foot-long single box culvert running beneath the highway contributes to the channelization of the Chico Creek estuary and is at risk of washing out in the event of a major flood (Credit: Google Earth).

for the state to address habitat restrictions being caused by culverts along major state roads (Le). In 2018, following several appeals, the "culverts case" came to a close in the tribes' favor when the Supreme Court upheld the 2007 decision of U.S. District Judge Ricardo Martinez, ordering the State to repair or replace over 1,000 culverts impeding access to salmon spawning grounds. The 17-year-long culverts case is the latest chapter in Washington tribes' ongoing fight against the State to uphold reserved treaty rights to hunt and fish in usual and accustomed places like Chico Creek.

As the State begins to sort out the billions of dollars' worth of work and countless culvert removal projects ahead, restoration efforts within the Chico Creek Watershed may offer an example for successful collaboration. This case study explores the long history behind restoration efforts within the Chico Creek Watershed and introduces the communities of people who have fought to

preserve it. Archaeologist, historian, and Suquamish Tribal Council Chairman Leonard Forsman introduces us to the *SXa'tabs*, the Suquamish people of south Dyes Inlet, and “Place of the Chum Salmon,” now known as Chico. Handed down from Suquamish elders and compiled by early 20th century ethnographer, T.T. Waterman, Lushootseed place names surrounding this former winter village site familiarize us with their traditional identities and the relationships they describe. The case study highlights the resilience of the Suquamish community through colonization and the long fight for recognition of their treaty rights. Finally, an interview with Tom Ostrom, Suquamish Tribal Ecosystem Recovery Manager, describes the ecological impact of development, as well as the long-term vision, planning, and collaborative efforts that have made restoration of the Chico Creek Watershed the success story it is today.

***SXa'tabs* (“People of the ‘Way Back in’ Village”)**

For the Suquamish, southern Dyes Inlet has always been a place of bounty. In his Master’s thesis, *The Dyes Inlet Indian Communities: An Analysis of the Historic Significance of an Off-Reservation Settlement*, Suquamish Chairman Leonard Forsman remarks that the Suquamish living around Dyes Inlet were known as the *SXa'tabs*, or “people of the ‘way back in’ village” (Forsman). Although the village after which the *SXa'tabs* were named was situated two miles north of Chico, near what is now the unincorporated town of Silverdale, southern Dyes Inlet was a prime location for the gathering of different foods and materials, as well as the location of several Suquamish communities. In addition to excellent salmon fishing at the mouth of Chico Creek, nearby Erlands Point was known to be an excellent source for the raw materials needed to make tools. To the southeast, the shallow waters and narrow inlets of Ostrich, Oyster, Mud, and Phinney bays were plentiful in clams, oysters, flounder, and other bottom fish.

The significance of these areas to the Suquamish is evidenced in the number of traditional place names that



One example that highlights the importance of the Suquamish relationship to water is the place name *Qw1tca'qudup*, or “Looking for a Canoe” (Hilbert, Miller, & Zalmai). Historic memories of the place recount canoes piled up along the shoreline near the mouth of the creek as people came to fish and harvest oysters. A boulder near where canoes were often parked is said to be a man who came in search of his missing canoe and was turned to stone. Forsman cites one informant, who explained that canoes “always drifted to this point when they were lost” (Credit: Courtesy Suquamish Museum.).

describe locations along the shores of the Chico Creek Watershed and southern Dyes Inlet. “Suquamish people assigned names to bays, creeks, springs, boulders, sandspits, promontories and other geographic features,” notes Forsman, “The names were specific and were mostly applied to shoreline features, which is not a surprise given the Suquamish people’s reliance on waterborne resources for food and their use of local waterways for transportation” (Forsman).



Eagle Harbor Suquamish village on Bainbridge Island. The winter village house at the mouth of Chico Creek would have been constructed in a similar manner as this one, with split cedar planks and a shed roof (Credit: Courtesy Suquamish Museum).

Spw'IL (“To Whistle”): Where the Salmon Run

For millennia, the cool, clear water of Chico Creek, known to the Suquamish as *Spw'IL*, or “To Whistle” (Hilbert, Miller, & Zalmi), its connecting tributaries, and shady old-growth forests have provided the perfect spawning ground for tens of thousands of Chum salmon, as well as Coho, Steelhead, and coastal Cutthroat populations. The large estuary at the mouth of the creek and the winter village that once flourished there are aptly referred to as “Place of the Chum Salmon” (Northwest Treaty Tribes, 2010a) or “Where the Salmon Run” (Sigo) by the Suquamish, for the vast numbers of Chum that return each year to rest there briefly before making their journey upstream.

The Suquamish Community of Southern Dyes Inlet

With the arrival of European settlers in the 1800s, the Suquamish community of southern Dyes Inlet, as well as the land and waters they called home, were significantly impacted. “The Suquamish living on Dyes Inlet in the mid-19th century experienced an upheaval of their traditional economy, culture and social structure as non-Natives began to settle the area,” remarks Forsman, “The Indians learned to live alongside their non-Native neighbors, sharing their ancient homeland with the newcomers. Increased settlement in the area caused the destruction of archaeological sites, prominent shoreline boulders, and former villages” (Forsman). The lasting impact of settlement and development throughout the area would leave a heavy mark on the land and water of the Chico Creek Watershed, as well as on Suquamish culture.

“The Dyes Inlet Indian homesteads represent the resilience, adaptiveness and independence of the Suquamish people living in this off-reservation community.”

– Suquamish Chairman Leonard Forsman

Forsman indicates that after the Treaty of Point Elliott was signed in 1855, the government had an expectation that all Suquamish people would settle on the Suquamish Reservation at Port Madison. For Dyes Inlet families, this would mean relinquishing the land they had called home for centuries, giving up their ceremonial way of life, and having to send their children to boarding schools, as required by federal Indian policy. Left with no other choice, many Dyes Inlet Suquamish fami-

lies abandoned their tribal affiliation—the only option available to them to gain legal ownership of their land. These families primarily homesteaded four traditional areas around Dyes Inlet: Phinney Bay, Rocky Point, Elwood Point, and particularly, the rich lands of the winter village site of Erlands Point, near what is now known as Chico. Forsman remarks, “By adapting to a wage economy, familiarizing themselves with land laws, and resorting to their aboriginal lands to escape federal policy being employed on the reservation, the Suquamish of Dyes Inlet established off-reservation Indian communities that remained healthy for many years” (Forsman).



The Judson, Napoleon, and Sigo families at Elwood Point, circa 1855 (Credit: Courtesy Suquamish Museum).

Two Suquamish homesteads on the Erlands Point Peninsula, established by Stephen Ya Tle Wit Wilson and Chief William Chico, were home to a community of approximately 200 people from the mid- to late-1800s. Forsman notes that the Suquamish of Erlands Point became wealthy in the settler economy and commanded the respect of their non-Indian peers by employing their traditional woodworking knowledge in the logging camps and sawmills. They supplemented their income by selling baskets and knitted to the mills and camps. Dogfish oil, derived from the liver of this small species of shark, was sold to local loggers who utilized it as a lubricant for logging machinery and skid roads (Forsman).

Forsman explains that as Chico grew older and was no longer able to support himself in the wage economy through hunting, fishing, and logging, he struggled to support himself and keep up with the property taxes imposed on his land. Like many other Dyes Inlet Suquamish who gave up their tribal affiliation to retain legal ownership of their homelands, much of Chico’s homestead was eventually lost to foreclosure. After his death in 1910, most of the Native residents of the Erlands Point community joined the Suquamish community at

Elwood Point, about a half mile to the south. Known by Suquamish elders to be “one of the most culturally important places in southern Dyes Inlet,” legal ownership of Elwood Point was gained by the Suquamish in 1877 (Forsman). However, the site was lost to the U.S. Navy



The fight to protect Suquamish treaty rights to fish has stretched across generations. Above: Beach seiners on Agate Pass, near the Suquamish Reservation at Port Madison (Credit: Courtesy Suquamish Museum). Below: 21st-century tribal salmon seiners bring in the Chum catch at Chico Bay (Credit: Tom Ostrom).



Military Hospital still stand on this significant Suquamish cultural site and a portion of Chief Chico’s original homestead lands (Forsman).

Despite the considerable challenges faced by the people of southern Dyes Inlet, several resilient Suquamish families still reside on portions of their original homestead sites near Erlands Point and Chico Bay. Forsman notes that a large number of Suquamish tribal members living on the Port Madison Reservation today are descended from families that lived at Erlands Point, Elwood Point, and Phinney Bay.

The Long Fight for Treaty Rights

For many members of the Suquamish community, restoration of the Chico Creek Watershed is about so much

more than just protection of salmon and habitat. Ensuring the health of Chico Creek and the salmon that swim in its waters is their birthright. Suquamish Tribal Council Treasurer Robin Little Wing Sigo, a descendant of Chief Chico’s sister Louisa, recounts spending holidays as a child with her great-grandparents, “Kaia” and “Soppa,” at the Sigo family’s ancestral home on Chico Bay. Along with her fisherman father, Sigo has come to Chico to watch the Chum return every fall for as long as she can remember, and continues the tradition with her own kids today.

“I’ve heard it referred to as ‘Where the Salmon Run’ or ‘the Salmon Run,’” shares Sigo, when asked about her family’s ancestral home, “Original place names aren’t used by a lot of families. Parents wanted to protect their kids and assimilation was the safest choice.”

Sigo’s remarks highlight the harsh impacts of colonization, the long fight to defend tribal sovereignty, and the sacrifices that tribes have made to regain what is rightfully theirs. Like so many other tribes throughout the Pacific Northwest, the Suquamish have fought hard to protect their culture and ceremonial ways, including the right to harvest salmon from clean, unimpeded streams. “U.S. v. WA [the treaty case] is enmeshed with so many other things. The Tribe has had to make a lot of sacrifices to be able to afford attorneys,” shares Sigo. In 1968, just six years before the historic Boldt Decision reaffirmed the rights of 20 western Washington tribes to hunt and fish in their usual and accustomed places, the Suquamish signed a 50-year lease on 36 acres of waterfront land in the heart of the Port Madison Reservation (Suquamish Tribe). At the time, money was scarce and costs were high. Expenses for travel to the Bureau of Indian Affairs offices in Everett, Portland, and Washington D.C., necessary to maintain treaty rights, came out of volunteers’ pockets.

“We leased the land to provide funds for Council members’ flights back and forth to D.C. and to afford attorneys to fight for treaty rights,” says Sigo, “It was like putting a child in foster care. People who leased the land were told that the Tribe wouldn’t even be here when the lease expired.”

Sigo recalls the joy she felt during the breakfast celebration the Tribe held the morning after the Suquamish Shores lease expired in 2018. “The sun shone gold on the Salish Sea; the most beautiful golden color, glittering along the water, looking out over traditional Suquamish territory,” she shares, “It was like we and our ancestors were there celebrating together. It was a moment of feeling reunited.”

Less than two weeks later, the Suquamish and 20 other Washington tribes would have cause to celebrate again. On June 11, 2018, the U.S. Supreme Court determined that Judge Ricardo Martinez’s culvert case ruling would stand (Le). The historic ruling held the State of Washington liable for the repair or replacement of more than 1,000 culverts impeding salmon migration and blocking access to spawning and rearing habitat. Further, it required the state to address the highest priority culverts by 2035, including the SR 3 culvert at the mouth of Chico Creek. The decision was another vital win for Washington tribes, reinforcing the significance of the 1974 Boldt Decision and bringing a degree of justice following court battles that stretched for nearly half a century.

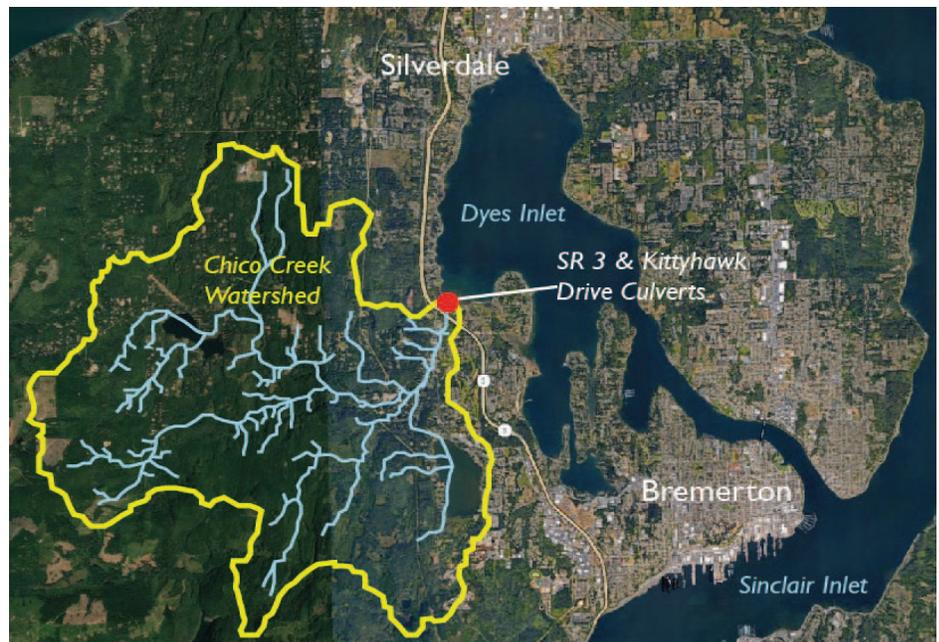
Impact of Development & Restoration Efforts

“The culvert project at SR 3 has a very long history,” says Suquamish Tribal Ecosystem Recovery Manager Tom Ostrom. Moving toward this project has been a high priority for the Tribe since before Ostrom started working there over twenty years ago. Throughout his tenure, Ostrom and the Tribe have worked with biologists from Washington Department of Fish and Wildlife, and other state and county representatives to build community in and around the Chico Creek Watershed, with the aim of supporting restoration. “Kind of an ad-hoc group came together and met once a month or so for a couple years. We took a hard look at habitat conditions in the lower corridor and came up with a restoration plan,” says Ostrom. A multitude of problems were identified in the lower watershed alone, many of which were stemming from road crossings. “Every few hundred feet you had another culvert. All were causing problems for fish passage,” says Ostrom.

Early on, members of the group prioritized outreach efforts. For their long-term restoration vision to be successful, they realized they would need to garner support from elected officials and members of the community. They developed a pamphlet that could be used as an educational tool, featuring an artistic rendering of what a restored Chico Creek might look like, with a free-flowing stream unencumbered by culverts. Their vision included reconnecting floodplain habitat that had been decimated

by development. Large woody debris would need to be added to provide variable dynamics in stream flow and shady areas that would offer resting places essential for spawning salmon.

The most ambitious part of their vision was undoubtedly the restoration of the Chico Creek Estuary. Restoration would require the removal of two eight-by-eight concrete culverts restricting the mouth of the stream: a double box culvert running beneath Kittyhawk Drive (a residential road along the shoreline) and a single box culvert lying beneath SR 3, central Kitsap’s main thoroughfare (Farley). Built in the 1960s, the 400-foot-long culvert running beneath SR 3 was an engineering nightmare for restoration planners. “The way we built roads back then was particularly bad for streams,” asserts Ostrom, “They just put in a pipe and packed it in with fill.”



Chico Creek and its four tributaries drain 68 miles of streams, 17 of which provide prime spawning and rearing habitat for salmon. Encompassing the largest remaining stand of old-growth forest in the Puget Sound Basin of Washington, the sparsely developed watershed is a vital conservation area in this rapidly developing part of Kitsap County (Credit: Bridget Marsch-Grim).

The 50 feet of fill material used in the construction of SR 3 was mined from ponds just upstream from the mouth of the creek. “When they were done, they didn’t want the creek flowing through those borrow pits, so they diked Chico Creek from the crossing at Erlands Point Road and all the way down to the mouth,” Ostrom explains, “They shortened and straightened the creek channel. That created big consequences on habitat conditions and stream health. The culverts were large enough to convey storm flows, but our creeks also convey wood and sediment. Almost every year, the SR 3 culvert would get blocked. Washington State Department of Transportation



"Place of the Chum Salmon" Artist's Statement by Bridget Marsch-Grim: "This piece attempts to portray the weight of the vital watershed that balances precariously on the SR 3 culvert. The scale itself is shown teetering between the traditional ways of the canoe and the fast-paced highway perspective of the modern Euro-colonial world. The tension between worldviews is visible, as is the risk of tipping too far toward the non-Native side. The watershed stands in danger of slipping off the edge. The pressure builds behind the culvert; the creek bulges out of the pipe, straining to continue whistling. At its mouth, there is no resting place for the chum as they struggle against the pressure of the stream, fighting to return to their natal spawning grounds" (Credit: Bridget Marsch-Grim).

(WSDOT) would have to send crews out to unclog it... it's a maintenance nightmare."

Ostrom explains that eventually, the creek broke out of the dike and found its way to the abandoned borrow pits, where sediment became trapped. Downstream, the channel below Kittyhawk Drive began to degrade, getting lower and lower in elevation. This loss of sediment spelled disaster for estuary habitat, as well as for spawning salmon trying to make their way upstream.

"If left untended, the roadway can become like a dam and fail spectacularly."

–Tom Ostrom

Ostrom shares that the SR 3 culvert issue was a problem with many moving and interconnected pieces. In addition to the tangle of engineering challenges, it became clear that the restoration project was going to be a financial nightmare. "Eventually, we had this sort of informal agreement with WSDOT that we would work on correcting this SR 3 project, but we didn't know how it would be funded," Ostrom recalls, "Everyone realized that the SR 3 project was going to be a huge financial project and be very difficult to fund in the traditional way. It was in that period that tribes brought suit against the state."

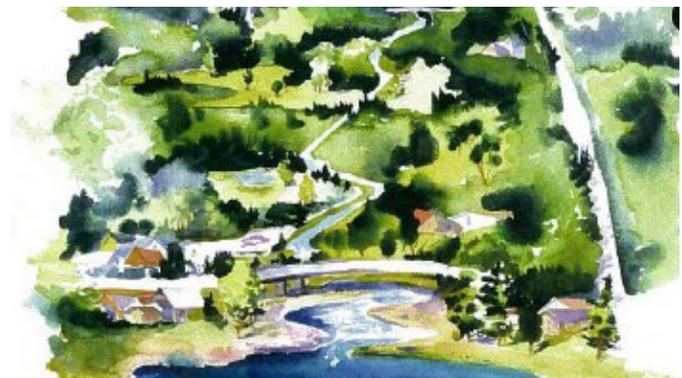
While the tribes fought against the State's appeals in court, Suquamish restoration planners pushed ahead toward their goal of untangling the SR 3 culvert mess. They continued working with planning partners to scope out a plan for the complex and interconnected projects. Funding and engineering challenges required a phased approach; they would remove the Kittyhawk Drive culvert first, then hope to address the massive SR 3 project later if funding could be secured.

Completion of the two-million-dollar Kittyhawk Drive project in 2015 would be a true test of collaborative restoration. The Tribe enlisted planning partnerships with the U.S. Navy, the U.S. Environmental Protection Agency, Kitsap County, and Washington Department of Fish and Wildlife's Estuary and Salmon Restoration Program, pulling together funding from each to get the project done (Salmon Recovery Portal). Careful negotiation with local property owners and land acquisitions took place to allow for residential road access to be reconfigured (Ostrom). During the project's planning phase, the Tribe re-acquired 157 acres of ancestral tidelands encompassing the mouth of the creek and the Chico Bay Estuary—areas essential for continuing traditions of salmon fishing and shellfish harvesting, as well as for continued stewardship of the recovering stream (Northwest Treaty Tribes 2010b).



The removal of the Kittyhawk Drive culvert (above) in 2015 was a collaborative effort of tribal, state, county, and federal partners. Construction will begin in 2021 to replace the SR 3 culvert with a 200-foot bridge, allowing the mouth of the creek to flow unimpeded (Credit: Tom Ostrom).

The successful completion of the Kittyhawk project was an essential step toward making the massive SR 3 project a reality. Survey data, maps, and lessons learned from Kittyhawk provided much-needed details for the preparation of a preliminary SR 3 project cost estimate to be considered by the State Legislature (Salmon Recovery Portal). Funding for the 57-million-dollar project was approved in 2020 and a four-year design-build project is currently underway (Ostrom; Kitsap Sun; WSDOT). The start of construction to remove the existing culvert is planned for the summer of 2021, with plans to install two single-span bridges stretching 200 feet across the stream (Atkinson). When the project is completed in 2024, it will include the removal of five remaining barriers impeding fish passage beneath both directions of the highway and the on- and off-ramps (WSDOT; Atkinson). Moreover, the completion of the SR 3 project will be the culmination of decades worth of strategic planning, tribal leadership, and collaborative partnership.



This artist's rendering, featured in the 2004 "Chico Creek: Connecting and Restoring" plan, represents the long-term vision of a free-flowing stream unencumbered by culverts (Credit: Suquamish Tribe and Myers Biodynamics).

Lessons Learned

The Chico Creek Watershed case study has shown that the countless culvert removal projects Washington State faces are more than just complex and financially burdensome feats of engineering. The story of Chico shows us that successful environmental restoration begins and continues with connections to place and community.

“I think community engagement is still a big part,” shares Ostrom. As the watershed continues to heal, it will take the efforts of volunteers from the Kitsap County community to monitor fish numbers and stream quality, as well as replanting and removing invasive plants along stream edges. Ostrom notes that for this phase of restoration to be successful, the leadership of individuals is needed to steward the community and direct volunteer projects.

Since the outset of the planning process, the multi-phased restoration of the Chico Creek Watershed has been heralded by both tribal and non-tribal leaders as an example of how people with varied interests and backgrounds can come together to achieve a shared vision, despite conflicts and challenges (NWIFC). In addition to the history of contention and legal battles between tribes and the state, successful restoration has also required the unlikely alliance of community members with clashing interests.

“There’s a history of old battles and rivalries between tribal and recreational fishers,” says Ostrom. “That’s still kind of there, but people have matured and put that aside to work together for the benefit of a resource. It’s great to see. There’s been a lot of cross-cultural learning and understanding since the years of the Boldt Decision,” he says. Today, local sport fishers are some of the watershed’s biggest advocates and volunteers. “It’s just by learning about other people’s perspectives that there’s better understanding,” says Ostrom, “In the end, what the tribes want for this incredible resource is for it to be protected and enhanced.”

By considering the human as well as environmental history behind the restoration of Chico, we contextualize the “Place of the Chum Salmon” as a place with a unique identity and human connections, rather than merely a project or problem to be solved. Work within the Chico Creek Watershed will never be complete. Rather, it is a continuing responsibility of stewardship with a long history of deep and complex relationships between people and place, and, hopefully, a long future as well.

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