



**SKOKOMISH**  
WATERSHED  
ACTION TEAM

*Supplement to*  
**Skokomish Watershed  
Action Plan Update**

*August 1, 2016*

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**NOTE:**

**This document provides supplemental information for the 2016 Skokomish Watershed Action Plan Update. It includes details that are summarized in the Update about the Skokomish watershed regions; important policies, plans, programs, and agreements; and restoration accomplishments from 2005 to 2015. The information was compiled in 2015 by Robin Stoddard under contract with the Skokomish Tribe.**

## **Skokomish Watershed Regions**

This document organizes information about past, current, and planned restoration actions within the Skokomish into four regions, as described below: South Fork Skokomish/Upper Watershed, North Fork Skokomish/Lake Cushman, Skokomish Valley, and Skokomish Estuary. These regions define major areas within the watershed rather than whole drainages. For example, the South Fork and North Fork cover the upper extents of these drainages, while the Skokomish Valley encompasses their lower extents.

### ***South Fork Skokomish/Upper Watershed***

This region includes the upper extent of the South Fork Skokomish from the area above the canyon to its headwaters, adjacent portions of the North Fork watershed, and also the upper Vance Creek drainage, a major tributary to the South Fork. The area is predominantly lush conifer forest based in generally steep mountainous terrain highly dissected by a dense stream network that drains to the South Fork. Lands are predominantly under federal forest and park jurisdiction, but also include private holdings. The majority of federal lands lie within the Olympic National Forest, with a small portion of Olympic National Park in the headwaters. Private lands are mostly Green Diamond ownership.

Land use within this area changed substantially over the last century and a half from early Native American uses of seasonal encampments and villages, to homesteading and mining, to timber harvest from the 1920s to 1980s. The Shelton Cooperative Sustained Yield Unit authorized by act of Congress in 1946 provided for accelerated timber production to supply local mills. By the 1990s, over half the entire South Fork watershed had been clearcut and density of forest roads was high – nearly four miles per square mile.

Past management practices degraded aquatic and terrestrial habitats in the South Fork. Intensive forest harvest and road construction, in combination with clearing an inundation area for a proposed dam along a four-mile stretch of the mainstem South Fork, and instream woody debris removal degraded water quality, fish habitat, and wildlife. Changes to aquatic habitats generally include an increase in fine sediments, channel aggradation, alterations of the natural streamflow regime, loss of in-channel woody debris, and elevated stream temperatures. The net result has been a reduction of instream habitat complexity and a reduction in the diversity of the aquatic habitat community. Changes to terrestrial habitats due to clear-cut harvest practices resulted in young, simplified forest stands and degraded wildlife habitat.

The Forest Service and Green Diamond efforts to improve degraded conditions on their respective lands span more than two decades. Between the early 1990s and 2003, the Forest Service and various partners accomplished \$10.6 million of restoration work, primarily focused on road decommissioning, road drainage and stabilization, and thinning forest stands for wildlife benefits. From the mid-1990s to mid-2000s, Green Diamond spent \$950,000 on road upgrades and decommissioning as part of a strategy to disconnect roads from watercourses and restore fish passage throughout its ownership in the Skokomish watershed. As discussed in the Accomplishments section, much more restoration work has occurred since then.

### ***North Fork Skokomish/Lake Cushman***

This region covers the upper extent of the North Fork drainage area above the Skokomish Valley. The natural setting is predominantly lush conifer forest based in generally steep mountainous terrain highly dissected by a dense stream network that drains to the North Fork. The majority of lands are federal park and forest lands, with private, state and tribal holdings. The Olympic National Park lies within the uppermost part of the watershed, with the Olympic National Forest, Green Diamond, Tacoma Power, individual landowner, and tribal holdings in the remaining areas.

Early land uses in the North Fork show similar trends to those in the South Fork over the last century and a half from early Native American uses of seasonal encampments and villages, to homesteading and mining, to timber harvest from the 1920s to 1980s. In addition to these, a major land use change occurred with operations of the Cushman Hydroelectric Project by Tacoma Power that began in the mid-1920s. The hydroelectric project consists of two dams, a powerhouse, and transmission line. Details of the Cushman Project, including 2009 Cushman Settlement Agreement, can be found elsewhere in this document.

Land use alterations in the North Fork have resulted in degraded aquatic and terrestrial ecosystems. Hydropower operations caused severe impacts to the aquatic environment that have diminished the capacity of the Skokomish watershed to support healthy fish runs. These operations altered natural flow patterns, degraded fish habitat, prevented fish access to important habitat upstream of the dams, reduced carrying capacity of sediment in the North Fork and mainstem downstream of the dams, and reduced the quality of water.

After years of controversy and litigation, the 2009 Cushman Settlement Agreement opened a new chapter in the history of the North Fork. As described in the Accomplishments section, Tacoma Power has completed or is currently implementing an astonishing amount of restoration actions that emphasize fish habitat improvements, production, and utilization, wildlife enhancement, and monitoring.

### ***Skokomish Valley***

This region covers the broad glacial Skokomish Valley from its upper extent that encompasses the lower portions of the South Fork, Vance Creek, and North Fork drainages to its lower end where it transitions with the Skokomish Estuary. The mainstem Skokomish River, which begins at the confluence of the South and North Forks, flows through the length of the valley. It is fed by several streams and springs, and supports wetland complexes.

Land uses over the last century and a half range from early Native American seasonal encampments and villages, to homesteading and agriculture. Land use now comprises primarily commercial and noncommercial agriculture and includes cattle and other livestock culture, hay and Christmas tree production, and some vegetable cropping.

Since the settlement of the Skokomish Valley in the 1850s by European and American settlers, human activities have altered the Skokomish River's hydraulic and geomorphic processes and reduced the fisheries resource. Sedimentation in the lower river channel due to forestry, road building, dikes, levies, and other land use practices have resulted in an increase in the frequency and intensity of flood events, higher basin groundwater levels, and subsequent septic system failures. Ecosystem degradation, including high sediment load, reduced flows, and encroachment on the floodplain by man-made

structures is causing continued degradation of natural ecosystem structures, functions, and processes necessary to support critical fish and wildlife habitat.

Flooding impacts in the valley worsened significantly during the 1990s, leading to several studies and local mitigation actions. In the early 2000s, continued aggradation of the river channel caused a portion of the river near the confluence of the North Fork and South Fork to begin running subsurface, cutting off adult salmon access to spawning habitat in the upper South Fork and delaying juvenile migration downstream to food sources in the estuary. Since then, abundance estimates of coho, chum, Chinook, and steelhead have dropped dramatically.

To date, restoration efforts in the Valley have generally lagged behind the rest of the watershed. However, with the completion of the Skokomish General Investigation, this portion of the watershed is likely to become the focal point of restoration work in the coming years.

### ***Skokomish Estuary***

The Skokomish Estuary, located on the Skokomish Indian Reservation at the mouth of the Skokomish River at the Great Bend of Hood River, covers 1,000 acres, and is the single largest contiguous salt marsh complex in Hood Canal and the eastern Strait of Juan de Fuca. The estuary provides critical habitat for fish species of Hood Canal and provides important refuge for migrating fish, both juveniles and adults whose natal streams are located further into the interior of Hood Canal. All Skokomish salmon, including ESA-listed Chinook, summer chum, steelhead, and bull trout, migrate through the estuary in their access to upstream reaches within the Skokomish watershed.

The estuary has long-standing cultural significance to the Tribe, which has historically used the area to fish, harvest shellfish, and gather sweet grass for basket-making, among other uses. Marcus Nalley purchased land in the estuary in the early part of the 20<sup>th</sup> century, and subsequently developed low levees around the former salt marsh to facilitate agricultural conversion. Landscape alterations to the estuary under his management are well documented and showed rapid and massive change to tidal inundation patterns. The development at the mouth of the river caused it to flood and changed the natural ecosystem of the estuary, including degradation of habitat for fish, shellfish and terrestrial species.

During the past decade, the Skokomish Tribe has worked effectively with many partners to undertake a large-scale, multi-phased effort to restore the Skokomish Estuary to its historic and natural estuarine form and function, as well as improve water quality and habitat for fish, shellfish, and shore birds. As human-made barriers are removed or reduced, the natural forces of tidal intrusion are quickly restoring native vegetation and productive fish habitat to this vital corner of Hood Canal and Puget Sound, as well as instilling cultural pride among tribal members.

## **Policies, Plans, Programs, and Agreements**

Multiple policies, plans, programs, and agreements direct or guide management and restoration activities on the various ownerships throughout the Skokomish watershed. Some are well established and others have been recently developed or are currently in development, as described below. Policies such as the federal Clean Water Act and Endangered Species Act and salmon recovery plans span all

ownerships. Other policies, plans, programs, and agreements are bound to certain lands or areas of responsibility.

### **Land Management Overview**

Federal and state land management in the Skokomish is carried out by several agencies. Federal lands are part of the national park and national forest systems. The National Park Service manages Olympic National Park to preserve the natural and cultural resources and values of the park for the enjoyment, education, and inspiration of this and future generations. U.S. Forest Service multiple-use management of Olympic National Forest lands in the Skokomish shifted focus from intensive timber harvest and road construction to landscape-scale restoration beginning in the 1990's. State agency responsibilities include management of the George Adams Fish Hatchery by the Washington State Fish and Wildlife, and management of Lake Cushman State Park by the Washington State Parks.

Private lands in the watershed support timber production, hydropower, agriculture, and residences. Green Diamond Resource Company has the largest private holdings and manages its lands as sustainable and productive working forests. They adhere to Washington State forest practice regulations developed to protect water quality, soils, fish, wildlife species, sensitive plants, and archeological sites. Green Diamond's Habitat Conservation Plan for the Northern Spotted Owl, approved by federal and state regulatory agencies in 1992, was the first in the nation to integrate endangered species and water quality issues. Green Diamond's Multi-species Habitat Conservation Plan, approved by regulatory agencies in 2000, protects 51 fish and wildlife species on their lands in Washington State. Their timberlands in Washington are independently certified to be in compliance with the Sustainable Forestry Initiative Standard.

The Skokomish Reservation contains low-density residential development and the estuary and is governed by the Skokomish Tribe. The Tribe's natural resources and fisheries departments are deeply involved in fish and wildlife resource management issues throughout the watershed.

### **Recent Developments**

Since completion of the 2007 SWAT Action Plan, five key developments have occurred that frame both recent and future restoration actions in the Skokomish:

- 2008-2015 Forest Service Legacy Roads and Trails Program
- 2009 Forest Service Watershed Condition Framework, which guided development of the Upper and Lower South Fork Skokomish Watershed Action Plans in 2011
- 2009 Cushman Settlement Agreement and 2010 Cushman Hydroelectric Project License
- 2010 Recovery Plan for the Skokomish Chinook Salmon
- 2006-2015 Skokomish General Investigation Study

### ***Forest Service Legacy Roads and Trails Program***

National Forest System lands across the United States are intersected by a road network totaling 374,000 miles. Many of these roads were built over the past 60 years, for the primary purpose of accessing timber on public lands. Historically the Forest Service had funds to build and maintain roads; however, as timber harvests declined, so too did road maintenance funding. Many of these roads are often referred to as "legacy" roads, those roads left on the landscape after decades of logging. Some of these roads are used today for recreational access and resource management, while others are no longer needed, used, or maintained and pose environmental and fiscal liabilities. In current times, the Forest Service is able to maintain or improve only about 20 percent of its road system in a given year.

The Legacy Roads and Trails Program<sup>c</sup> was established in 2008 to address the large-scale restoration needs associated with chronically under-funded road and trail maintenance work on the extensive Forest Service transportation system. Advocacy for Congressional action came from the Washington Watershed Restoration Initiative, a coalition of conservation and recreation organizations, state agencies, and tribes in Washington State. Motivated by the serious road-related water quality issues on Washington's national forests, the Coalition asked Congress for a targeted fund to address the extensive forest road system, and earned broad support from organizations throughout the country. Congressman Norm Dicks, U.S. Representative for Washington's 6<sup>th</sup> Congressional District from 1977 to 2012, and House Interior Appropriations Subcommittee chairman beginning in 2007, was a strong proponent and leader in establishing the Legacy Roads and Trails Program.

Once established, the Legacy Roads and Trails Program quickly became a cornerstone of the Forest Service's restoration program. Since its inception the program has delivered \$350 million to implement critically needed road and trail remediation work. In doing so, it has reduced stream pollution, restored fish and wildlife habitat, created jobs, and improved essential roads to ensure safe access. A report<sup>d</sup> written by Wildlands CPR and The Wilderness Society in 2013 illustrates the success of the Legacy Roads and Trails Program during its first five years, a reflection of the program's targeted, results-oriented, and collaborative approach. The report gives a general accounting of the \$270 million in appropriated funds expended between 2008 and 2013, and showcases projects from each of the nine Regions of the Forest Service.

Since 2008, Legacy Roads and Trails Program funds totaling \$6.6 million received by the Olympic National Forest have been a primary and vital funding instrument in execution of critically needed road and trail work within the South Fork Skokomish watershed. Many hands have contributed to the quality restoration work accomplished using Legacy Roads program funds. As such, local and rural communities have gained economic benefits through jobs created to complete this work.

### ***2009 Forest Service Watershed Condition Framework***

In 2009, U.S. Department of Agriculture Secretary Tom Vilsack declared that restoring watershed and forest health would be the primary emphasis of the U.S. Forest Service's management across 193 million acres of national forests and grasslands. Over a year later, the Forest Service launched a major restoration initiative – the Watershed Condition Framework (WCF)<sup>e</sup>. This framework is designed to implement integrated restoration on priority watersheds. The WCF established a new process for improving the health of watersheds, one that focuses efforts in a consistent and accountable manner, and facilitates new investments in watershed restoration that will provide economic and environmental benefits to local communities.

Starting in 2011, the Forest Service implemented the first three steps of the Watershed Condition Framework: watershed condition classification, priority watershed designation, and watershed restoration action plans. As part of this effort, the Olympic National Forest identified both the Upper and Lower South Fork Skokomish as priority subwatersheds. The Forest then collaborated with SWAT and the Skokomish Tribe in development of restoration action plans for these watersheds: the Upper South Fork Skokomish River Watershed Restoration Action Plan (WRAP)<sup>f</sup> and the Lower South Fork Skokomish River Watershed Restoration Action Plan<sup>g</sup>. Collectively, these plans identify an estimated \$12.5 million in restoration projects, \$8.6 million within the Lower WRAP and \$3.9 million in the Upper WRAP, some of which have now been completed. These plans list additional restoration opportunities

on ONF lands that were identified by the Forest Service, SWAT, and the Skokomish Tribe to benefit aquatic and terrestrial resources, and may be modified based upon updated information.

***2009 Cushman Settlement Agreement and the 2010 Cushman Hydroelectric Project License***

In 1924, the Federal Power Commission, now the Federal Energy Regulatory Commission (FERC), issued a 50-year license to Tacoma Power for the Cushman Hydroelectric Project. Cushman was one of the first major dam projects developed in the Pacific Northwest. The hydroelectric project consists of two dams, three powerhouses, and transmission line. Tacoma Power's Cushman Dam No. 1, completed in 1926, is located on the North Fork Skokomish River and forms Lake Cushman. The Cushman No. 1 Powerhouse is located approximately 550 feet downstream from the dam and has a licensed capacity of 50 MW. Cushman Dam No. 2, completed in 1930, is just downstream of Dam No. 1, and forms the small 150-acre Kokanee Lake. The Cushman No. 2 Powerhouse sits several miles below the dam, on the Hood Canal and has a total licensed and installed capacity of 81 MW. The North Fork Powerhouse is located immediately adjacent to the valve house at the base of No. 2 Dam and has an installed capacity of 3.6 MW. Electricity moves from the Cushman Hydro Project to Tacoma on a 40-mile-long transmission line. The original license expired in 1974. Tacoma Power operated the project under short-term licenses for 24 years while parties litigated relicensing. In 1998, FERC issued a license that was broadly contested by the Skokomish Tribe, Tacoma Power, and state and federal agencies.

On January 12, 2009, Tacoma Power, the Skokomish Tribal Nation, and state and federal agencies, including Bureau of Indian Affairs (BIA), National Marine Fisheries Service (NMFS), U.S. Forest Service (USFS), U.S. Fish & Wildlife Service (USFWS), Washington Department of Fish & Wildlife (WDFW), and Washington Department of Ecology (WDOE), signed a historic settlement agreement<sup>h</sup> for Tacoma Power's Cushman Hydroelectric project. The settlement agreement consists of: proposed license articles for the Cushman Hydropower Project; off-license agreements with the Skokomish Tribe (Tribe-Tacoma Damages Settlement), WDFW, and USFS; a Memorandum of Understanding (MOU) between WDFW, the Tribe, and Tacoma Power; and the application for a non-capacity license amendment for the North Fork Powerhouse.

The settlement agreement concluded nearly two years of negotiation and a long history of litigation, including a \$5.8 billion damages claim by the Skokomish Tribe, and resolved long standing disputes between Tacoma Power, the Tribe, and the state and federal agencies over the terms of a long-term license for Cushman Hydroelectric Project. As part of the settlement and to resolve the litigation damages claim, the Skokomish Tribal Nation received money and lands from Tacoma Power: a \$12.6 million one-time cash payment, 7.25 percent of the value of electric production from the Cushman No. 2 powerhouse, and transfer of land valued at \$23 million including Camp Cushman on Lake Cushman, the 500 acre Nalley Ranch within the Skokomish Estuary, and Saltwater Park on Hood Canal.

On July 15, 2010, the FERC issued Tacoma Power a license for the Cushman Hydroelectric Project<sup>i</sup>, as amended according to the terms of the 2009 settlement agreement. The new license grants Tacoma Power the right to operate its two dams within the Cushman Hydroelectric Project until 2048, a 50-year license retroactive to the 1998 license. Under the amended license, Tacoma Power has the opportunity to construct an additional generator to capture some of the energy from the restoration flows being released into North Fork Skokomish River. Key licensing terms that Tacoma Power must follow pertaining to channel conveyance capacity, minimum flows, water quality, fish, wildlife and recreation are summarized in the Appendix.



**2010 Recovery Plan for the Skokomish Chinook Salmon**

On March 24, 1999, the National Marine Fisheries Service (NMFS) listed all naturally spawned populations of Chinook salmon (*Onchorhynchus tshawytscha*) and five artificial propagation programs within the Puget Sound evolutionarily significant unit (ESU) as a threatened species under the Endangered Species Act (ESA). On June 28, 2005, NMFS added an additional 21 artificial propagation programs within the ESU to the listing. This listing included the Chinook stock currently produced in the Skokomish watershed, a stock comprised of hatchery-produced fish from the George Adams and Rick's Pond hatcheries and naturally-produced fish from the Skokomish River.

This listing under the ESA requires NMFS to develop and implement recovery plans for the conservation and survival of Chinook salmon within the Puget Sound ESU. The NMFS Puget Sound Technical Review Team (PSTRT) identified Hood Canal as one of five biogeographical regions within the Puget Sound ESU. Each region has unique habitat attributes, shaped by its own topographical and climatic variations that have supported similar evolutionary development by Chinook there. The PSTRT recognized two aggregate historic groups of Chinook in the Hood Canal region as independent populations, those produced in the Skokomish watershed and those produced in Mid-Hood Canal rivers (Ruckelshaus et al. 2006). The recovery of two Hood Canal populations is considered essential to meet the PSTRT's viability criteria for the long-term survival of the species in the Puget Sound ESU (Puget Sound Shared Strategy 2007).

Historically, Skokomish Chinook exhibited a diverse set of life histories, having, among other traits, a wide range of river entry timing patterns. The river once supported both early-timed (spring/summer) and late-timed (fall) racial groups. Besides differences in river entry timing, these groups differed markedly in their spatial use of the watershed. Both indigenous racial groups are now extinct in the river basin (Ruckelshaus et al. 2006). This fact presents particular challenges for recovery since a well-adapted genetic stock source does not currently exist in the river system.

The Skokomish Tribe and WDFW developed the Recovery Plan for the Skokomish Chinook Salmon, dated August 2010<sup>1</sup>. The central goal of this plan is to re-establish a productive, self-sustaining Chinook population in the Skokomish watershed. This will require the re-emergence of a population that is adapted to the natural environment and exhibits life histories that resemble those seen in aboriginal Skokomish Chinook. The plan is built on the premise that population recovery requires restoring life histories that are adapted to the environmental conditions that either still exist in the watershed or that are being restored. It is developed around this life history perspective and guides every part of the plan. Knowledge of the aboriginal life histories that existed prior to their extirpation provides an essential part of this guidance. Importantly, diagnosis of factors that caused extirpation of the aboriginal life histories helped set plan direction, restoration priorities, and sequencing for strategies.

The recovery plan concludes that the best prospect for recovering a Skokomish Chinook population, at least in the near-term, targets the early-timed racial group. It recognizes that significant issues exist in restoring habitat function sufficiently within the core spawning areas used by late-timed fish to support a viable population. In addition, the 2009 Cushman Settlement Agreement provides significant resources and impetus for initiating recovery actions aimed at early-timed Chinook. The plan assigns the highest recovery priority to the early-timed racial group. Because of its extirpation, recovery necessitates a re-introduction of a suitable early-timed stock to the watershed. Once this is accomplished, the plan treats the reintroduced stock as the listed Chinook in the watershed. Failure to make significant progress toward recovering the early-timed group over the next 10 to 12 years would be cause to re-examine plan direction and possibly reset the priority to the late-timed life history group.

As the plan moves forward, and as progress is made in restoring key habitats in the lower valleys, the potential for expanding recovery efforts to include the late-timed racial group will be re-evaluated.

The Skokomish Chinook Recovery Plan analyzed habitat limiting factors and made conclusions regarding priority and sequencing of geographic areas and restoration treatments for both early-timed and late-timed Chinook populations. For early-timed Chinook, the highest priority geographic areas for restoration are the Cushman Project area, South Fork Skokomish gorge, areas of the upper South Fork upstream of gorge, then the Skokomish river mouth estuary. The highest priority habitat factors identified for restoration are passage over obstructions at the Cushman Dams, South Fork gorge cascades, and dry channel in the lower South Fork; channel stability in the upper South Fork, followed by stability in the lower valleys; water temperature in several areas; key habitat amount; and the inundation of the upper North Fork by Lake Cushman. All of these factors, except the inundation, have the potential of being restored or protected at some level of normative condition over the next 40 years. For late-timed Chinook population the highest priority geographic areas for restoration are all of the lower river valleys in the watershed, including that of the main river, the lower South Fork and the lower North Fork, then the river-mouth estuary and reaches within the South Fork canyon. The highest priority habitat factors identified for restoration are channel stability, sediment load, flow characteristics, key habitat amounts, and passage through the dewatered channel in the lower South Fork. All of these factors relate to the aggradation and flooding issues occurring in the lower river valleys.

The recovery plan outlines a framework for addressing habitat-related issues, and involves a total of 26 strategies grouped according to the habitat threats they address. Collectively, these strategies have the potential to restore watershed processes and habitat functions to normative levels that would achieve the recovery goals.

### ***2015 Skokomish River Basin General Investigation Study***

The Skokomish River Basin General Investigation Feasibility Study (GI Study) is a monumental and collaborative undertaking by the U.S. Army Corps of Engineers (USACE) in partnership with Mason County and the Skokomish Tribe to evaluate significant ecosystem degradation in the Skokomish River Basin, formulate solutions to these problems, and recommend actions for recovery. The Skokomish River is the largest source of freshwater to Hood Canal and of critical importance to the overall health of Hood Canal. Ecosystem degradation, including high sediment load, reduced flows, and encroachment on the floodplain by man-made structures is causing continued degradation of natural ecosystem structures, functions, and processes necessary to support critical fish and wildlife habitat throughout the basin. The decline in populations has resulted in the listing of four anadromous fish species under the ESA, including Chinook salmon, Hood Canal summer run chum salmon, steelhead, and bull trout, that use the river as their primary habitat. These endangered Skokomish fish populations must be restored before they can be considered as restored for the entire Hood Canal. The impaired ecosystem has adversely affected riverine, wetland, and estuarine habitats that are critical to these and other important fish and wildlife species such as bears, bald eagles, and river otters to name a few.

In preparation of the Feasibility Report/Environmental Impact Statement, the Skokomish River General Investigation Study team developed conceptual designs and cost estimates for an array of alternatives identified in early planning activities. Additional analysis and evaluation led the team to identify a recommended restoration plan to be carried forward for further design and ultimately for construction by the USACE. In addition, the team identified other restoration projects to be carried out by local

agencies. Following is a partial list of the “local projects” identified in the GI Study. **This list is now a living document; contact either the Skokomish Tribe or Mason Conservation District for the latest version.**

### **Skokomish GI Study - Local Projects**

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Skabob Creek
SR 106 Small Dike Removal
TPU Tower Access Fill
Main Stem Intertidal Channel Creation
Agency Road Stream Reconnection
Levee Setback, Downstream of SR 106
Levee Setback, Upstream of SR 106
Skabob Creek Freshwater Reconnection
Weaver Creek Mouth Reconnection
Mainstem Realignment
Bourgault Farm Side Channel
10 Acre Creek Restoration
Main Stem Engineered Log Jams
WDFW Fishing Access Back Channel Reconnection
Hunter Creek Side Channel Creation
South Fork Levee Removal
South Fork Back Channel
Hunter Creek Mouth Reconnection
Skokomish Valley Road Relocation

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The recommended restoration plan includes one “base” plan and four restoration “increments.” The “base” and “increments” are all restoration projects proposed in the study for implementation by the USACE. Corps projects included in the recommended plan are: Confluence Levee Removal; Upstream Large Woody Debris Installation; Side Channel Reconnection; Grange Levee Setback; and River Mile 9 Levee Setback. The plan restores an estimated 277 acres of spawning, rearing, and refuge habitats at an estimate project cost of \$19.5 million.

The overall cumulative effects of the plan would be synergistic benefits to all aquatic species through process-based restoration in the lower Skokomish River. The benefits of increasing the number and size of in-channel pools, placing enough large woody debris (LWD) to mimic quantities in nearby more natural rivers, reconnecting aquatic habitats in the adjacent floodplain, and greatly increasing the acreage of riparian zones along the river is predicted to provide substantial benefits to fish and wildlife habitat, especially for salmon species.

The Skokomish GI Feasibility Study, initiated in 2006, is in its final stages. In February 2014, the USACE released the Draft Integrated Feasibility Report/Environmental Impact Statement (FR/EIS) for public review, and the final version was approved in April 2015<sup>k</sup>. The FR/EIS presents the results of a USACE Ecosystem Restoration feasibility study undertaken to identify and evaluate alternatives for restoring degraded structures, functions, and processes in the Skokomish River Basin. This report provides documentation of the plan formulation process to select a recommended restoration plan, along with environmental, engineering, and cost details of the recommended restoration plan, which will allow additional design and construction to proceed following approval of the report. The report also recommends additional restoration projects to be carried out by local agencies (see partial list above). In August 2015, this report was presented at the Headquarters of the USACE in Washington, DC, and

was approved by a Civil Works Review Board. The report will be submitted to Congress to request federal funding for final project design and project construction. Projects funded by Congress would be implemented by USACE. State and local agencies will coordinate with the USACE on USACE projects as well as significant restoration projects they carry out.

## **Detailed Accomplishments by Region 2005 – 2015**

### **1. South Fork Skokomish/Upper Watershed**

#### ***Olympic National Forest Roads and Trails Remediation***

**Background and Overview:** Past land management practices on Olympic National Forest (ONF) lands in the South Fork Skokomish resulted in construction of hundreds of miles of road, often on steep and unstable slopes, primarily to gain access for harvest of old-growth forest stands. By the early 1990's, sixty percent of the watershed the watershed was harvested using clear-cut methods, and the density of the extensive road network measured nearly 4 miles per square mile. The watershed experienced a large number of road failures and landslides that sent substantial amounts of road-related sediment into the South Fork mainstem and its tributaries. Starting in the early 1990s, Forest Service management direction shifted from emphasizing timber production to restoring damaged forests and watersheds. The ONF and partners decommissioned 100 miles of road between 1990 and 2003.

In 2000, the ONF completed their forest-wide Road Management Strategy (RMS), an inter-disciplinary assessment of roads to determine risk and access needs. RMS identified 70 percent of the remaining roads in the South Fork watershed as high risk to aquatic resources, while 20 percent were rated as moderate risk and 10 percent as low risk. The ONF 2003 Access and Travel Management Plan, updated for the South Fork Skokomish in 2007, recommended roads for either decommissioning, closure, conversion to trail, or maintained.

Since 2005, all of the high priority road decommissioning, road closure, and trail conversion work identified has been implemented, including all such road work in Brown, Lebar, Church, Pine, and Cedar creek drainages. The success of this program of work is due in large part to the strong support by SWAT and the Skokomish Tribe and receipt of \$6.6 million in Legacy Road and Trail funds targeted for the South Fork Skokomish watershed.

The program of work within Forest Service road and trail work covers a broad spectrum of restoration actions, as described below. Road treatments included decommissioning, closure, trail conversion, storm damage risk reduction, individual culvert upgrades, storm damage risk reduction, fish passage and maintenance. Trail projects include bridge replacements and maintenance. The over-arching goal is to reduce the potential for mass wasting, surface erosion, and road-related delivery of coarse and fine sediment inputs to resident and anadromous spawning and rearing habitat and to improve and protect water quality in the South Fork Skokomish River and its tributaries.

**Planning** – A total of 100.6 miles of classified roads and 5.5 miles of unclassified roads were included in six National Environmental Policy Act (NEPA) decisions completed by the Forest Service between 2005 and 2010. For the 100.6 miles of classified roads under these multiple decisions, the distribution of road miles by Road Objective Maintenance Level (OBML) is: 76.8 miles

decommission, 16 miles Maintenance Level (ML) 1 closure, 5.5 miles decommission with conversion to trail, and 2.3 miles ML 2 (open to high-clearance vehicles).

***Decommissioning*** – The primary objective of decommissioning treatments was to reduce road-related erosion and mass wasting and associated sediment delivery into aquatic systems. Other objectives included increasing the amount of habitat connectivity for terrestrial species, enhancement of deer and elk forage habitat along select decommissioned road corridors, and recovery of native plant species. Decommissioning also aimed to reduce road maintenance costs.

Decommission treatments varied in intensity based for the most part on site conditions and risk to aquatic resources and included: removal of culverts at stream crossings, stream channel restoration, removal of ditch relief culverts, construction of cross ditches and drainage swales, pullback of unstable fill slope material, out-sloping, deep scarification, construction of an earthen or rock closure berm, treatment of select invasive plant species, application of native seed and weed-free mulch, and planting native species.

***Closure (Maintenance Level 1)*** - The primary objective of closure was to reduce the potential for sediment delivery to aquatic systems through treatments targeted at reducing the potential for water diversion and fill-slope failure, but also to retain the road prism for future access needs. Treatment intensities varied, and were determined through evaluation of site conditions and risk to aquatic resources as part of NEPA analysis. High intensity closure treatments were similar to decommissioning treatments.

***Decommission with Conversion to Trail*** – Trail conversion incorporated decommissioning of the three different road segments and construction of a trail within the former roadway, according to specified trail management objectives.

***Storm Damage Risk Reduction (SDRR)*** – Roads targeted for SDRR treatments included those that are to remain on the transportation system. The main objective of SDRR was to reduce the potential for sediment delivery to aquatic systems through treatments targeted at reducing the potential for water diversion and fill slope failure. Treatments varied for individual road segments by site conditions, aquatic resources at risk, and requirements for the objective maintenance level assigned to the road. Typical treatments included: construction of water bars, installation of new or replacement of existing ditch relief culverts, maintenance of culvert inlet basins and ditches, placement of armoring at inlets and outlets of culverts, and removal of unstable road fill slopes. At select sites treatments also included lowering of fills at culvert crossings, construction of drivable dips, installation of overflow culvert, placement of armoring at select ditch segments, and road surfacing. ***SDRR Highlight:*** The Skokomish Tribe was an important contributor to SDRR work. They received a \$145,000 grant from U.S. Environmental Protection Agency to implement SDRR work.

***Individual Culvert Upgrades*** – Upgrades targeted culverts that were undersized or had large road fills. The primary objective at these sites is to prevent delivery of sediment to aquatic systems through treatments targeted at reducing the potential for failure of the road crossing and the potential for diversion of water from the site.

***Fir Creek Bridge - Fish Passage Barrier Correction*** – This project involved replacement of a culvert that was a barrier to resident fish migration with a bridge. The project restored access to 0.3 miles of resident fish habitat. Restoration of the channel to simulate more natural conditions involved

placement of rock, boulders, and large wood in and adjacent to the creek. Riparian areas disturbed by construction activities were planted with native plant species.

**FS Road 23 Paving** – The first mile of Forest Service Road 23, the primary entrance into the South Fork Skokomish from Skokomish Valley, was resurfaced with asphalt.

**Annual Road Maintenance** – Roads that received maintenance included those that are to remain on the transportation system. Work was designed to meet maintenance standards set for the roads.

**Skokomish River Trail Bridge Project** – This project involved replacement of four existing deteriorating trail bridges with new glu-lam bridges on the popular Skokomish River Trail.

**Road and Trail Accomplishments (2005-2015):**

- 89 road miles decommissioned, closed or converted to trails
- 83 miles stabilized or improved drainage - storm damage risk reduction
- 1 resident fish passage barrier corrected
- 1 mile of road paved
- 4 trail bridges replaced

**Funding Sources:**

\$ 6,600,000	Legacy Road and Trail Program Funds (includes \$483,000 received for work in 2015)
\$ 1,075,550	Forest Service Flood Supplemental
\$ 1,080,000	Federal Highways Emergency Repair for Federally-owned Roads
\$ 285,000	Forest Service Stewardship Conservation Credits
\$ 145,000	United States Environmental Protection Agency (grant to Skokomish Tribe)
\$ 448,500	Whole Watershed Joint Venture
\$ 79,000	Wolftree
\$ 444,600	Salmon Recovery Funding Board
\$ 87,100	Secure Rural Schools
\$ 400,000	Federal Stimulus (FS Road 24 paving)
\$ 220,700	Other Forest Service funds
\$10,865,450	Total

**Key Partners:** Skokomish Watershed Action Team; Skokomish Tribe; United States Environmental Protection Agency; Hood Canal Salmon Enhancement Group; Wolfe Tree, Inc.; Ecotrust; Washington State Department of Ecology, Tacoma Urban League, Great Old Broads for Wilderness, Olympic Forest Coalition, U.S. Forest Service Rocky Mountain Research Station

**Contractors:** Primary contractors for road decommission, closure, trail conversion, culvert replacement, storm damage risk reduction, flood damage repair, maintenance or paving: R.G. Forestry Consultant; Neilton Landscaping, Inc.; Arris Kollman Trucking; Westek Forest, Ltd; Seaton Construction, Inc.; Sam Bickle Logging; LK&E Corporation; YRU Contracting, Inc.; and JX Construction, LLC.

Primary contractors for native revegetation work on road decommissioning, closure, trail conversion and other road treatment sites: Washington Conservation Corps; Sound Native Plants.

**Monitoring Efforts:**

**Forest Service Legacy Road & Trail Program Monitoring** – The Rocky Mountain Research Station and Pacific Northwest Region of the Forest Service monitored some of the road decommissioning and SDRR projects in the South Fork Skokomish watershed to assess their effectiveness in reducing impacts and risks to key watershed processes. Researchers developed risk profiles and compared before and after road treatments using the Geomorphic Road Analysis and Inventory Package<sup>m</sup>, a suite of robust inventory and analysis tools. Using GRAIP, they evaluated the following road impacts and risks: road-stream hydrologic connectivity, fine sediment production and delivery, shallow landslide risk, gully initiation risk, stream crossing failure risk, and drain point condition.

The initial results are summarized in reports<sup>n</sup> developed by the researchers.

As a whole the initial monitoring results indicate that the decommissioning work should be effective in greatly reducing many of the hydro-geomorphic impacts and risk that these roads posed to aquatic ecosystems. Key results show an 81 percent reduction in fine sediment delivery to streams, 100 percent reduction in culvert failure risk, and over 5,200 cubic yards of earthen fill removed from high risk sties. Similarly, initial monitoring results indicate that the SDRR work should be effective in reducing non-mass wasting impacts and risk that these roads posed to aquatic systems. However, landslide and gully risk may have increased. Final post storm inventory assessment will enable closer examination of the hydrologic function of both decommissioned and SDRR treated roads.

**Olympic National Forest Monitoring** – The Forest Service conducted the following types monitoring on road or trail projects:

- ✓ Compliance monitoring through contract administration to determine if road decommissioning, closure, trail conversion, storm damage risk reduction, fish passage, and trail bridge treatments were implemented as specified in contracts.
- ✓ Best Management Practices (BMP) at randomly select decommission, trail conversion, and SDRR sites using national-level Forest Service protocols to determine the effectiveness of treatments implemented to protect water resources.
- ✓ Photo monitoring for various road decommissioning, closure, trail conversion, fish passage and SDRR projects. Photos capture before and after conditions at select sites, and in some cases also “during” photos of on-site activities.

**Great Old Broads for Wilderness/Olympic Forest Coalition** – In 2010-2012, the local chapter of the Great Old Broads for Wilderness, the Polly Dyer Cascadia Broadband, completed three field seasons of citizen road survey and monitoring projects in the South Fork Skokomish watershed, in collaboration with the Olympic Forest Coalition (OFCO) and the Olympic National Forest. Volunteers used the Citizen Road Surveying and Monitoring, a method developed by OFCO, to gather data on specific conditions that have the potential to degrade water quality or aquatic species habitat. The types of projects monitored varied by year and included sections of road decommissioned in past years, road decommissioning and trail conversion work in current years, and temporary and system roads associated with future commercial thinning projects. This boots on the ground project presented a very successful way to educate citizens about the vital role of watershed restoration in recovery and protection of our public lands. The multi-year Citizen Survey project is an excellent forum for citizens to engage and contribute to important work on NFS lands. The results of the Citizen Surveys were summarized in annual accomplishment reports.

### ***South Fork Skokomish Large Wood Enhancement Phase I***

Completed in 2010, this large-river restoration project involved constructing a series of 30 log jam structures along the one mile of the mainstem South Fork Skokomish River that extends from River Mile 12 to 13. This stretch was part of a four-mile reach called Holman Flats that had been cleared for a proposed reservoir in the 1950's. The intent of the project was to restore channel processes and improve aquatic habitat and fisheries production by stabilizing the river channel, banks and terraces, increasing floodplain roughness, and reestablishing riparian vegetation. Trees with intact root wads were obtained from nearby Olympic National Forest lands and flown by helicopter to the river, where they were assembled into different-sized log jams and firmly embedded in the river channel.

In 2011, following the first winter storm period that occurred since installation of large wood complex structures, Forest Service TEAMS Enterprise specialists conducted preliminary monitoring within the one mile restored reach. Initial monitoring results concluded that:

- ✓ Gravel bars increased 2.4 feet on average
- ✓ Thalweg decreased an average of -2.0 feet
- ✓ Estimated sediment storage is 43,000 cubic yards (9 cubic yards per linear foot of stream)
- ✓ Bankfull and low flow channel width to depth ratios decreased 49% and 36%, respectively
- ✓ Total number of pools with greater than 5 foot residual pool depth doubled from 3 to 6
- ✓ Wood complexes endured the 6-7<sup>th</sup> highest flow on record, with no loss of wood structure pieces. Wood accumulated, including a large old-growth tree.

The U.S. Fish and Wildlife Service has also conducted initial monitoring to assess the effectiveness of these large wood structures in restoring habitat, primary and secondary production, and fish communities. These data will be useful for long-term evaluations of the restoration effort.

The project was funded by \$729,000 from the Washington Salmon Recovery Funding Board and U.S. Fish and Wildlife Service and \$525,000 from the Forest Service and in-kind contributions (wood). Contractors were U.S. Forest Service TEAMS Enterprise (survey, design, contract administration for construction); Arris Kollman Trucking (tree felling and staging); Columbia Helicopters (tree transport by helicopter); and Aquatic Limited, LCC (log jam structure construction).

### ***Collaborative Stewardship Thinning***

Since 2005, collaboration among Olympic National Forest, the Skokomish Watershed Action Team, the Skokomish Tribe, and other partners led to successful execution of three stewardship thinning projects within the South Fork Skokomish watershed -- Flat, Flat Two, and Pine Creek. The purpose of commercial thinning was to improve forest stand conditions, enhance structural diversity, and promote development of old growth characteristics and a healthy resilient forest. The projects involved use of stewardship conservation credits (retained receipts) generated from commercial thinning of second growth stands to implement other high priority restoration work, including road decommissioning in the Church Creek drainage. Contractors for these projects were Sam Bickle Logging (Flat Stewardship); Westek Forest, Ltd (Pine Stewardship); Seaton Construction Inc. (Church Creek road decommissioning); and Columbia Helicopters (Flat Two Stewardship). In addition, Washington Native Plant Society volunteers monitored road decommissioning and road to trail conversion projects to determine the effectiveness of treatments in restoring native plant species

***Flat Stewardship*** -- 104 acres commercially thinned; stewardship receipts were used to used toward road decommissioning, which included restoration of a stream crossing deemed the "Big Dig" that involved removal of 35,000 cubic yards of road fill material, and 59 acres of pre-commercial thinning.



Flat Stewardship was the catalyst for formation of the Skokomish Watershed Action Team. In 2005, Conservation Northwest worked with the Forest Service and diverse stakeholders to reach consensus on using a stewardship contract to implement the Flat Timber Sale in the South Fork Skokomish watershed. After a few field trips and meetings, the group agreed to support a modified thinning project, from which timber sale receipts would be used to fund high-priority road decommissioning and other restoration work in the watershed. Encouraged by the successful agreement and constructive dialogue about Flat Stewardship, The Wilderness Society and others began to discuss the possibility of continuing and expanding the collaboration to address restoration of the entire Skokomish watershed. After an all-day facilitated discussion, the group agreed in early 2006 to form an informal collaborative group – the Skokomish Watershed Action Team (SWAT).

**Flat 2 Stewardship** – 96 acres commercially thinned; stewardship receipts were used to complete 17 acres of pre-commercial thinning.

**Pine Stewardship** – 69 acres commercially thinned; stewardship receipts were used to complete a road to trail conversion project. A professional forester from Conservation Northwest contributed significantly to development of the prescription for this thinning project.

### **Pine Lake Restoration**

Implemented in 2011-2014, the aim of this project was to eradicate the invasive weed reed canarygrass and restore native plants along the shoreline of Pine Lake, resulting in improved habitat for amphibians, waterfowl, and other freshwater lake-associated wildlife. The project used mechanical, cultural, and chemical methods to remove reed canarygrass from 3 acres of riparian lake habitat, and planted native grasses and sedges grown from locally collected seed and willow. Volunteers with Backcountry Horsemen of Washington were a key partner in completing this project, along with Mason County Noxious Weed Control Board and Washington State Department of Ecology. Total cost: \$38,000 (years 2010-2012, including \$4,800 of in-kind contribution).

### **Riparian Nutrient Enhancement – Annual Salmon Carcass Placement**

Initiated in the mid 1990's, this project is intended to bring nutrients from spawning salmon carcasses to the upper reaches of the South Fork watershed, benefiting juvenile salmon and trout populations and riparian vegetation. Deployment of 5,000-10,000 excess hatchery salmon carcasses within 13-15 river miles each year partially replaces some of the salmon carcasses which historically existed. The average annual cost of the project has been shared by the Forest Service and Washington State Department of Ecology. Work was completed by Forest Service personnel and Washington Conservation Corps crews. Total cost: \$10,000 per year.

### **Pre- Commercial Thinning**

This project involved pre-commercially thinning 76 acres of young overstocked forest plantations to enhance wildlife habitat and species diversity by moving stands more rapidly toward late-successional conditions. Thinning in early and mid-seral patches begins creating the structural diversity and promoting a reconnection of wildlife corridors. Rocky Mountain Elk Foundation contributed \$7,000.

### **Elk Forage Enhancement**

Implemented in 2009-2010, this project targeted enhancement of forage habitat for elk through planting of native plant species within the understory of 31 acres of five selected forest stands. Preference browse species planted included either cuttings or rooted stock of red-osier dogwood, willow, snowberry, and red elderberry. The Skokomish Tribe contributed \$6,000, and Washington Conservation Corps was another key partner by providing manpower.

### ***Other Projects in the Upper Watershed***

#### **Gibbons Creek Bridge – Fish Passage Barrier Correction**

Gibbons Creek is a tributary to McTaggart Creek, in the North Fork Skokomish watershed. Prior to 1946, a railroad grade crossing was established on Gibbons Creek. The crossing later became part of Green Diamond Resource Company's 8000 Road. The crossing at Gibbons Creek had a 6 foot diameter by 108 foot long corrugated metal culvert covered by 35 foot deep road fill approximating 10,000 cubic yards. A 10 foot outfall drop at the culvert outlet prevented upstream fish migration, and completely block anadromous fish passage.

In 2009, Green Diamond partnered with Mason Conservation District, Skokomish Tribe, and others to replace the existing culvert with a 65 foot span bridge on elevated abutments and rehabilitate the stream adjacent to the new bridge. Stream restoration included construction of a 25 foot stream bankfull width under the new bridge, and installation of large wood and construction of rock grade controls within the 350 foot stream reach immediately adjacent to the project site. Replacement of the culvert with a bridge restored access to 1.2 miles of upstream fish spawning and rearing habitat for anadromous fish species. Removal of the culvert and 10,000 cubic yards of road fill eliminated the risk of catastrophic failure and potential delivery of sediment downstream. The project successfully eliminated a substantial anadromous fish passage barrier in the North Fork Skokomish watershed and connected isolated freshwater in-stream habitat to increase the range and distribution of salmon.

Funding for the project included grants of \$173,500 from the Salmon Recovery Funding Board and \$22,500 from EcoTrust. Green Diamond workers provided labor valued at \$108,500.

#### **McTaggart Creek Diversion Removal and Bridge Upgrades**

McTaggart Creek is a right bank tributary of the North Fork Skokomish River that joins the North Fork at approximately River Mile 13. In the early 1950's, Tacoma Power constructed a dam on McTaggart Creek at approximately River Mile 4 for the purpose of diverting water from the creek into Lake Kokanee for power generation. In the summer of 2009, Tacoma Power partnered with Green Diamond Resource Company to remove the McTaggart Creek diversion dam and restore the stream channel upstream and downstream of the former diversion. This project returned up to 5 cubic feet per second of flow to the McTaggart Creek channel downstream of the former diversion. Removal of the diversion dam was preceded by the replacement of two culverts with prefabricated bridges on McTaggart Creek downstream of the diversion where it crosses the Green Diamond roads 8000 and 8700. These road crossings were upgraded to bridges to accommodate the increase in volume due to the restored flows in McTaggart Creek.

Funding for the project was provided by Tacoma Power as part of its commitment to restore habitat in the North Fork Skokomish River as outlined in the Article 412 Fish Habitat Enhancement and Restoration Plan of the Cushman Project License. The restoration project was completed nine months before the Federal Energy Regulatory Commission issued Tacoma the amended Cushman Project license on July 15, 2010.

#### **Green Diamond Road Management and Abandonment Plans, Road Projects**

To date, Green Diamond has addressed approximately ninety percent of the road hazards identified in the HCP within the South Fork/Vance Creek region through implementation of road upgrades, abandonment, or maintenance work. Three projects recently completed include the Falls Creek Culvert

Upgrade on the 915 Road, the Falls Creek Bridge on the 800 Road, and extensive work on the 900/866 road system in the Haven Lake area, as described below. In 2015, GDRC will continue to responsibly manage its timber harvest and transportation network through implementation of its on-going maintenance and wet haul mitigation programs.

**Falls Creek Culvert Upgrade on the 915 Road:** This project replaced an undersized culvert with a 12 foot diameter by 160 foot long culvert and a 6 foot diameter by 100 foot long overflow pipe during NB246 Harvest Unit road construction.

**Falls Creek Bridge on the 800 Road**

**900/866 Road System (Haven Lake area):** This project involved extensive work to upgrade stream crossings, reduce potential sediment delivery lengths, and increase user safety on these high-elevation roads. Green Diamond replaced multiple culverts, installed cross drains to mitigate sediment delivery to crossings, widened road prism and turn-outs that involved the use of an excavator-mounted rock hammer to remove basalt cut-banks along narrow corridors, and decommissioned a segment of this road system and relocated it away from over-steepened side slopes.

**Vance Creek Restoration Assessment – Bureau of Reclamation**

**Project Description, Goals, and Objectives:** Vance Creek is a major tributary to the Skokomish River and supports habitat for three ESA-listed fish stocks including Puget Sound chinook, Puget Sound Steelhead, and Hood Canal summer chum. Deposition of sediment in the lower deposition reach of Vance Creek, due in part to past harvest and road construction practices in the upper watershed, have resulted in dry channel segments throughout much of the floodplain segment during late summer low flow periods. In certain years, surface flow is absent to the confluence with the South Fork Skokomish River. Extermination of beavers, draining of the beaver ponds and wetlands and removal of LWD (large woody debris) from the stream channel has also contributed to stream channel and fish habitat degradation.

The Skokomish Tribe contracted with the Bureau of Reclamation (BOR) and Mason Conservation District (MCD) to study and analyze ecological function within Vance Creek. BOR conducted a reach assessment to investigate geomorphic processes and fluvial dynamics within the stream and floodplain and documented its findings within the technical report titled "Vance Creek Geomorphology and Modeling Report". MCD utilized the BOR data and analysis to develop project recommendations designed to help restore river function and enhance fish habitat and summarized its project recommendations in a report titled "Stream Habitat Restoration Recommendations for Vance Creek in the Skokomish Valley." This report identified near-term restoration projects designed to improve stream habitat at a relatively low cost and low risk: riparian enhancement at 5 sites; wood bank stabilization at 1 site, and single anchored logs at 4 sites within River Mile 0.3 and 0.9 along the right bank. MCD identified additional projects that will require additional investigation before deciding on implementation.

Conducted between March 2008 and July 2011, this study of Vance Creek complements the larger Skokomish River GI Study. The project cost a total of \$183,919 was funded by Puget Sound Acquisition and Restoration (\$123,919), Bureau of Reclamation (\$40,000), and Skokomish Tribe (\$20,000).

**South Fork Skokomish Canyon Fish Passage Assessment**

The Chinook Recovery Plan (see Policies, Plans, Programs, and Agreements section of this report) recognizes loss of consistent access to the upper South Fork as one of the contributing factors for

extirpation of the Skokomish early-timed Chinook. The recovery plan attributes reduced fish passage to long-term climate change, altered water storage patterns, and excessive sediment. Flow analysis referenced in the recovery plan indicates that spring runoff has diminished since the 1940's, likely the result of long-term climate change and logging practices in the upper watershed. Data also shows perennial snowfields and glaciers in the Olympic Mountains have greatly diminished in size since the 1920's, a pattern evidenced in the decreased spring runoff in the river hydrographs for both the South and North forks of the Skokomish River. It is also reasoned that excessive sediment resulting from past land management practices in the upper South Fork Skokomish has resulted in reduced pool depth due to deposition of excess sediments in pools throughout the canyon. Chinook depend on deep pools for ascending instream obstacles.

The recovery plan identifies a series of cascades within the South Fork Skokomish Canyon that were historically known to be passable by steelhead, bull trout, and early-timed Chinook, but are now a natural partial barrier to upstream migration. In the past, these cascades were primarily passable when flows were elevated due to snow-melt runoff. Decreased snow-melt runoff has made passage over the cascades more difficult. Engineers for Washington Department of Fish and Wildlife have concluded that some type of corrective action will need to take place to facilitate safe passage over the cascades. Fish passage in this location will be necessary for successful re-introduction of Chinook into the upper South Fork Skokomish River. When early-timed Chinook are reintroduced to the Skokomish it will be critical that they can access the 23 miles of habitat upstream of cascade barriers.

The goal of this project is to determine the passability of Spring Chinook over the cascades in the South Fork Skokomish River Canyon, and explore feasible corrective actions to restoring appropriate Spring Chinook passage. This project will assess the four sites identified by WDFW to determine the passability at various flows and develop design concepts for fish passage improvements if necessary.

The Mason Conservation District is contracting with an engineering firm to conduct the assessment, utilizing a \$175,437 grant from the Salmon Recovery Funding Board and \$30,960 in matching funds. The assessment is scheduled to be completed by the end of 2015. Implementation activities based on the assessment will be completed by Washington Department of Fish and Wildlife.

## **2. North Fork Skokomish/Lake Cushman**

As discussed in the Policies, Plans, Programs, and Agreements section of this report supplement, in 2009 Tacoma Power reached an historic agreement with the Skokomish Tribe and other entities regarding operation of the Cushman Hydroelectric Project. Based on the agreement, in 2010 the Federal Regulatory Energy Commission granted Tacoma Power a license to continue operating the project through 2048. The Cushman Project license includes numerous articles relating to restoration of water flows, anadromous fish runs, and other watershed values in the North Fork of the Skokomish River and Lake Cushman. Tacoma Power coordinates with a Cushman Fisheries and Habitat Committee that includes representatives of the National Marine Fisheries Service, US Fish and Wildlife Service, Bureau of Indian Affairs, US Forest Service, Olympic National Park, Skokomish Tribe, Washington Department of Fish and Wildlife, and Washington Department of Ecology.

### ***Minimum Flows: North Fork Streamflow Enhancement (License Article 407)***

The Cushman Project license guides flow releases in the North Fork Skokomish River. The flow regime developed by the Cushman Fisheries and Habitat Committee for the North Fork is designed to mimic the

timing, duration, and frequency of natural flow events. This approach aims to enhance healthy conditions in the river system. The new flow regime has four categories of flow:

- **Component 1 Base flows** – 115,835 acre-feet of the 160,000 acre-feet annual water budget is released as the minimum flow into the lower North Fork Skokomish River. Additional water is released for fish, channel formation, and sediment transport.
- **Component 1 Additional Base Flows**– 44,165 acre-feet of the annual 160,000 acre-feet is released in accordance with a release schedule developed prior to each water budget year in consultation with the Cushman Fisheries and Habitat Committee to improve conditions for fish.
- **Component 2 North Fork channel formation flows** – predetermined flows designed to establish and maintain habitat in the lower North Fork, triggered by upstream USGS Staircase gauge measurements.
- **Component 3 Mainstem sediment transport flows** –flows designed to flush sediment in the mainstem downstream after storm events, triggered by downstream USGS Potlatch gauge measurements.

The Flow Plan for the water budget year (July 1 – June 30) is developed by the Fisheries and Habitat Committee, and filed with the Federal Energy Regulatory Commission no later than June 15 of each year. In-season modifications to the plan can be made by the Committee if deemed warranted (e.g. when there is not enough snow pack to support higher spring flows as in 2015). Benefits to fish include higher than normal, and cooler, low flows during the spring and summer, particularly in dry years.

#### ***Fish Habitat Enhancement and Restoration Plan: Habitat Restoration Projects (License Article 412)***

Upon receipt of the amended Cushman Project License in 2010, Tacoma Power paid \$3.5 million into an interest-bearing Habitat Restoration Fund. On the fifth anniversary (July 15, 2015) of the Project license, Tacoma Power added \$300,000 (plus inflation adjustments) into this Fund. Tacoma Power will annually deposit \$300,000 into the account for the term of the amended license (to 2048). All deposits are based on 2008 dollars adjusted annually for inflation. The fund will be used for fish and aquatic habitat restoration projects primarily within the North Fork sub-basin. Projects will include (a) instream structure enhancements; (b) side channel habitat development; (c) removal of existing barriers to upstream migration in North Fork tributaries; and (d) gravel augmentation. The Fisheries and Habitat Committee has been reviewing the license article 413 monitoring data to identify locations and project types within the North Fork, and may select in 2015 its first habitat restoration project to construct with Habitat Restoration Funds in 2016 or 2017.

#### ***Fish Populations and Habitat Monitoring Plan (License Article 413)***

Tacoma Power developed a Fish and Habitat Monitoring Plan in consultation with the Fisheries and Habitat Committee that was approved by the Federal Energy Regulatory Commission in 2011. Beginning in 2012, Tacoma Power biologists have been implementing the plan by monitoring (a) sediment transport and channel morphology in the mainstem Skokomish River and lower North Fork; (b) fish and fish habitat in the North Fork and mainstem Skokomish River; (c) lake productivity in Lake Cushman and its effects on juvenile sockeye; (d) water temperature in the North Fork sub-basin; (e) fish populations (including distribution and habitat utilization) in the North Fork; and (f) genetic monitoring. The Skokomish Tribe has contributed to the annual monitoring effort by conducting spawning surveys in the North Fork downstream of Cushman No. 2 Dam, and the National Park Service has contributed by surveying bull trout populations in the upper North Fork. The purpose of monitoring is to ensure that

the flows, passage requirements, supplementation program, habitat projects, etc. are effectively restoring fish populations and habitat.

**Annual Monitoring Reports**

Tacoma Power prepares approximately sixteen annual reports and files them with FERC in compliance with the requirements of individual license articles in the Cushman Project license. Prior to filing the reports, Tacoma Power submits draft reports to the Fisheries and Habitat Committee for their review and approval. The information provided in the reports documents how Tacoma Power complied with the specific license article requirements during the reporting period. Some of the subject matter reported on annually includes instream flows and reservoir elevations, water quality, wildlife habitat enhancement, threatened and endangered species protection, fish habitat enhancement and restoration, fish population monitoring, upstream and downstream fish passage monitoring, and shoreline management. In addition, once the two Cushman Project hatcheries are operational in 2016, Tacoma Power will begin filing annual hatchery monitoring reports.

***Downstream Fish Passage: Floating Juvenile Fish Collection Facility at Cushman No. 2 Dam (License Article 414)***

Tacoma Power built and installed a new floating fish collection facility for Lake Cushman, to help migrating juvenile fish around the dams. This large floating device is attached to Cushman No. 1 Dam. Water flowing into the floating facility will carry the fish into a fish trap. Once collected, the young fish will then be transported to the sorting facility at the lower dam. After a portion of the smolts are counted, measured and marked, they will be released in the North Fork Skokomish River at the base of Cushman No. 2 Dam to continue their migration. Construction began in April 2013 and was completed in December 2014.

***Upstream Fish Passage (License Article 415)***

**Little Falls Fish Passage Modifications**

Little Falls is located on the North Fork Skokomish River, approximately 2.5 miles downstream of Cushman Dam No. 2. The falls has become a prominent partial fish barrier given the controlled flows coming through the dams and down the North Fork. The flow of the river at Little Falls divides into two bedrock channels, and both were identified as barriers to fish migrating upstream. The goal of this project was to improve fish passage over the falls while preserving the beauty of this site that has cultural significance to the Skokomish Tribe.

Modification to the falls, completed in 2014, involved micro-blasting the bedrock channel to create small steps that serve as resting pools for fish on their migration upstream. During blasting operations, a critical bedrock wall was blown out. As temporary compensation for the loss of the wall, Tacoma Power placed super sacks filled with spawning gravel and covered with rock in 2014.

During the fall of 2014, and spring of 2015, adult salmon and steelhead were seen upstream of the falls. Adult coho entered the trap at the base of Cushman No. 2 Dam, and steelhead redds were documented in the river channel upstream of the falls. In 2015, fish trapped in the adult collection facility are being implanted with radio tags and released downstream to assess fish passage success. Tacoma Power and the Fisheries and Habitat Committee will continue to assess fish passage over the falls, and make a determination as to whether additional work is needed to improve passage.

Tacoma Power collaborated with the Skokomish Tribe and regulatory agencies on this project and worked with them to conceptualize potential future modifications using innovative construction techniques. In addition, Tacoma Power consulted with the Skokomish Tribe's Culture Committee to ensure that the final fish passage design was culturally acceptable.

**Adult Fish Collection Facility at Cushman No. 2 Dam**

In 2011-2013, Tacoma Power built a new powerhouse and innovative fish collection and transportation system at Cushman Dam No. 2. Tacoma Power worked in partnership with the Skokomish Indian Tribe and natural resource agencies to design the facility. The unique facility uses water discharged from turbines to attract migrating adult fish into a collector. Once in the collector, fish are moved into a transport hopper and lifted to the top of the dam on a tram. The new fish handling system is used to sort by species, count, and as necessary mark the fish. Fish are then transported by truck to their final destination – either to a hatchery to be used as brood stock, or upstream of the two Cushman dams and released into upper Cushman Lake, where they can find their way into the upper part of the North Fork or other lake tributaries.

**Fish Supplementation Program (License Article 417)**

Tacoma Power is constructing two hatcheries at the Cushman Project to protect, address damages to, and enhance anadromous and resident fisheries. The objectives of the fish supplementation program are: 1) to support the reintroduction, restoration, and long-term maintenance of anadromous fish populations in the North Fork Skokomish watershed using best management practices for fish health and maintenance of genetic fitness; 2) to provide harvest opportunities to treaty Indian and non-treaty fishers; and 3) to provide recreational fishing opportunities. Construction of both hatcheries began in 2014 and is expected to be completed in 2015.

**Saltwater Park Sockeye Hatchery**

The sockeye hatchery is located adjacent to Saltwater Park at Potlatch on the Hood Canal. The production goal for the Saltwater Park Hatchery is to release 2 million sockeye fry into Lake Cushman. Eyed eggs will be obtained, as available over a period of several years, from the Baker Lake Sockeye Hatchery in northern Puget Sound. The fish will be reared at the Saltwater Park Hatchery and released into Lake Cushman at various sizes. Because sockeye are prone to disease, the hatchery will release its freshwater into Hood Canal rather than risking exposures to fish in the Skokomish River. After spending a year in Lake Cushman, the young sockeye will be captured in the downstream fish collection facility and released into the lower North Fork Skokomish River where they will migrate to sea. When they return as adults, the sockeye will be collected at the base of Cushman Dam No. 2 and taken to the hatchery to be used as brood stock.

**Lake Kokanee Salmon and Steelhead Hatchery**

The North Fork salmon and steelhead hatchery is located near Cushman Dam No. 2 at Lake Kokanee in the North Fork Skokomish. The goal of this hatchery is to produce spring Chinook, Coho, and steelhead. Plans call for rearing up to 375,000 spring chinook each year. During the early years of production, eyed spring Chinook eggs will be obtained from the state's Marblemount Hatchery in northern Puget Sound. In 2014, 150,000 eyed spring Chinook eggs were transferred from the Marblemount hatchery to the Long Live the Kings Lilliwaup Hatchery for incubation and early rearing while the North Fork Hatchery was under construction. The hatchery will also be used to supplement native runs with annual releases of up to 15,000 steelhead smolts and 35,000 Coho smolts. Tacoma Power contracted with Long Live the

Kings to incubate and rear spring Chinook at the Lilliwaup Hatcher while Tacoma Power's North Fork Hatchery was under construction in 2014 and 2015.

**Lake Kokanee Rainbow Trout Release (License Article 417 and Off-License Agreement with WDFW)**

To improve sport harvest of rainbow trout, Tacoma Power releases up to 35,000 rainbow trout annually into Lake Kokanee and other lakes designated by WDFW in Mason, Kitsap, Thurston, Pierce, and Jefferson counties. In 2014, Tacoma Power released 54,488 rainbow trout into lakes in Mason, Jefferson, and Kitsap counties, including approximately 10,400 fish (8,000 pounds) into Lake Kokanee. The objective of this project is to improve sport harvest of rainbow trout

***Land Management and Acquisition for Wildlife (License Articles 420 and 421)***

Tacoma Power manages a total of 2,800 acres of lands in the North Fork Skokomish basin for the maintenance and enhancement of wildlife populations. This includes 750 acres of land -- 430 acres in the North Fork Skokomish basin and 320 acres in the South Fork basin – which Tacoma Power recently acquired for the purpose of enhancing native plants and wildlife populations near the Cushman Project. The project improves and protects wildlife habitat that supports multiple species, including osprey, eagles, wood ducks, bats, elk, and deer. Specific management accomplishments include:

- 3 osprey nesting structures at Cushman project reservoirs installed. Two of these platforms are located on poles at either end of Lake Cushman, and one rests on a tree at Lake Kokanee.
- 10 wood duck nest boxes installed
- 6 bat boxes installed
- 100 snags created in 2013, with creation of an additional 100 snags planned for 2016
- 100 acres of dense conifer forest thinned
- 50 acres of forage fields for elk and deer at Homan Flats constructed
- 25 acres of forage fields for elk and deer at Lake May constructed
- Initial invasive weed surveys completed
- Boundary signs posted at all wildlife land access points

In addition, Article 421 of the amended Cushman Project license requires Tacoma Power to improve forage production and tree growth within 200 acres of dense Class 1 or 2 conifer forest through thinning and maintaining target tree densities and forage throughout the term of the license. Tacoma Power proposed thinning the first 100 acres in 2014, but delayed the work until 2015 to accommodate Mason Conservation District's need for large wood for phase 2 of the South Fork Skokomish River woody debris enhancement project. Mason Conservation District anticipates harvesting specific trees needed for the wood debris project in 2015, after which Tacoma Power will thin the remainder of the 103-acre site.

***Recreation Plan (License Article 425)***

**Big Creek Campground Improvements**

As part of the Cushman settlement agreement, Tacoma Power made improvements to the U.S. Forest Service's Big Creek Campground, located in the North Fork Skokomish. In an effort to improve this campground facility, Tacoma Power constructed new recreational vehicle (RV) and tent campsites, constructed and widened road segments, installed underground utilities, and built new picnic shelters, as described below:

- 41 additional campsites added to the already existing 23 sites. Twelve of the campsites are tent camping sites and the others are RV-accessible camp sites. Seven of the sites will be Americans with Disabilities Act (ADA) accessible.



- Three new road sections were constructed and two existing sections were widened to facilitate the expansion.
- Underground utilities were installed to support 20 new hose bibs around the campground and power to the 3 new vault toilets that replaced 2 older facilities.
- Two new picnic shelters and group fire rings were built adjacent to the new Loop A and Loop B roads where campers can reserve the entire loop for group camping.

### **Staircase Road Recreational Site Improvements**

As part of the Cushman settlement agreement, Tacoma Power made improvements to informal recreational sites along the Staircase Road. Work involved improvements to five existing shoreline day-use recreational sites along Staircase Road, Mount Rose trailhead access road and parking area, and the addition of picnic tables, toilets, and parking at the Bear Gulch day-use site. Upgrades were also made to the Dry Creek trailhead and Lake Cushman Viewpoint.

## **3. Skokomish Valley**

### **Purdy Creek Bridge Replacement – U.S. Highway 101**

The U.S. Highway 101 Purdy Creek Bridge, which was built with timber trestles in the early 1930s, was subject to frequent overtopping by floodwaters, caused dangerous conditions for drivers, and resulted in frequent closure of the highway. The 2003-2004 State Legislature mandated the bridge be replaced as part of Washington State Department of Transportation's P2 Bridge Preservation Replacement Program. The new Purdy Creek Bridge, completed in 2009, has wider lanes and shoulders, is 12.5 feet higher and more than three times the length of the old structure. The 350-foot pre-stressed concrete girder bridge allows floodwaters to pass freely under the bridge, improves public safety, and ensures highway traffic remains open during flood events. The new bridge has also helped to alleviate flooding impacts in the valley by reducing the barrier effect of Highway 101 during flood events. The total cost of the state-funded transportation project was \$9.5 million. Quigg Brothers Construction was the general contractor for the bridge project, and Malcolm Drilling was the subcontractor for building shafts.

### **East Bourgault Road Bridge Removal and Habitat Restoration**

The East Bourgault Road Bridge Removal Project is a 0.81 acre mitigation site, created to compensate for 0.23 acre of permanent impacts associated with the replacement of the Purdy Creek Bridge on the US Highway 101 (see above). This project consisted of enhancing the riparian and wetland habitat along East Bourgault Road through removal of a timber bridge and road to allow floodwater to flow across and into wetlands. Work included removal of the bridge, bridge abutments and approach, asphalt concrete pavement, and roadway, followed by decompacting, grading and planting of the former roadway, removal of guardrail and creosote treated fence posts, riparian enhancement, and wetland re-establishment. According to a 2013 WDOT monitoring report, the site is generally beginning to develop as desired with native woody species flourishing. The project was completed in 2009 for \$99,140 by R.W. Rhine, Inc.

### **River Road Abandonment and Habitat Enhancement**

River Road, located in the lower Skokomish valley, was a partial barrier to fish migration. It restricted fish access to the large Skobob wetland complex during flood flows, and stranded salmon fry during summer low flows. The River Road project removed culverts to restore the natural hydrologic functions of the area, including reconnection of remnant flood channels to the Skokomish River, and provided unimpeded access to fish movement. Completed in 2009 with funding from U.S. Fish and Wildlife

Service and Skokomish Tribe, the project reconnected 68 acres of floodplain and restored a quarter-mile of instream habitat.

### **State Route 106 Skobob Creek Bridge Fish Passage Restoration**

The Skokomish River delta has been heavily impacted by past land use practices, including logging in the upper watershed, construction of power generation facilities on the North Fork Skokomish River, construction of roads within the Skokomish floodplain including State Routes 101 and 106, and construction of dikes in the Skokomish valley. Aggradation in the Skokomish River has contributed to flood conditions on the Skokomish Tribe Reservation lands.

The overall project goals aimed to restore critical salmon and wildlife habitat located on Skokomish Tribal lands and in the Hood Canal watershed. Project objectives were to improve fish passage and creek flow capacity under the State Route 106 during storm events. This project replaced the existing undersized 6-foot by 6-foot culvert at the State Route 106 Skobob Creek crossing with a 120-foot bridge. Benefits of the project include:

- ✓ Year round access for adult and juvenile salmon to upper Skobob Creek and 430 acres of wetland habitat suitable for rearing.
- ✓ Reduced entrapment of salmon during flood conditions in the Skokomish River.
- ✓ Restored ecological diversity of an existing palustrine wetland by lowering the seasonal ground water table and eliminating the permanent flooding at the outer fringes of the wetland.
- ✓ Reduced deposition of silt and mud in the wetlands
- ✓ Reduced occurrence of the overtopping (and subsequent closure) of State Route 106 due to flooding
- ✓ Restoration of Indian reservation lands so that they can again be used for religious and cultural uses

Hood Canal Salmon Enhancement Group partnered with WDOT, USFWS, and the Skokomish Tribe to complete the project in 2005 with \$1,775,828 in gas tax funding.

### **Potlatch Wastewater Treatment Plant**

Completed in 2013, this project is designed to help preserve and protect the water quality of the lower Hood Canal area. The goal of the project is to eliminate pollution into Hood Canal from existing septic system drain fields located close to the canal's shore, including some that lie within the Skokomish watershed. Owned and operated by the Skokomish Tribe, the new community wastewater treatment system uses a Membrane Bioreactor (MBR) technology to treat wastewater, and the resulting effluent can be safely returned to the ground or recycled. The wastewater plant houses a small water quality testing lab, office and garage, and the collection system includes hook-ups to individual homes and businesses on either side of Highway 101.

To date, this project has removed 17 septic systems offline including the Waterfront at Potlatch Hotel, Tacoma Power House facilities and the Potlatch State Park facilities. In the future, the wastewater treatment plant will accommodate eight new houses that are currently under construction and has the capacity to serve many more future homes to be built at the Tribe's t3ba'das housing development. Work on the 9600 foot long Force Main is set to begin in July 2015 and be completed by June 2016. The force main will run from the Potlatch Wastewater Reclamation facility south along U.S. Highway 101. It will replace 22 septic systems from houses and businesses along the highway including Lucky Dog Casino, Twin Totems Store and Deli, Ferrellgas, two seafood stores, a church, and public safety building. All septic tanks will be properly drained and backfilled when abandoned.

Funding for design and construction of the \$8.5 million Potlatch Wastewater Reclamation facility included \$4,969,828 in EPA STAG grants, \$3,330,606 in Washington State Centennial Clean Water Grants, and \$ 198,818 in low-interest loan. Washington Department of Ecology is funding the \$2 million U.S. Highway 101 Force Main project with a \$438,356 grant and \$1,561,664 in low-interest loan. The low-interest loans will be paid back through user fees charged to the residential and commercial sites. Gray & Osborne, Inc. provided design, permitting, and construction management, while McClure and Sons, Inc. constructed the MBR Plant. The construction contract for the Force Main went out to bid in July 2015.

#### **Skokomish Reservation Septic System Management**

Starting in 2007, the Skokomish Tribe has undertaken a comprehensive program to inventory, maintain, and repair or replace septic systems on the reservation. In 2008-2009, the Tribe conducted a survey to collect information on 134 septic systems and found that nine of the septic systems were failing. Since 2007 the Tribe has pumped 46 systems and repaired or replaced 24 systems, significantly reducing the amount of effluent and nitrate pollution entering the watershed and Hood Canal. Funding sources include \$5,000 in EPA and \$400,000 from Indian Health Service.

#### **Skokomish Reservation Road Paving and Stormwater Project**

In 2014, the Skokomish Tribe reconstructed 4,600 feet of Reservation Road serving the core reservation area in order to addressing flooding problems, as well fix potholes and provide a safe sidewalk for pedestrians. Reconstruction included the addition of a ditch swale between the sidewalk and the road to collect pollutants before draining downstream. The ditch swales conveyed water captured from several large rain events totaling several inches per day in the winter 2014-2015, without overtopping. The project also cleaned all existing catch basins and culverts, emphasizing the importance of regular maintenance on the stormwater system. The \$1.3 million project received \$1 million from Public Lands Highway and \$278,000 from Bureau of Indian Affairs Indian Reservation Roads. SCJ Alliance conducted engineering and construction project management, and Active Construction, Inc. constructed the project.

#### **Five Mile Creek Large Woody Debris Placement**

Five Mile Creek is a perennial, spring fed tributary that flows into the South Fork Skokomish River about 1 mile upstream of the Vance Creek Confluence. This stream offers pristine spawning and rearing habitat, cool spring waters, and high-flow refuge to spawning and juvenile salmon, including Puget Sound Chinook, Hood Canal Summer-Run Chum, Steelhead and Bull Trout. Over the past several years, the mouth of the creek has been blocked to fish passage by excess sediment along the right bank of the South Fork. The blockage prevents fish from escaping the overly-warm river water into the cool, spring-fed water of Five Mile Creek.

The goal of this project was to maintain stream connectivity between Five Mile Creek and the South Fork Skokomish River, and provide cool covered habitat for endangered salmon, steelhead and bull trout, especially during summer low-flow periods. This project placed a series of four log jams totaling 320 feet of large woody debris along the right bank adjacent to the Five Mile Creek and Skokomish South Fork confluence. Log structures were placed strategically to cause channel scour in order to maintain summer low-flow access from the South Fork Skokomish to Five Mile Creek. After the project was completed in March 2015, post-construction monitoring found LWD placement at the stream mouth has caused scour and pool formation, effective in maintaining stream connectivity between Five Mile Creek and the South Fork Skokomish during summer low flows.

Mason Conservation District engineered and designed the project under contract with Natural Resource Conservation Service. Landowner Charles Toal contributed labor and equipment. Funding for the \$66,000 project included \$30,304 from Puget Sound Acquisition and Restoration and \$35,499 from project sponsors.

### **Southern Hood Canal Riparian Enhancement Project Phase I**

Mason Conservation District initiated this project in 2009 as part of an effort to control knotweed and other invasive plants in the Hood Canal area. Focusing on the extensive needs of the Skokomish watershed for riparian and salmon habitat restoration, the project entails planting native conifers, shrubs and hardwood species in high priority areas to restore natural streamside vegetation, improve stream temperature, reduce erosion, filtration, and recruit large woody debris. Riparian plantings emphasized native conifers, shrub, and hardwood species. Invasive plant control targeted primarily Japanese knotweed, but also included Himalayan blackberry and reed canarygrass. Riparian enhancement work was conducted on multiple riparian parcels owned by Mason County, Skokomish Tribe, and Washington Department of Fish and Wildlife, and private land owners in the Skokomish valley. More than 100 local landowners signed permission forms allowing riparian enhancement on almost 350 parcels for Phase 1.

MCD contracted a Washington Conservation Corps crew from 2010 to 2013, and hired additional contractors when necessary, to complete project work. MCD continued to collaborate with regional riparian restoration partners to refine methods of knotweed treatment, riparian planting, and data collection. This project resulted in more than 455 acres and 20 miles of streambank treated, consisting of more than 255 acres of riparian planting and 241 acres treated for invasive vegetation. Funding sources included \$28,466 from Puget Sound Acquisition and Restoration and \$394,044 from Salmon Federal Projects.

### **Skokomish River Floodplain Acquisition and Restoration**

This project targets properties in the Skokomish River floodplain for acquisition and implementation of site-specific habitat conservation and restoration efforts. The majority of the properties are downstream of Highway 101 and within the lower floodplain of the mainstem Skokomish River and all parcels are south of the Skokomish River. This project addresses disjointed ownership and patchwork of lower Skokomish River floodplains that continue to degrade. Abandoned properties due to floods and high ground water have left structures, foundations and fencing in marginal states of integrity. Restoration efforts to be implemented include building demolition and road prism removal. Adjacent lands owned by Washington Department of Fish and Wildlife, Mason County, and the Skokomish Indian Tribe have been secured with other resources. This project will lead towards common ownership with appropriate stewardship and restoration practices across multiple jurisdictions.

The project began in 2012 and will be completed by the end of 2015. Puget Sound Acquisition and Restoration has provided \$425,950 in funding, matched by \$77,500 from Mason Conservation District and Skokomish Tribe.

### **Dips Land Transfer**

In 2011, Cascade Land Conservancy (CLC) (now Forterra) purchased two land parcels totaling 160 acres of mostly forested floodplain land along the south bank of the Skokomish River, including 131 acres of forest from Green Diamond Resource Company and 29 acres of grass field from an individual owner. CLC subsequently transferred the lands to the Skokomish Tribe. The properties contain the Skokomish River

Road, the only transportation access through the valley into working farms and forests above the River. The site, known as the “Dips”, is usually the first to flood, closing the road and isolating the community.

At the time of their purchase, conservation of these lands was widely regarded as the most important and urgent salmon restoration project within the Hood Canal Basin, since it will allow creation of significant off-channel and floodplain habitat beneficial for all salmonid species as well as for flood retention. The property’s riparian forest contains mixed-age conifers and hardwoods that protect the river bank of the Skokomish River, prevent the transport of high sediment loads into the river and contribute large woody debris to the flood plain and river. Logs and stumps of mature conifers along the gravelly riverbanks further enhance habitat and structural complexity, while side channels provide additional fish habitat. Protection of upstream floodplains is also of great importance to ensuring natural watershed function and reducing flood impacts downstream.

Funding for the \$444,000 land acquisition came from the Salmon Recovery Funding Board (\$371,744) and Washington Department of Fish and Wildlife Landowner Incentive Program (\$72,278).

#### **Skokomish Confluence Reach Restoration Design**

Conducted in 2007-2013 in concert with the Skokomish River General Investigation, this project examined the complex confluence of the North and South forks of the Skokomish River. Decades of upland land use and lower valley levee construction have created a severely aggraded and channelized river. The aggraded river bed has gone dry for several years creating a fish passage barrier during the chinook and summer chum migration period, eliminating 20 miles of spawning habitat in the South Fork Skokomish. The project gathered information needed to help select projects that have a high certainty of beneficial outcome and to determine project siting, feasibility, design, and implementation. Results are summarized in a report titled “Skokomish River Confluence Reach Feasibility and Design.” The project was undertaken by the Skokomish Tribe in partnership with Mason Conservation District and U.S. Army Corps of Engineers and was funded by a \$445,126 Puget Sound Acquisition and Restoration grant.

#### **Lower Skokomish Car Body Removal and Riparian Restoration -- General Investigation Study (Corps Project)**

This project site is on a 1,800-foot section of the right bank of the mainstem Skokomish River at River Mile 4.4, downriver of Hwy. 101. In past years, the bank was armored with car bodies in order to stabilize it, and was void of riparian vegetation. Car body armoring prevented natural channel migration and flooding along the banks and in the channel of the Skokomish. The Weaver Creek/Skokomish River floodplain was previously cleared for agricultural uses.

Mason Conservation District’s goal for this project is to restore natural channel migration in the mainstem Skokomish and restore riparian function. The project involves removing 39 vehicles and their associated parts totaling 48.7 tons of scrap metal along 1,800 linear feet from the right bank and channel of the mainstem Skokomish River. In addition, native riparian vegetation is being planted within the entire 22.5 acre Weaver Creek/Skokomish floodplain.

The project is scheduled to be completed by the end of 2015. The Salmon Recovery Funding Board provided a \$129,710 grant, matched by \$64,000 from MCD. The contractor is James C. Pro, Inc.

## **4. Skokomish Estuary**

**Skokomish Estuary Restoration – Phase 1 Nalley Slough**

This project involved restoration of inter-tidal wetlands on the former Nalley Farm property located on the Skokomish Indian Reservation, within the Skokomish Estuary. Work was focused on the main shore and involved removal of dike surrounding the property on the west side of the Nalley Slough. Borrow pits just landward of the dikes were refilled and leveled in order to allow even tidal flows and promote the natural formation of tidal sloughs. The elevated road network inside the restoration area was removed and replaced with an elevated boardwalk to allow even tidal inundation. The boardwalk allows access to accommodate continued maintenance of the Tacoma Public Utilities high-voltage transmission towers, and to maintain Tribal access to treaty-protected and culturally significant sites.

Specific accomplishments include:

- 115 acres opened to tidal processes
- 1 mile of dike removed
- 2 culverts modified or removed to allow for fish passage
- 3 tide gates altered or removed to allow fish passage
- 110 yards of channel modified or created

Implementation of Phase 1 occurred between 2005 and 2007. The project resulted in 115 acres becoming available to salmonids through dike or berm modification or removal, and opening another 40 acres to fish passage through tide gate alteration or removal. Salt marsh vegetation has also recolonized. Funding for the \$1.3 million project came from the Estuary Salmon Restoration Program (\$990,296), Salmon Recovery Funding Board (\$130,439), and local match (\$220,293).

**Skokomish Estuary Restoration – Phase 2 Nalley Island**

Phase 2 of the Skokomish River Estuary aimed at restoring natural estuarine functions by removal of agricultural dikes and seawall. This project focused on the Skokomish River's lower island, referred to locally as Nalley Island. The purposes of the project were to: restore intertidal wetlands, shellfish habitat, and natural river geomorphology; improve sediment transport; restore critical habitat for endangered salmon; reduce flood severity; and improve dissolved oxygen conditions in Hood Canal. The project involved construction of a 224 foot temporary bridge used to access removal of interior dikes and soils, followed by its subsequent deconstruction; reinforcement of Tacoma Power transmission towers; reconstruction of a PUD power line; restoration of the interior of Nalley Island; removal of culverts and roads; filling of ditches and restoration of natural drainage channels; and removal of dikes and reconnecting historic channels. Specific accomplishments include:

- 215 acres opened to tidal processes
- 2.5 miles of dike removed
- 12 culverts modified or removed to allow for fish passage
- 3 tide gates altered or removed to allow fish passage
- 823 yards of channel modified or created

Implementation of Phase II occurred in 2010-2011 by Quigg Brothers Construction. The project resulted in 213 acres becoming available to salmonids (through dike or berm modification or removal, and opening another 93 acres opened to fish passage altering or removing culverts or tide gates. Funding for the \$2.6 million project was provided by Estuary Salmon Restoration Program (\$90,000), Salmon Recovery Funding Board (\$193,647), and Recreation and Conservation Office (\$2,263,397).

**Skokomish Estuary Restoration – Phase 3A & 3B Skokomish Flats**

Skokomish Estuary Restoration Phase 3, a continuation of Phases 1 and 2, includes wetland and channel connectivity within the Phase I site and additional salt marsh in the western edge of the Skokomish estuary. Phase 3 addressed hydrologic continuity from a forested wetland complex by opening barriers to stream flow and anadromous salmonids. It improved estuarine functions by re-connecting wetland channels through the salt marsh, restoring tidal channels, enhancing roads to connect natural wetland flow or tidal channels, and filling or enhancing ditches for wetland channel habitat.

Because large amounts of fill material needed to be brought in at considerable expense, the project was broken into sub-phases 3A, 3B, and 3C. Collectively, Phases 3A and 3B treatments included recreating and reconnecting tidal channels in historic locations, removal or replacement of partial barrier culverts, installation of 3 bridges, and restoration of man-altered channels. Phase 3A and 3B were completed in 2012 and 2013, respectively. Phase 3C will address hydrologic continuity from a forested wetland complex by opening barriers to stream flow and anadromous salmonids and will be implemented in 2015-2016 (see Present and Future Projects section).

Specific accomplishments of Phase 3A and 3B include the following:

- 33.5 acres opened to tidal processes
- 1.3 acres of estuary treated through fill material removal
- 4 culverts modified or removed to allow for fish passage
- 1,012 yards of channel modified/created
- 8.02 riparian acres and 0.5 miles of streambank planted

The project has resulted in opening 56 acres to fish passage through culvert alteration or removal, benefiting ESA-listed Puget Sound Chinook, Hood Canal summer chum, coastal bull trout and coastal steelhead, as well as Coho and pink salmon and cutthroat. It has also improved habitat for migratory waterfowl and shellfish and increased native vegetation in the estuary. Contractors for the project were Quigg Brothers Construction (Phase 3A) and Jansen Construction (Phase 3B). Funding for the \$1.8 million project has come from several sources:

\$ 539,951	Estuary Salmon Restoration Program
\$ 326,139	Salmon Recovery Funding Board
\$ 405,688	NOAA – Estuary Restoration Act Grant
\$ 100,000	NOAA – Community Restoration Center Grants
\$ 301,090	Puget Sound Acquisition and Restoration
\$ 85,253	US Environmental Protection Agency

### **Skokomish Estuary Tidelands Shellfish Enhancement**

The Skokomish Tidelands have been an important foraging area for Skokomish tribal members for generations. Tribal members frequent the estuary's tidelands to harvest subsistence crab, oysters, and several species of clams. With the health of the estuary returning following recent restoration efforts, as well as water quality improvements and increased monitoring, the Tribe has allocated resources to optimize the tidelands for shellfish production. In addition to providing subsistence harvest opportunity, the tidelands will eventually offer commercial harvest opportunity. The enhanced shellfish resources, for their part, provide a number of ecosystem services including water filtration, habitat complexity, larval production, and shoreline stabilization.

The Tribe has planted clam and oyster seed in various parts of Annas Bay since at least 2003, but with conditions improving for shellfish at the Skokomish estuary tidelands, recent efforts have focused there. Since 2013, the Tribe has planted approximately 18 million seed oysters and about 150,000 seed clams,

with annual additions planned for the foreseeable future. The Tribe has also: removed over 100 pounds of invasive Japanese oyster drills; mapped Olympia oyster aggregations with ideas for future enhancement; monitored oyster recruitment dynamics and supported student and non-profit research; conducted annual population monitoring for oysters and clams; monitored water quality and contributed to Washington State Department of Health status upgrades; and removed several pickup truckloads of debris. Additionally, the Tribe is exploring ways to manage invasive varnish clam populations.

Supporters of the Tribe's tidelands restoration efforts include Hood Canal Oyster Company, Taylor Shellfish, University of Washington, Puget Sound Restoration Fund, Washington Department of Health, and U.S. Fish and Wildlife Service. The Tribe has invested \$120,000 in the project over the past three years.

## ENDNOTES

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**APPENDIX – 2010 Cushman Hydroelectric Project - Key License Articles Pertaining to Channel Conveyance Capacity, Minimum Flows, Fish, Wildlife, and Recreation**

<b>CHANNEL CONVEYANCE CAPACITY - License Article 403</b>
Tacoma will pay up to \$400,000 per year and no more than a total of \$1.2 million towards completion of the Army Corps of Engineers General Investigation study (GI study) of restoration of channel capacity in the mainstem Skokomish River. The purpose of the GI study is to determine the appropriate measures to restore channel capacity and minimize flooding of the mainstem Skokomish River.
Tacoma and the Tribe will cooperate to seek Congressional funding for implementation of measures recommended by the GI study. If Congress fails to appropriate funds to fully restore mainstem channel capacity by year 15 of the Project license, Tacoma shall deposit \$600,000 into the Channel Restoration Fund every five years for the remainder of the license for channel restoration projects.
<b>MINIMUM FLOWS - License Article 407</b>
<u>Component I Base Flow:</u> Tacoma will annually release 160,000 acre feet of water into the North Fork Skokomish from Dam No. 2. Flows will be released to mimic the natural flow changes of the river. Higher flows in the Winter and Spring and lower flows in the Summer and early Fall. Flows will be managed by a Committee that includes a representative of the Tribe and state and federal agencies to provide adequate fish passage.
<u>Component II Flow:</u> Tacoma will release 500 cubic feet per second (cfs), 750 cfs, and 1,000 cfs into the North Fork from Dam No. 2 whenever flows at Staircase Gage in Upper North Fork exceed 3,000 cfs, 4,000 cfs, and 5,000 cfs, respectively. Increase these flows by 5% every five years of the license term. The flow regime is intended to mimic the natural flow changes of the river.
<u>Component III Flow:</u> Tacoma will release “flushing flows” of up to 2,200 cfs for 48 consecutive hours whenever flows at the Potlatch Gage in mainstem Skokomish River exceed 9,800 cfs or 15% above flood stage, whichever is greater. Flows will be released and managed to not exceed the flood stage and are intended to use high flow events to help move sediment and aggregate through the mainstem channel. If, after evaluation, the Fisheries and Habitat Committee determines that these flows are not effective to help move sediment through the mainstem, Tacoma shall provide \$150,000 per year, as adjusted annually for inflation, into a Flood Damage Reduction and Mitigation Fund used for channel restoration activities.
<b>WATER QUALITY ENHANCEMENT PLAN – License Article 410</b>
Tacoma Power will develop a Water Quality Enhancement Plan that includes provisions for: (1) installing emergency intake shutoff valves on all penstock intakes; (2) improving and maintaining Staircase Road to protect water quality; and (3) monitoring dissolved gases at all powerhouse outfalls and spillways, including mechanisms, data recording methods, a schedule, and reasonable enhancement measures if needed to maintain state water quality standards.
<b>FISH HABITAT ENHANCEMENT AND RESTORATION - License Article 412</b>
<u>Project Funding:</u> Tacoma will pay \$3.5 million into an interest bearing Habitat Restoration Fund. Beginning in year five of the Project license, Tacoma shall add \$300,000 plus inflation adjustments into this Fund. The fund may be used for fish and aquatic habitat restoration projects primarily within the North Fork sub-basin. Projects shall include (a) instream structure enhancements; (b) side channel habitat development; (c) removal of existing barriers to upstream migration in North Fork tributaries; and (d) gravel augmentation.
<u>Removal of McTaggart Creek Diversion:</u> Tacoma will remove the McTaggart Creek diversion structure and restore the affected areas. It will replace the existing U.S. Forest Service culvert underlying the U.S.

Forest Service road crossing on McTaggart Creek if the culvert is not replaced prior to issuance of the license. All this work will be done without using funds from the Habitat Restoration Fund.
<b>FISH AND HABITAT MONITORING - License Article 413</b>
Tacoma will develop and implement a fish habitat monitoring program that will include evaluation of: (a) sediment transport and channel characteristics in the mainstem Skokomish River and lower North Fork; (b) fish habitat and habitat restoration projects; (c) lake productivity in Lake Cushman and its effects on juvenile sockeye; (d) water temperature in the North Fork sub-basin; (e) fish populations, including distribution and habitat utilization, in the North Fork; and (f) genetic monitoring. The purpose of the monitoring is to ensure that the flows, passage requirements, supplementation program, habitat projects, etc. are effectively restoring fish populations and habitat.
<b>FISH PASSAGE – License Articles 414-416</b>
<u>414 -Downstream Passage:</u> Tacoma will construct and operate a downstream juvenile collection facility in Lake Cushman that will be capable of providing safe, timely, and effective downstream passage for juvenile salmon, steelhead smolts and kelts, and bull trout. The facility will be located just above Cushman Dam No. 1 at the lower end of Lake Cushman. It will be modeled after multi-million dollar facility recently built by Puget Sound Energy at Baker Lake. Tacoma is required to meet specific performance standards. If such standards are not met, Tacoma will be required to modify the passage facility at the direction of the fisheries agencies.
<u>415 - Upstream Passage:</u> Tacoma will construct and operate upstream trap and haul fish passage facility at the base of Dam No. 2. The facilities will be operated year-round except for an annual maintenance period.
<u>416 - Fish Passage Monitoring Plan:</u> Tacoma will implement a Fish Passage Monitoring Plan to: (1) measure fish survival through the reservoir and fish passage facilities; (2) assess compliance with survival and performance standards; and (3) inform implementation of the fish passage program. This plan will be developed and implemented in consultation with the Tribe and federal and state fisheries agencies.
<b>FISH SUPPLEMENTATION PROGRAM- License Article 417</b>
<u>Fish Supplementation Program:</u> Tacoma will implement a program to supplement sockeye, spring Chinook, winter Steelhead, and Coho in the North Fork Skokomish River. The program is designed to meet annual production targets of: (a) Sockeye: 2,000,000 sockeye fry (6,663 pounds); (b) Spring Chinook: 300,000 fingerling/75,000 yearling (13,500 pounds); (c) Winter Steelhead: 15,000 smolts/225 adults (3,675 pounds); and (d) Coho: 10,000 to 35,000 smolts (666 to 2,333 pounds).
<u>New Hatchery/Supplementation Facilities:</u> Tacoma will construct and operate new sockeye hatchery to meet production targets, likely at Saltwater Park. It will also construct and operate additional adult holding, spawning, egg incubation, and rearing facilities for spring Chinook, steelhead, and Coho, likely near Lake Kokanee.
<u>Monitoring:</u> Tacoma will develop and implement a Hatchery Monitoring Plan in consultation with Tribe, and federal and state fisheries agencies.
<b>COMPREHENSIVE WILDLIFE HABITAT ENHANCEMENT PLAN - License Article 421</b>
Tacoma Power will develop and implement a Terrestrial Resources Protection Plan (Terrestrial Plan) to protect plant and wildlife resources on project properties. The Terrestrial Plan requires two components: a mitigation plan that includes measures to minimize adverse effects on terrestrial resources during project construction; and a monitoring and protection plan that includes monitoring and protection measures for terrestrial resources during project operation.
<u>Land Acquisition:</u> Tacoma will acquire an additional 430 acres of land in the North Fork Skokomish basin and 320 acres in the South Fork Skokomish basin for the purpose of enhancing native plants and wildlife populations near the Project.

<p><b>Land Management:</b> Tacoma will manage a total of 2,332 acres of lands in the North Fork Skokomish basin and 480 acres in the South Fork Skokomish basin for the maintenance and enhancement of wildlife populations.</p>
<p><b>Enhancement Activities:</b> Tacoma will perform specific wildlife enhancement activities: (1) constructing and maintaining up to 200 acres of elk forage fields; (2) constructing three osprey nesting structures on project reservoirs; (3) protecting and preserving all suitable bald eagle and osprey perching, roosting, and nesting sites on managed wildlife lands; (4) thinning 200 acres of dense forest; (5) create 300 snags; and (6) install and maintain 20 wood duck nest boxes.</p>
<p><b>THREATENED AND ENDANGERED SPECIES PLAN – License Article 423</b></p>
<p>Tacoma will develop a Threatened and Endangered Species Protection Plan. This plan requires measures to protect the peregrine falcon, bald eagle, marbled murrelet, and spotted owl during construction and operation of the project. It also includes measures to Puget Sound Chinook salmon, Puget Sound Steelhead, Hood Canal summer-run chum salmon, and bull trout.</p>
<p><b>RECREATION PLAN – License Article 425</b></p>
<p>Tacoma will upgrade Big Creek Campground and other formal and informal recreation sites managed on Tacoma Power and US Forest Service properties. Tacoma will make improvements to the day-use recreational sites along Staircase Road, Mount Rose trailhead access road and parking area, and Bear Gulch day-use site.</p>
<p><b>FISHERIES AND HABITAT COMMITTEE - License Article 432</b></p>
<p>Tacoma shall establish and convene a Fisheries and Habitat Committee (FHC) for the purpose of consultation with the licensee as expressly provided in specific license articles and settlement agreement Appendix 3. In addition to the entities identified in the settlement agreement, the licensee shall also invite the National Park Service to participate on the Fisheries and Habitat Committee.</p>