Quillayute Watershed Prioritized Salmon Restoration Projects

Produced For

Quileute Natural Resources, LaPush Washington

By

John W. (Jay) Hunter, September 2006

Quillayute Watershed

Prioritized Salmon Restoration Projects

TABLE OF CONTENTS

Quillayute Basin Salmonid Restoration Projects

The Quileute Tribe located at La Push on the Northwest Coast of Washington has a long and productive history of salmonid restoration and enhancement projects in the Quillayute basin. This report is a summary of prioritized proposed salmonid enhancement projects from the entities involved with the land, water and roads of this watershed. Funding for this project was acquired from the Bureau of Indian Affairs (BIA).

Executive Summary

Every effort was made to involve all the entities involved with Quillayute watershed habitat management and to obtain salmonid restoration project recommendations. Project recommendations were integrated with watershed analysis reports to utilize the recommendations and priorities within those reports. Individual and group meetings along with extensive communication efforts have resulted in priority project listings.

The salmon restoration project listings are grouped by the top priority projects followed by high priority projects and significant projects. Top priority projects include connecting habitats by replacing fish barrier culverts, removing adverse impacts from roads by decommissioning them, adding large woody debris to streams and the conversion of deciduous riparian zones to conifers. Removal of the invasive species Japanese Knotweed from the riparian zone is a top priority.

Acknowledgements

The Quileute Natural Resources staff under the direction of Mel Moon provided exceptional support for this project. Katie Krueger, Frank Geyer and Kris Northcut have extensive knowledge of the Quillayute watershed and environments. Their valuable input and guidance was critical to the success of this project.

It took a lot of time and effort for several people to assist in the information gathering for their extensive road management jurisdictions:

- Rayonier – Ian MacIver, Meghan Tuttle, Julie Dieu
- U.S. Forest Service – Phil DeCillis
- WA. Dept. of Natural Resources – William Traub

Many years of salmonid restoration projects and local knowledge were represented by:

- Pacific Coast Salmon Coalition – Carl Chastain
- WA. Dept. of Fish and Wildlife – Dave King, Theresa Powell

Project Outline and Objectives

The Quileute Tribe obtained a BIA grant to prioritize salmon restoration projects within the Quillayute watershed. The Tribe hired John W. (Jay) Hunter to perform this work. Jay Hunter is a retired Washington Department of Fish and Wildlife fish biologist with extensive background in watershed analysis and fish habitat requirements. The project required review of all Quillayute watershed assessments, determination of what restoration has been done and what remains to be accomplished. Interaction with landowners, local governments and stakeholders involved in Quillayute watershed reports and activities was critical to the development of salmonid project restoration priorities. The final objective is to develop a prioritized list of salmon restoration projects along with supportive data and agreement by those involved in the process.

Steve Rondeau contracted to place project locations on GIS maps for exact location of the sites. This information is available in a separate report form from Quileute Natural Resources.

COVER PAGE

The cover page illustrates several of the habitat types that are significant influences in the Quillayute Watershed.

Road maintenance and abandonment plans by large land-managers recognize the need to reduce the impacts to salmonid waters from the many road systems throughout this watershed. All the government and landowner “resource stewards” contacted are working hard annually to improve their roads and culverts and to reduce any adverse impacts to surface waters.

Road decommissioning and fish-passable culverts are a important component to salmon habitat restoration and are a high priority in the Quillayute Watershed.

Watershed environments are a reflection of historic and current activities. An old bridge site in an alder dominated riparian zone and agricultural exposed banks are part of the Quillayute environment.

Quillayute Watershed Background

The Quillayute River is one of the largest and most productive river systems on the Washington coast. Five major rivers combine to form the Quillayute system. The Dickey, Sol Duc, Sitkum, Calawah and Bogachiel Rivers drain the Northwest Olympic Peninsula westerly to the Pacific Ocean. The headwaters of these rivers generally originate in the Olympic National Park (ONP) from the Olympic Mountains, except the Dickey which originates in lower elevations west of the Olympics.

The Quillayute River has a very short mainstem of some 5.5 river miles. At river mile 5.5 the Bogachiel and Sol Duc River Systems combine to form the Quillayute. The Dickey River enters the Quillayute one mile from the Pacific, and shares a common but limited estuary. The Calawah River joins the Bogachiel at river mile 8.5 near Forks, Washington, 20 miles from the mouth of the Quillayute River at La Push. The Sitkum River joins the South Fork Calawah at river mile 16.2. The Quillayute River System alone drains over 825 square miles, or over 800,000 acres.

The area experiences some 120-140 inches of rainfall per year, being located in one of three temperate rain forests in the world. All of the rivers have extensive tributary systems with forestry activities common outside the Olympic National Park boundaries. The Dickey has significant wetlands and is largely a low-velocity, low gradient system. The other rivers originate in the Olympic highlands with relatively steep terrain which becomes more gradual some 15 miles from the Pacific.

The Olympic National Park owns the largest percentage of the coastal lands and the very highest reaches of the Olympic Mountains. This includes the headwaters of the upper Sol Duc, Calawah, Sitkum and Bogachiel Rivers. The USFS manages the lands downstream of the Park (middle altitudes). Private timber and state lands are downstream from the USFS holdings. Rayonier is the largest private timber landowner in the watershed. The City of Forks is the only incorporated city with the two small towns of Beaver and Sappho in the Sol Duc watershed.

Quileute Tribal Usual and Accustomed Area (U & A)

Included in this report are salmon restoration projects outside the Quillayute drainage but within the Quileute Tribal “Usual and Accustomed” area. The Ozette drainage, Cedar Creek, and Goodman Creek fall within this area. Recommended projects in these drainages are listed at the bottom of Attachment A, Quillayute Salmon Projects by Drainage.

Prior Watershed Reports and Activities

Three watershed analyses were completed between 1995 and 1999; Sol Duc, North Fork Calawah, and Sitkum-South Fork Calawah. The East/West Dickey WSA was not officially completed but significant report information was developed. In 2000 the Washington Conservation Commission completed the report "Salmon and Steelhead Habitat Limiting Factors in the North Washington Rivers of WRIA 20". This report included a list of salmon restoration projects for the Quillayute basin. A summary of these documents is included in the following pages.

In 2000-2003 the Quileute Tribe assessed fish habitat in the Bogachiel (unpublished), using Washington Department of Natural Resources (WDNR) protocol. The Bogachiel mainstem was completed in 2000, lower tributaries in 2001, middle tributaries in 2002, and upper tributaries to the Park boundary in 2002.

The Olympic National Park has assessed fish habitat for the Bogachiel watershed above the Park boundary.

In 2004 the Quileute Tribe assessed fish habitat in Coal Creek of the Dickey (unpublished) using WDNR protocol.

In 2004 USFS completed a draft of aquatic and wildlife habitat conditions in the Pacific Region (for their lands only). They also finished a Draft Environmental Impact Statement (DEIS) on invasive weeds, which are a habitat problem for the Riparian Management Zone (RMZ).

The WDNR maintains a comprehensive "Road Maintenance and Abandonment Plans" (RMAP) program for their holdings, often in cooperation with timber company holdings, which is a valuable tool for culvert assessment and road management activities. WDNR approves and warehouses all RMAP's for those landowners large and small who are required to develop RMAP's.

Rayonier maintains a comprehensive "Road Maintenance and Abandonment Plans" (RMAP) program for their holdings. These plans include all roads and culverts subdivided into categories such as Fish Passage, including Fish Barriers, Mass Wasting Activities, Mass Wasting Pipes, and Surface Erosion.

Prior Watershed Reports: A summary of information, priorities, recommendations.

These reports were reviewed and information applied to salmon project prioritization. Included is information from North Olympic Peninsula Lead Entity (NOPLE) reports as well as those listed above. This summary is included as an environmental background to each of the significant drainages within the Quillayute Watershed and to outline historic accomplishments of the Quileute Tribe.

Sol Duc Pilot Watershed Analysis, Oct 30, 1995

This report contains extensive material divided into many chapters comprising hundreds of pages of analysis and information.

The Sol Duc sub-basin upper reaches lie in the Olympic National Park (ONP) and downstream in timber, agricultural, and residential managed lands. Downstream of the ONP excessive sedimentation is a problem mostly from landslides. High road densities contribute to this problem. Poor large woody debris (LWD) and riparian problems exist. Low summer stream flows associated with water withdrawals and natural geomorphology result in warm water conditions. Wetland habitats are limited.

The most important density independent processes that may affect salmonid populations in the Sol Duc basin are fine sediment intrusions of spawning gravels and cobble refuge habitat, the loss of pool habitat where LWD is the dominant control and loss of cover and winter refuge habitat provided by debris jams. Several streams go dry during the summer rearing period and a few barriers to upstream migration exist.

The most significant restoration opportunities are in riparian and adjacent areas that supply LWD. Decreased inputs of coarse and fine sediments are strongly advocated. Fish passage problems should be remedied.

Watershed General Recommendations:

- Increase channel complexity and roughness.
- Decrease pool spacing and increase residual pool volume.
- Increase the conifer component in riparian communities.
- Manage riparian and instream areas for LWD.
- Increase low flow rearing area and maintain fish passage.
- Modify all unnatural barriers or flow limitations to fish passage, except for LWD.
- Reduce fine sediment inputs to natural background rates.
- Prioritize actions to conserve and expand locally significant habitats.
- Implement a Riparian Reserve system on Federal lands.

North Fork Calawah, Rayonier, USFS, Sept 1997, Sitkum-South Fork Calawah, USFS, Sept. 1998. (Two Reports)

These two reports contain extensive material with many chapters of analysis and information. The Sitkum River joins the North and South Fork Calawah to form the Calawah watershed. Above its confluence with the Sitkum the South Fork Calawah lies entirely within the ONP. Except for parts of the Lost Creek drainage, all remaining parts of the lower South Fork and Sitkum River watershed flow through forested lands managed for timber production.

The Calawah sub-basin has extensive landslide problems, mostly related to older roads. Side-cast roads are a particular concern, and in general high road densities are found in the South Fork Calawah and in the headwaters of the North Fork Calawah. The excessive sedimentation is thought to contribute to dewatering in Hyas Creek, the North Fork Sitkum River, and Rainbow Creek. Channel instability is a major problem and is likely a result of the excessive sedimentation, low levels of LWD and riparian road impacts.

In the North Fork Calawah, the single most important component of fish habitat that has been altered is the input of coniferous LWD to the stream. Most of the in-channel LWD is composed of alders and small conifers which has a limited influence on habitat formation in the large tributaries and mainstem. Coniferous LWD is needed in the larger tributaries and mainstem areas.

The 1951 Forks Fire drastically impacted the riparian zone by removal or loss of all large conifers in much of the upper watershed; Hyas Creek, NF and SF Calawah. Recruitment of LWD to the stream channel has been lacking for over five decades.

Watershed General Recommendations:

- Restoration should focus on preventing large mass wasting events that deliver directly to the Sitkum and North Fork Sitkum Rivers and Hyas Creek.
- Decommission road segments identified with high mass wasting potential.
- Opportunities in Hyas Creek include restoring conifers in hardwood dominated riparian areas and instream LWD placement.
- Restore riparian function by releasing suppressed conifers where possible and interplanting where conifers are lacking.

Bogachiel Basin: NOPLE and QNR Information

The Bogachiel headwaters originate in the ONP and generally flow west towards the Pacific Ocean. Downstream of the ONP, poor riparian and LWD conditions exist in many areas. Collapsing banks are a problem along the lower mainstem and fines from exposed clay layers likely degrade spawning habitat. Warm water temperatures are a documented habitat problem in the lower Bogachiel.

The Bogachiel sub-basin is lacking in specific data regarding many habitat conditions and additional studies are needed to define several habitat needs.

Summary Of FY 2000 Prior Culvert and Road Assessment Survey On The Bogachiel River, Quillayute System, Clallam Co. Washington, By The Quileute Tribe. Katherine Kruger.

This was a BIA funded grant for a culvert assessment on the Bogachiel River. The tribal Timber Fish and Wildlife Biologist and two tribal technicians attended Washington Department of Fish and Wildlife (WDFW) culvert assessment training.

Thirty-seven culverts owned by four entities (WDNR, Rayonier, Clallam Co., Jefferson Co.) were assessed. None of the 37 culverts passed WDFW's assessment criteria and all need additional assessments to prioritize replacement.

Cross drains that redirect sediments to the forest floor from ditches were also assessed. Seventy-one cross drains were assessed to determine sediment input into streams. Fifty-three of the seventy-one cross drains preformed adequately. All of the cross drains have silt traps before and after entering the pipe bringing the fine sediment delivery to the stream under 1% of the total. This amount is immeasurable and therefore all cross drains passed the evaluation.

A tributary and wetland identification study was done that identified 29 new tributaries. Six of these tributaries had associated wetlands within 500 meters of the mouth. All GPS data was transferred to the GIS map of the watershed.

Summary Of Lower Bogachiel Stream typing Survey of Weeden, Maxfield and Murphy Creeks, Quileute Tribe FY 2001, Katherine Krueger.

Quileute technicians under the supervision of a tribal fisheries biologist walked the extent of three major tributaries of the Lower Bogachiel. Over 23 river miles were recategorized from non-fishbearing to fish bearing, nearly 16 river miles were categorized from type 5 to type 4, allowing better buffers to be established. Twenty river miles of unknown drainage was categorized as type 5 waters. Culverts: 37 were passable, 123 not passable. Cross drains: 173 noted and all were functioning.

Summary Of Upper Bogachiel Streamtyping Survey of Dowans, Hemphill, and Kahkwa Creeks, Quileute Tribe FY 2003, Katherine Krueger.

Quileute technicians under the supervision of a tribal fisheries biologist walked the extent of three major tributaries to the upper Bogachiel. Over 24 river miles were recategorized from non-fishbearing to fishbearing. Culverts: 41 total, 23 were passable, 18 not passable. Cross drains: 85 noted and all were functioning.

East/West Dickey Watershed Analysis

The mouth of the Dickey River enters the Quillayute River approximately one mile from the Pacific Ocean in West Clallam County, Washington. The Dickey watershed is a low gradient system with three major rivers; West, Middle and East Fork Dickey. Major tributaries include Thunder, Skunk, Squaw, Coal and Colby Creeks along with Dickey Lake. The East and Middle Dickey Rivers drain the hills that separate the Dickey from the Hoko watershed. They have a greater range of gradient and habitat features than the West Dickey. Throughout the Dickey watershed, fine sediment levels are generally high with extensive substrate embeddedness. One major source of fine sediments is from roads and is worsened by the high precipitation levels and road surfacing materials.

The Dickey sub-basin consists of plentiful sloughs, wetlands and small streams that are well suited to coho production. Because of the low-gradient nature mass wasting is

rare, however sedimentation from roads remains a problem. Riparian damage from windthrow is common as strong winter storm winds blow down the stream buffers left after logging. Warm water temperatures are a problem and may contribute to the increased distribution of squawfish, a known salmonid predator. Riparian roads impact floodplain conditions and adjacent wetlands. Flooding in 1999 washed out LWD in the East Fork and LWD levels remain low in mainstem areas.

Mid-grant Report for BIA Grant: Baseline Monitoring in the Dickey River, a sub-basin of the Quillayute Watershed, Quileute Natural Resources, 2004.

The Dickey mainstem extends up-stream for approximately 8 ½ miles and has two major tributaries, Coal Creek and Colby Creek both of which are greater than five square miles in area. The Quileute Tribe assessed the entire Coal Creek drainage which is approximately nine square miles in size, the third largest tributary within the Dickey watershed.

The assessment was done according to Section 13 "Guidelines for determining fish use for the purpose of typing waters." under WAC 222-16-031. Surveys started May 15th and ended on July 14, 2004. Measurements were taken every 50 feet, including bank full width, gradient, and wetted width of the stream. Extensive and valuable data was obtained resulting in an additional 112,644 linear feet of documented fish use habitat. This equals approximately 21.33 linear miles of habitat upgrades.

Salmon and Steelhead Habitat Limiting Factors in the North Washington Rivers of WRIA 20, March 2000

In 2000 the Washington Conservation Commission completed this report with input and support of twenty individuals comprising the Technical Advisory Group for Habitat Limiting Factors in WRIA 20. This group was associated with salmon restoration in the Quillayute watershed as well as those waters outside the Quillayute basin and in WRIA 20.

This report included a list of salmon restoration projects for the Quillayute basin. These recommended restoration projects were sorted by project sponsor and project lists were distributed for review, input and comments. The project sponsors who were sent lists of their recommendations included: Washington Department of Transportation, U.S. Forest Service, Washington Department of Fish and Wildlife, Rayonier.

Review of these recommended salmon restoration projects by Frank Geyer and Kris Northcut of Quileute Natural Resources (QNR) resulted in identification of several priority projects included in this project's evaluations.

Prioritization Publication

A guideline publication consulted in this process was “A Review of Stream Restoration Techniques and a Hierarchical Strategy for Prioritizing Restoration in Pacific Northwest Watersheds”, Roni, Beechie, Bilby, Leonetti, Pollock and Pess. National Marine Fisheries Service.

This publication does an analysis of several types of restoration projects and their effects on several salmonid species over time. Several recommendations are promoted including the following:

> “Restoration focus on reconnecting isolated high-quality fish habitats such as instream or off-channel habitat made inaccessible by culverts or other man-made obstructions. Once the connectivity of habitats within a basin has been restored, efforts should focus on restoring hydrology, geologic (sediment delivery and routing), and riparian processes through road decommissioning and maintenance, exclusion of livestock, and restoration of riparian areas.”

Stakeholders and Cooperators

Many individuals, state and federal agencies, timber companies and tribal representatives were contacted for salmonid enhancement project information. The major contributors included Washington Department of Fish and Wildlife, Washington Department of Natural Resources, U.S. Forest Service, Pacific Coast Salmon Coalition, Rayonier, Green Crow, Merrill & Ring, City of Forks and Quileute Natural Resources Tribal biologists.

Involvement Process

Initial contacts with those listed as contributors to past Quillayute Watershed Analysis documents began in November 2005. Individuals were asked about salmonid restoration projects in the Quillayute watershed. Many people had changed jobs and work responsibilities over the past decade and felt that they were not current in their understanding of what had been accomplished and what should be done next. Over the next six months contact recommendations and referrals resulted in a list of those currently working with habitat projects in the Quillayute watershed.

Road management and riparian projects by WDNR, USFS, and timber companies makes them key players in habitat activities affecting fish. Those activities being culvert replacements and upgrades, sediment control measures, riparian plantings, road abandonment and large woody debris placement.

The experience from locally sponsored salmon restoration projects by the Pacific Coast Salmon Coalition and Washington Dept. of Fish and Wildlife was included in this process.

The major agency/company representatives who participated and contributed to this project were:

U.S. Forest Service – Phil DeCillis
WA. Dept. of Natural Resources – William Traub
WA. Dept. of Fish and Wildlife – Dave King, Theresa Powell
City of Forks – Rod Fleck
Quileute Natural Resources – Katie Krueger, Frank Geyer, Kris Northcut
Pacific Coast Salmon Coalition – Carl Chastain
Rayonier – Ian MacIver, Meghan Tuttle, Julie Dieu
Green Crow – Harry Bell
Merrill Ring – Joe Murray

Several agency/company representatives who were contacted and communicated with regarding this project were:

U of W Center, Forks - John Calhoun
WA. Conservation Commission - Dr Carol Smith
Hoh Tribe - Tim Snowden
Olympic National Park - Pat Crain
Clallam Co. – Cathy Lear, Julie Trigs, Comm. Develop.
WDFW – Roger Mosley, Dave Nettnin, Chris Byrnes, Jeff Haymes, Randy Johnson, Tera Hegy, Anne Shafer, David Low
DNR – Eric Carlson, Al Vaughan, Charlie Cortelyou
USFS – Edward Olmedo
City of Forks – Dan Lienan
Merrill & Ring – Norm Schaaf
Rayonier – Bill Peach

Culvert Funding

Culvert project funding has considerations that impact which projects meet funding criteria. The Washington Salmon Recovery Funding Board has a position of not funding culverts for those with state required (FFR) culvert obligations. The BIA is involved with a Tribal US vs Washington lawsuit and at this time will not fund state culverts.
Those projects have an asterisk after them in the listings. (*)
* funding currently blocked by ongoing federal or state litigation

Restoration Priorities, Aug 14, 2006 Meeting

The stakeholders involved in the Quillayute Basin submitted recommended salmon restoration projects to be considered by this project. (See attachments "A through J"). In many cases priority projects within a list of proposals were indicated by the proponents. These priority project recommendations were discussed and considered at an August 14, 2006 meeting at the Quileute Natural Resources office in LaPush. The following list of considerations was developed at that meeting to assist in determining project priorities.

Attendance at the August 14th meeting:

Katie Krueger, QNR
Frank Geyer, QNR
Kris Northcut, QNR
Jay Hunter, QNR
Ian MacIver, Rayonier
Meghan Tuttle, Rayonier
Joe Murray, Merrill & Ring
Anne Shafer, WDFW
Dave King, WDFW

Input for the meeting was received from Phil DeCillis USFS, Bill Traub DNR and the other major representatives listed previously. This information was distributed ahead of time and considered by those in attendance when recommending project priorities.

Considerations for Quileute Grant Request Salmon Restoration Projects

1) Identified in prior assessments
2) Large/significant habitat above blockage
3) Multiple species use
4) Cost of project
5) Possible partners, matching monies
6) Tied to other or completed projects
7) Time urgency
8) Momentum, current interest in that type of project
9) ESA concerns, ESA driver stock species: Fall Coho, Fall Chinook
10) Restoration uses Quileute technical staff, preferred by Tribal Council

Those in attendance and those who have been in contact through phone and e-mail communication have had a list of all recommended projects by sponsor for weeks prior to the meeting. This gave all involved time to review projects and make recommendations and adjustments. The top projects recommended by this group and others not in attendance are listed in the following information.

Quillayute Watershed Top Priority Projects

Goodman Cr., Sol Duc, Road Decommissioning. USFS 2931-100 road
Unfunded - Large fills, prone to failure; will deliver directly into very productive Goodman Cr.

SF Sol Duc, Sol Duc, Road Decommissioning. USFS 2918-100, 2918-110 roads
Unfunded - History of failures delivering into SF Sol Duc River

Sitkum R., SF Calawah, Road Decommissioning. USFS 2912, 2912-060 road
Unfunded - History of failures delivering into SF Calawah River

Camp Cr. Sol Duc, Culvert to Bridge, MR & PCSC, $250K
Sponsored by PCSC, Merrill Ring and USFS

NF Calawah, south shore above fire area, LWD placement, Rayonier

Coal Cr., Dickey, Culvert to Bridge, 5000 Line Rd. Rayonier
$452,000 cost est. A previously recognized co-op project that did not get completed.

Japanese Knotweed eradication, Throughout the Quillayute Watershed. QNR
QNR has been very successful in the Dickey system with Knotweed removal.
This "time sensitive" basin-wide project is a high priority.
Sol Duc River drainage
Calawah River drainage
Bogachiel River drainage

DNR * projects that may have funding for 2007
Maxfield Cr., Bogachiel, culvert, DNR
Dry Cr. Trib. , Bogachiel, 2 DNR Culverts
May Cr., Bogachiel, DNR Culvert

High Priority Projects

Gunderson Cr. Sol Duc. T29R13W-8. Culvert Replace. DNR *
NF Calawah, south shore above fire area, Alder to Conifer, Rayonier
Trib to Skunk Cr. EF Dickey. T30R14W-9.RY-9000, 317+20. culvert. DNR*
High Priority. Habitat gain and existing culverts undersized for flood waters. 29,800' above.
Trib to Thunder Cr. Dickey. T30T14W-10. over 1100'. D5200 432+08. DNR*
Shuwah Cr. (0311), Sol Duc. LWD Placement. PCSC
Shuwah Cr Trib. Sol Duc. T29R13W-1. Culvert Replace. DNR *
CL000729 Fish passage culvert. Lk Cr Trib Lk Pleasant. Sol Duc. Rayonier
CL012690 Fish passage culvert. Coal Cr Trib, WF.Dickey. 1+mi. Rayonier

Significant Non-Prioritized Projects

Following the previous top and high priority project lists are the following significant projects whose importance is determined by the amount of habitat gained or compatibility with recommendations of Watershed Analysis reports. Additional information on individual projects may be found in the attachment information by project sponsor.

The projects are grouped by watershed.

Bear Cr., Sol Duc. Culvert Replacement. FS 3000Rd. MP 4.6. USFS
Bear Cr., Sol Duc. LWD. @ 2.0 mi. Bear Cr. USFS
SF Sol Duc, Sol Duc. LWD @ 2.0 mi. Sol Duc. USFS
SF Sol Duc. Sol Duc. Road Stabilization. FS 2920 road. USFS
Sol Duc Trib. # 20.0335, Culvert @ RM 0.4. WRIA 20 Report
Beaver Cr. (0324), Sol Duc. Culvert and off-channel ponds. PCSC
Lake Cr Trib. Sol Duc. Culvert Cleanout CL 000729. Rayonier
Wisen Cr. (0336?), Sol Duc. Three? Culvert replacements. PCSC
EF Gunderson Trib # 20.0118, Culvert @ RM 0.1. WRIA 20 Report
Gunderson Cr. (0304), Sol Duc. Off-channel Ponds. PCSC
EF Gunderson Cr. Trib # 20.0304a, Culvert @ RM 0.5. WRIA 20 Report

Sitkum R., SF Calawah. Road Decommissioning. FS 2923-015. USFS
Sitkum R., SF Calawah. Road Stabilization. FS 2900 "A" road. USFS
NF Calawah, south shore. Calawah. Alder to Conifer. Above Fire Area. Rayonier
Trib of Trib. NF Calawah R. Culvert Replace CL101001, Rayonier

Mill Cr. Bogachiel. Culvert Replace City of Forks
Bear Cr Trib. Bogachiel. T28R13W-8. Culvert Replace. DNR *

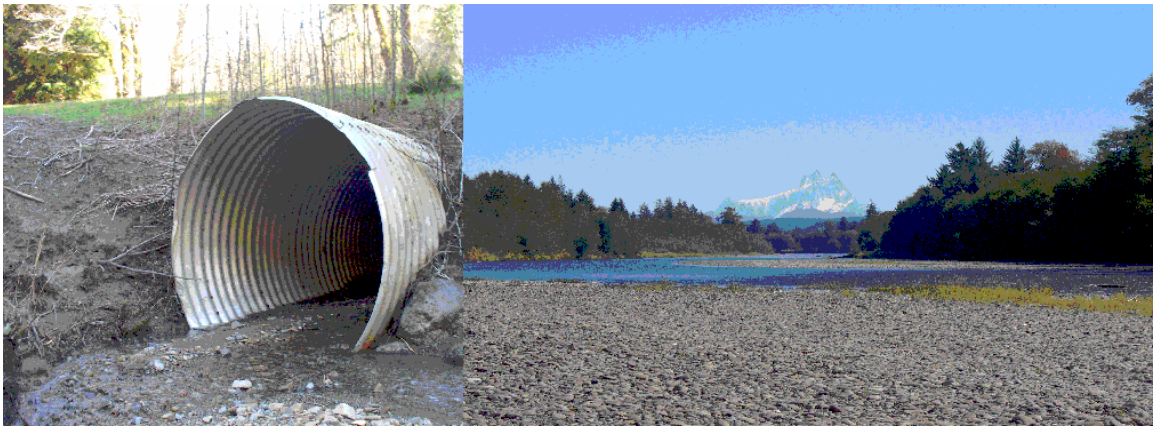
Trib to Trib. Lower Dickey R. Culvert Replace CL006896, Rayonier
Sands Cr Trib. Dickey Lk. Culvert Replace CL000893, Rayonier
WF Dickey Trib. # 20.0138, Culvert @ RM 0.3 WRIA 20 Report
Ponds Cr Trib.# 20.0155. Culvert @ RM 1.6, WRIA 20 Report
EF Dickey R. Trib. # 20.0114, Culvert @ RM 1.5. WRIA 20 Report
WF Dickey Trib. # 20.0114ax, Culvert @ RM 0.9 WRIA 20 Report
EF Dickey Trib. T29R14W-4, Culvert Replace. DNR *
Thunder Cr Trib. EF Dickey R. T30R13W-10. Culvert Replace. DNR*
Gunderson Cr Trib. EF Dickey. # 20.118, Culvert @ RM 1.4 WRIA 20 Report
EF Gunderson Trib. EF Dickey. # 20.0118, Culvert @ RM 0.1. WRIA 20 Report

The following Coal Cr culverts may be repeated as description data varies:
Coal Cr Trib. Dickey R. T29R15W-25. D5320, 57+16. Culvert Replace. DNR *
Coal Cr Trib. Dickey R. T29R15W-5. D5000, 267+74. Culvert Replace. DNR *
Coal Cr Trib. Dickey R.. Culvert Replace CL012690, Rayonier
Coal Cr. Trib. Dickey R. Culvert Replace CL009486, Rayonier
Coal Cr. Tribs: Culvert Replacements: (A-24,2), (A-23,7), (A-29A,2), (A-42,6), (A-20,8), QNR

Habitat Concerns Not Covered In The Priority Projects

Two environmental concerns very important to the Quillayute Watershed are low summer stream flows and the Quillayute River, Pacific Ocean estuary. The opportunities to improve the existing conditions are limited and no restoration recommendations were received during this project.

The lack of recommended projects in these two environments does not diminish the critical need to maintain adequate stream flows and a healthy estuary.



Several species of salmonids reside in the streams of the Quillayute system year-round. The lowest flow that a stream carries in the late summer or early fall determines the amount of rearing space and microhabitats available to juvenile salmonids. The smallest wetted area also determines the limiting area for aquatic insects and other fish food organisms to live. Upstream fall passage by adult Coho or Chinook is often restricted by shallow riffles and streams. The Sol Duc River is one example of low flow concerns.

The Quillayute River estuary enters the Pacific Ocean at La Push. The open ocean waves are restricted by a jetty that protects the harbor and town. The islands offshore are part of Washinton's Olympic Coast National Marine Sancuary. Home to a large variety of wildlife, the estuary plays a large role in the health of the Quillayute River Watershed.

The Following Attachments Provide Additional Information on Restoration Projects

Attachment A: Quillayute Salmon Projects by Drainage, 5p

Attachment B: USFS Projects

Attachment C: Rayonier Projects

Attachment D: WDNR Projects, 3p

Attachment E: WRIA 20 Report Projects, 2p

Attachment F: QNR Projects (Dickey)

Attachment G: PCSC Projects

Attachment H: Invasive Species Projects

Attachment I: City of Forks, Merrill Ring, Green Crow Projects

Attachment J: Past Projects, 2p