Quileute Tribe

Nonpoint Source Management Report

FY 2014 revised from 2009

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1. Overview:

The Tribe is updating this Nonpoint Source Pollution Management Plan (NPSPMP) as the second step to control sedimentation in the Quillayute River, where it passes through the Quileute reservation, under Treatment as a State for Water Quality and Clean Water Act Section 319. It sets forth programmatic presentations to implement certain key findings in the Nonpoint Source Pollution Assessment. It is the conclusion of that Assessment that sediment problems

arise from the Usual and Accustomed Treaty area in the four rivers that flow into the 5.5-mile Quillayute Mainstem, of which the last mile is in the reservation before the Quillayute flows into the Pacific Ocean. In reviewing sources of NPSP in the Quillayute, we have no new sources of pollution. Climate change may aggravate certain conditions (increased precipitation and local flooding, leading to suspended solids from runoff.) We do have specific ideas regarding broad categories under the original (now expiring) plan, for where we can perform restoration on the ground to address NPSP. That is where we will address changes. Further, Quileute with its treaty partners, the Hoh and Quinault, in January of 2014 received notice of an award a grant from BIA to assess climate change vulnerabilities. The report is over 12 months away but if it proves advisable to integrate results into this plan, we will do another update in the latter part of FY 2015.

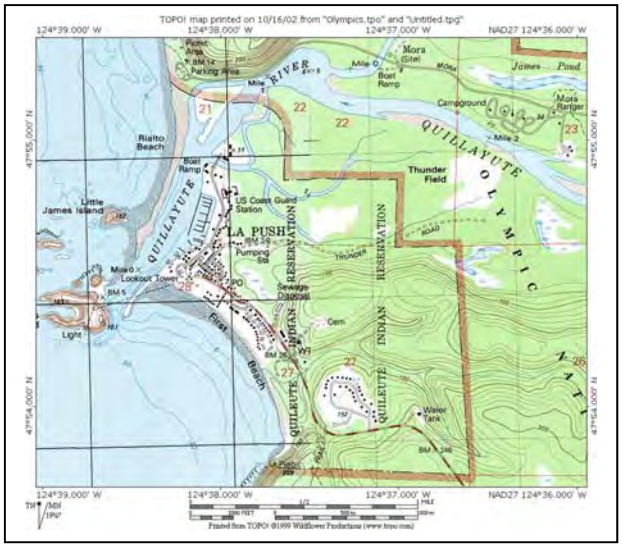
There are three primary sources of this sediment. First, highlands in Olympic National Forest and Olympic National Park are sometimes subject to natural mass wasting, perhaps triggered by earthquakes. Second, clear-cutting exposes soil to the 140-inch rainfall out here. Even when operators replant in a timely fashion, the seedlings cannot possibly take in all the rain that mature trees did. Clearing also disrupts the groundcover, which takes time to grow back. Most of the acreage of the 850 square miles of Quillayute River Basin is forest land and of that over half is private or state timber that is being harvested from time to time. Third, knotweed canes have invaded the river banks in the Basin. Knotweed displaces native plants that do a more efficient job of providing shade and securing the river bank. Since 2003 the Quileute have assessed, mapped, taken training and certification, and eradicated knotweed in most of the Basin, with the partnering of Clallam County and Olympic National Park. The Lower Quillayute River remains to complete as well as repeating parts where knotweed shoots are still persistently emerging from rhizomes. Our funds from USFWS have been used. Sites with knotweed been GIS-mapped as part of various program funds received the past five years to eradicate it. We have trained personnel. We need more funds to implement the eradication.

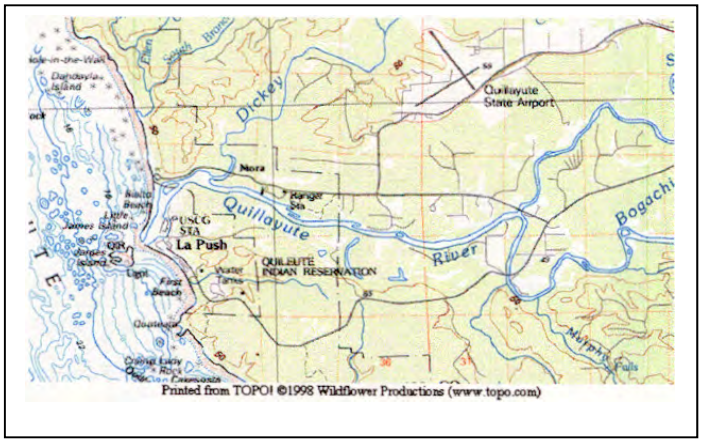
The result of sediment influx in the tributary system is the sediment load in the Quillayute estuary, which has greatly shallowed it and changed its ecology. Sometimes the access to the Pacific is not feasible. The marina function is impaired. The waters near sandbars and banks will have to become warmer, especially at low tide. The 10 runs of salmon, the smelt and anchovies, the pelicans and eagles, the ducks, and the marine mammals all can be impacted by this change in river ecology. Therefore dredging is increasingly necessary.

Some years, the Army Corps of Engineers only dredges a path for the USCG to exit for maneuvers and rescues. It does not do more because of funding. This year our local Congressman went to bat for us and we got last-minute ACOE funding to clear the river exit but we can't be sure that will always be the case.

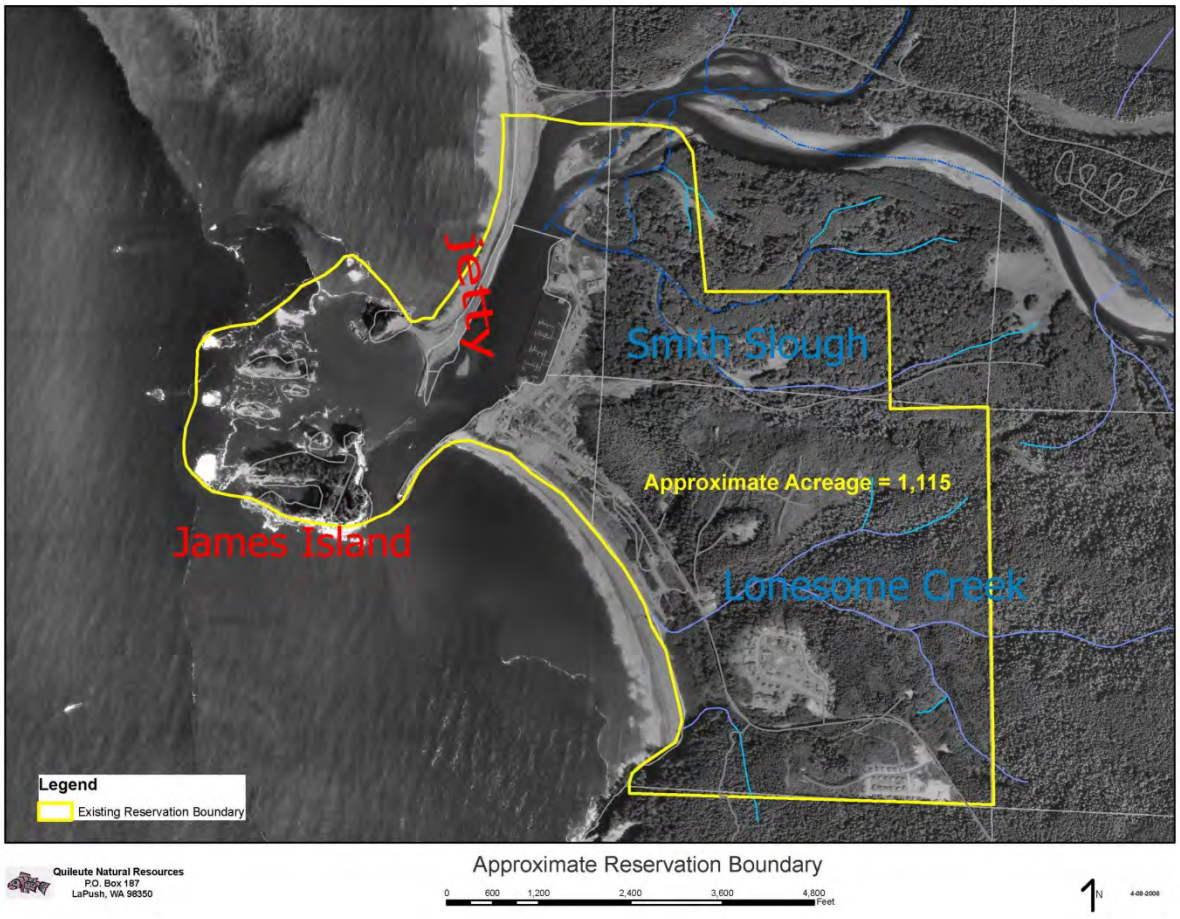
The Tribe owns the rights to the river bottom on the Reservation, pursuant to the federal case, *Moore v. US*, 157 F.2d 760 (9th Cir. 1946), winning a challenge by the state. When the River is dredged, some of this material, with EPA approval, is brought to Rialto Beach of Olympic National Park, to improve the beach for smelt.

Reservation topos, L (detailed) and R.



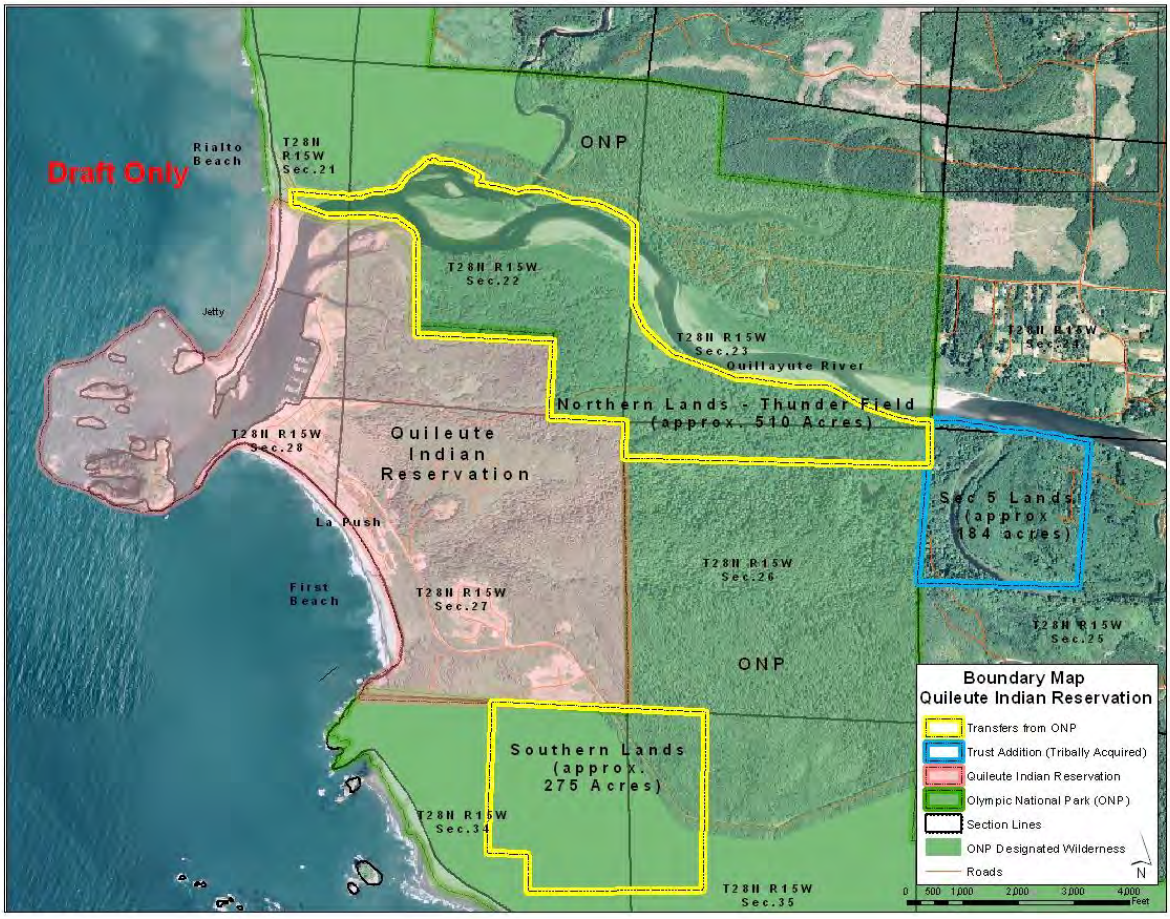


See Section 7.2 for a map of lands recently being added to the Reservation pursuant to PL 112-97, of 2/27/2012, to move to higher grounds per tsunami risk.



Most maps do not show James Island as part of the reservation, but since at low tide it is connected as land, it is officially a part (map prepared by Quileute GPS staff when working on Olympic National Park issues.) Smith Slough is the little E-W tributary into the River, at the North end, and Lonesome Creek flows E-W at the south end, into the Pacific.

In February of 2012 Congress passed legislation to provide some upland acreage for the tribe, adjacent to its current reservation and previously in federal ownership. The reservation will be approximately 1600 acres after final conveyance of federal lands and Quileute fee lands into trust, pursuant to Public Law 112-97 of February 27, 2012. Below is the map showing lands involved in the transfer. The tracts bounded by yellow have been added from Olympic National Park and the tract in blue will be added from present tribal fee land when an Environmental Assessment is completed (funding for it was received by BIA and the work is to be done fall of 2015.)



The tribe depends on healthy salmon for both economic (commercial), subsistence and ceremonial reasons. The Quillayute River System is one of the last in the Pacific Northwest that still has no ESA-listed fish. The Tribe wants to keep it that way. The biggest concern upstream is the impact from federal, state, and private timber harvests. Both removal of vegetation cover and sedimentation that shallows streams can lead to increased stream temperature and reduced dissolved oxygen. (Present forest practices allow two years to replant trees after harvest and it is still customary to scrape the land clean and burn piles of remaining underbrush, thus denuding the forest floor.) Warmer waters can also be the cause of certain fish diseases. The sediment, besides causing channels to become shallower, can fill interstices in gravel and interfere with salmon egg respiration. Silt can also impair gill function. Stream restoration is high on the tribal list of habitat programs, as is monitoring of the effectiveness of such restoration. We have a new potential concern now—will changes in precipitation pattern from climate change create even more erosion where trees have not yet been replanted after harvest? Will flooding increase and impact the lower river system, threatening the spawning grounds? Some ideas for controlling or reducing that risk are presented.

On the Reservation, sound management of municipal wastes occurs through our Utilities Department, which in the 1990s established wastewater treatment with funding from federal and state programs. Sewage design conformed with the Department of Ecology. Drinking water comes from a site 4.6 miles away (aquifer), again through federal and state funding, because the local groundwater is too high in manganese and may from time to time have salt water intrusion. Lonesome Creek, water source for our hatchery. Lonesome Creek and Smith Slough (shown in maps above) are monitored for water quality (CWA 106), as is the Quillayute itself and 44 U&A locations in the Quillayute Basin.

2.0 Introduction/Background

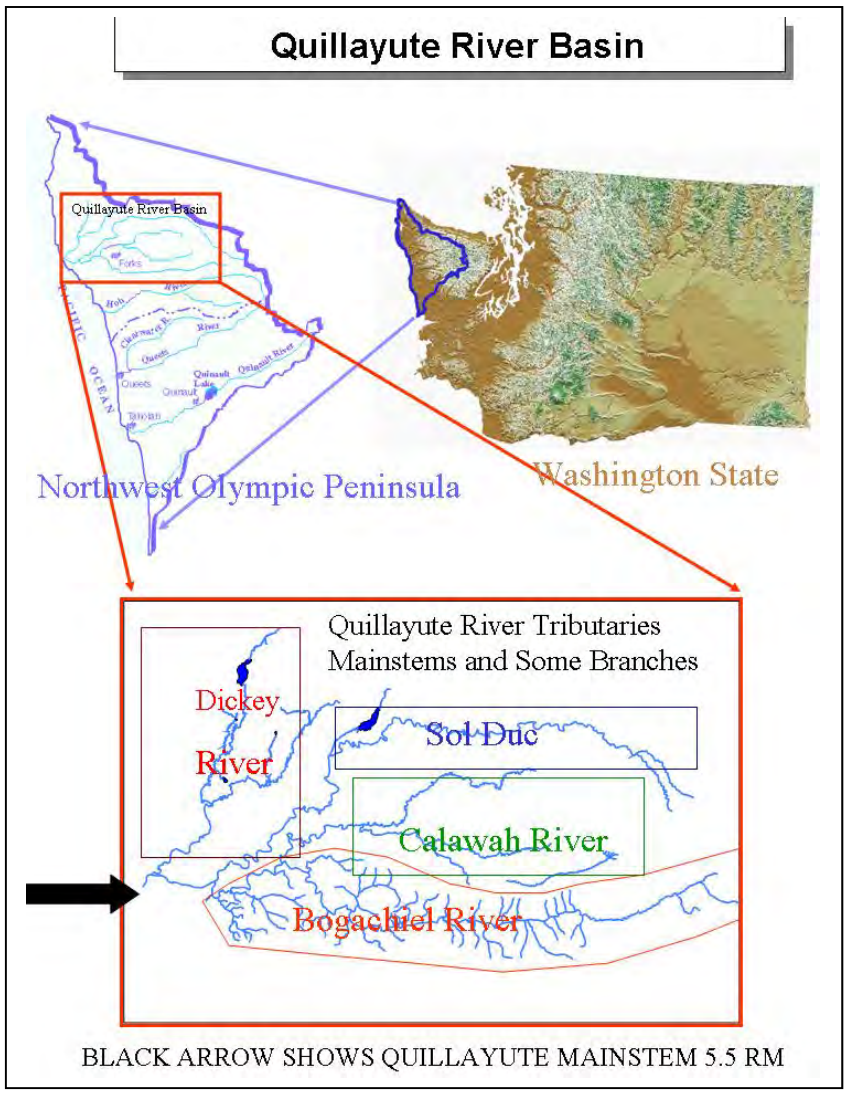
2.1 Background

Treaty: The Quileute Tribe's ancestors were signatories of the Treaty of Quinault River of July, 1855, reauthorized as the Treaty of Olympia in January of 1856. The Quileute were originally assigned to live on what is today the Quinault Reservation, but in 1889 were provided with their own reservation, the basically one square mile that people see around La Push, today. The Tribe has allotments on the Quinault Reservation but they are not included in this program. Nor are the scattered small trust lands, basically surrounded by non-tribal treaty-rights lands. Nor are the tribal Usual and Accustomed fishing grounds in the Ozette Basin or certain independent drainages to the Pacific. We are only including the Quillayute Basin, that drains into the reservation.

Water Quality Testing to date: In 2000-2001, the Army Corps of Engineers monitored the Quillayute River for inorganic criteria as part of an updated EIS for dredging. The Quileute Tribe received GAP funding to continue this as CWA 106 training, in 2002-3 and emulated Corps protocols. Since then we have greatly improved and enlarged our water quality program with Treatment as a State for CWA 106 and 319 .The Tribe has a Water Quality Strategy, QAPP, and Work Plan under CWA 106 at present. On reservation it monitors the Quillayute River, Lonesome Creek, and Smith Slough for DO, T, pH, and turbidity; and the past 2 ½ years now, has added 44 additional sites throughout the Quillayute Basin in our U&A and added macroinverbrate sampling, in-situ turbidity sensors, stream temperature monitoring, low-flow discharge sampling, and oversight of the Sol Duc River flow gage. We also hope to broaden the scope of activities through CWA 319. The larger goal is to develop the Tribe's administrative and technical capacity to establish an integrated environmental management program for Tribal lands and waters, and to fulfill the requirements of the Clean Water Act. At present no listed fish (ESA) are in the Quillayute River system, although some char allegedly exist "trapped" above the Sol Duc falls. (USFWS does *not* include the Quillayute Basin in habitat for bull trout or listed char, however.) The Tribe gets all its drinking water off-reservation from aquifers about 6 miles away, because the local ground and surface water is brackish and the ground water has manganese. Long-term goals are reviewed every two years, by the environmental coordinator at Quileute Natural Resources, when writing grants, and are based on progress made on previous goals and newly emergent problems.

Partners: Out of necessity, the Tribe has for decades vigorously pursued partnerships with other

entities that have jurisdiction over lands impacting the quality of waters for which the Tribe has treaty-protected rights. These partnerships include local governments (City of Forks and counties of Clallam—especially as to knotweed eradication—and Jefferson), the State of Washington (DNR, WDFW—fisheries co-manager, and Ecology), the US Forest Service, the US Fish and Wildlife Service, the National Marine Fisheries Service (fisheries c-manager), the Army Corps of Engineers (dredging the Quillayute), and the US Coast Guard (spill issues, and helping advocate dredging) To the extent that NPSP flows into the area of the Olympic Coast National Marine Sanctuary (OCNMS), it is also a partner. The tribe works with OCNMS through its Advisory Council and through the Intergovernmental Policy Council. We have cooperated with Olympic National Park in stream typing (they typed the streams above the boundary line and we below), and in eradication of knotweed in the riparian zones. In fact, ONP trained us in foliar spray technique. Of course, USEPA has been a major contributor to tribal grant programs, as has the Bureau of Indian Affairs.



Purple line shows the entire treaty area of Treaty of Olympia.

Area of WRIA 20 and Lead Entity work.

Enlargement shows Major rivers of the Quillayute Basin. Sol Duc is about 100 RM long (scale)

State programs: The tribe was an initiating government under WRIA 20 Watershed Planning (and now Implementation) body (under ESHB 2514, aka RCW 90.82) The Watershed Management Plan, Implementation Plan, and maps are online at http://www.ecy.wa.gov/programs/eap/wrias/Planning/20.html. Funding for that program ended a few years ago, before the implementation plan could be performed. Since inception in 1999, the tribe has been a participating government in the North Pacific Coast Lead Entity (under ESHB 2496, aka RCW 77.85). That program, state funded, deals with salmon habitat restoration. About five years ago the state determined to join four LEGs in one coastal restoration entity: Washington Coast Sustainable Salmon Partnership. Quileute is on the Board of that as well. Through these mechanisms, which both include local private citizen landowners as well as non-profit organizations and governmental entities, a broad base of public involvement is achieved. Funding sources are pooled and leveraged. Decisions are made in a coordinated and collaborative manner. TMDL work for nonpoint source pollution has not begun. The Department of Ecology is challenging whether it is subject to Forests and Fish Report agreements in 1999 and subsequent regulations that might require timber to engage in NPSP TMDLs and timber is reluctant to have monitoring occur on its property.

Culture, Geography, Geology, and Biology. The Quileute Tribe has been in this area since "time immemorial" (certainly thousands of years, including the last Ice Age advance, based on oral history, artifacts, and on Ice Age displays at the Victoria, B.C. Museum of Natural History). The people subsisted on fishing (salmonids), whaling, seal hunts, shellfish gathering, berry gathering, and hunting of elk, deer, and small mammals and birds. Fishing, including the gathering of shellfish, is still key to the tribal economy and culture.

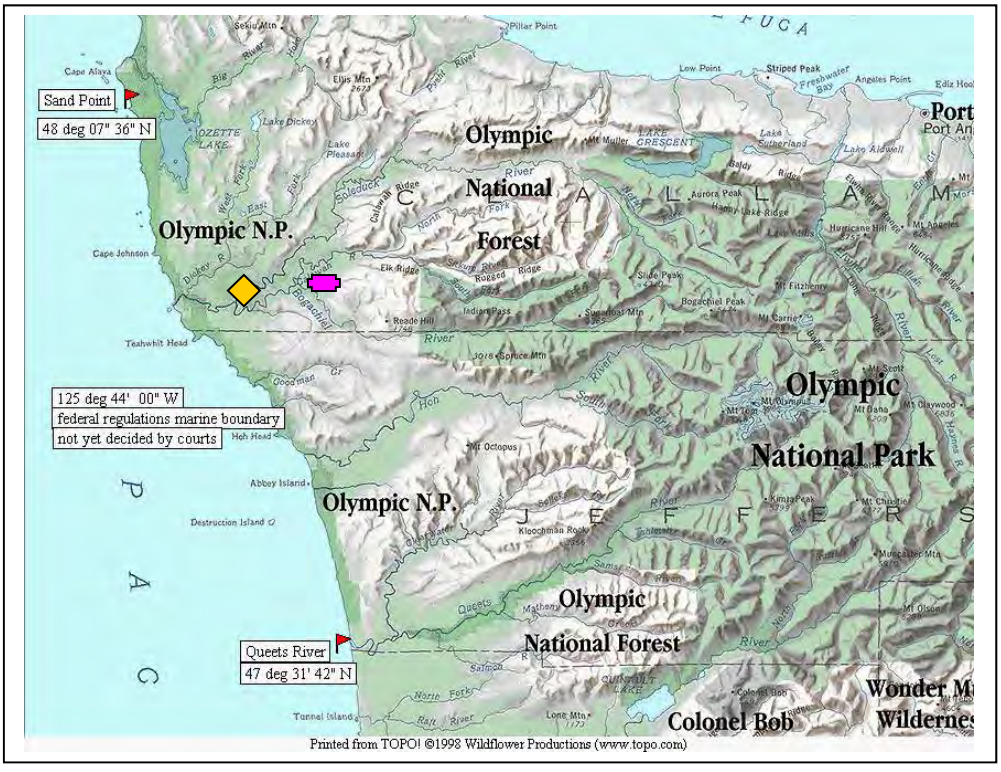
The terrain is gently rolling along the Pacific Coast and perhaps 20 miles inland. However, the Olympic Peninsula of Washington is dominated by a steep and relatively active young mountain range, the Olympic Mountains. These mountains trap most of the moisture from the Pacific, resulting in rainfall of 120-140 inches annually. The area lies within one of three temperate rainforests in the world, the others being in Chile and New Zealand. Native conifer forests that cover the landscape, both lowlands and highlands, are cut by numerous streams that flow into major river systems. There are two major hardwood species—red alder and large-leaf maple. Some vine maple and cottonwood trees are present. Important plants to the Quileute include red cedar, grasses, mushrooms, medicinal herbs, and berries. The cedar and grasses were used for clothing, canoes, baskets, harpoons, and other tools or weapons; and are still used for ceremonial canoes, basketry, and regalia. Berries, herbs, and mushrooms are still gathered for food and medicine. Camas used to be an important starch but is no longer a mainstay of the diet.

Salmon: The Quillayute River provides ingress and egress for 10 runs of salmonids that migrate through an extensive watershed of some 850 square miles. These include Chinook, coho, steelhead, and sockeye. (We are not including cutthroat trout, sea run or otherwise.) None of these runs is listed, either as threatened or endangered, although many are now diminished and

might get ESA attention in the future. The Quillayute has only a 5.5 RM-mainstem that begins at Three Rivers (an unincorporated cluster of homes and businesses about 8 miles west from US 101 on State 110), and ends at the Reservation, where it meets the Pacific. There is no distinct estuary, but tidal influence and measurable salinity can extend up to Three Rivers, where the Quillayute's confluence with the Sol Duc and Bogachiel Rivers occurs.

Tributaries. *While the tributaries of the Quillayute are off-reservation, they must be considered because they all flow into the Quillayute River and their water quality and quantity directly affect it.* Just past the reservation boundary, only one mile upstream, is the confluence with the Dickey River, which flows through lowlands—in fact, some 10% of its watershed is wetlands. This system is an important watershed for sockeye, steelhead, Chinook, coho, and resident trout. The Dickey has significantly high sedimentation in many locations, some due to forestry and some due to the unconsolidated nature of its river banks. Some streams also have been listed on the State's CWA 303(d) list for temperature. Dickey water naturally is tannic in some locations.

At Three Rivers, the Quillayute is met by the Bogachiel, which mostly winds through lowlands, some of which are agricultural. Not far from Forks, about 10 miles from Three Rivers, the Calawah River System joins the Bogachiel. The Calawah (North Fork, South Fork, and Sitkum) start in high lands and have extremely cold water in some locations. Part of the North Fork goes underground. Chinook, coho, sockeye, and resident trout are in this system. Three Rivers is also where the Sol Duc River meets the Quillayute (hence the name of the town). The Sol Duc starts high in the Olympic Mountains, south of Port Angeles. Fed by numerous tributaries and small lakes, it is home to sockeye, Chinook, coho, steelhead, and resident trout. Some Sol Duc streams have been listed as impaired waters (temperature, sedimentation, DO). This system has been harvested extensively, like the Dickey, Calawah, and Bogachiel. Both the Calawah and to a lesser extent the Sol Duc may have steep-slope mass wasting that contributes to the sediment load on occasion. Most sediment is anthropogenic.



This is a topo map of the Quillayute River drainage and shows surrounding Olympic National Park. It occupies the green band along the Pacific Ocean and the highlands of the Olympic Mts. Between it lie private timber lands (lowest), WA DNR forests (next), and then USFS (next). Timber operations (roads, cut trees) are NPSP potential issues. The Pink Block indicates City of Forks (population 3000). Three Rivers is shown by Yellow Diamond.

On the Pacific Coast, tribal members gather shellfish for subsistence. Clams are found at the high tide mark on coastal rocks and in the sand between the high and low tidal zones. Crabs for subsistence are captured in crab pots at the mouth of the Quillayute, and also by tribal fishermen, commercially, in the marine treaty waters. These shellfish may all ingest biotoxins from marine algae during harmful algal blooms. The conventional way to test is to capture specimens and send their flesh off for diagnosis at WA Department of Health. The sources of such biotoxins are enriched waters from natural upwellings, for the most part, although Victoria's sewage may be a factor at times.

2.2 Goal:

Through the sections below we will demonstrate how we intend to achieve the larger goal of keeping nonpoint source pollution, in particular, sediment load, from reaching a level that can impair salmon spawning, rearing, and migration. We are fortunate to live within a river basin that does not face industrial or agrarian threats. The only city, Forks, has a stormwater plan and provides for appropriate disposal of sewage.

2.3 Objectives

As described in further detail below, our objects to control sediment NPSP are through assisting landowners with forest practices projects and with noxious weed control.

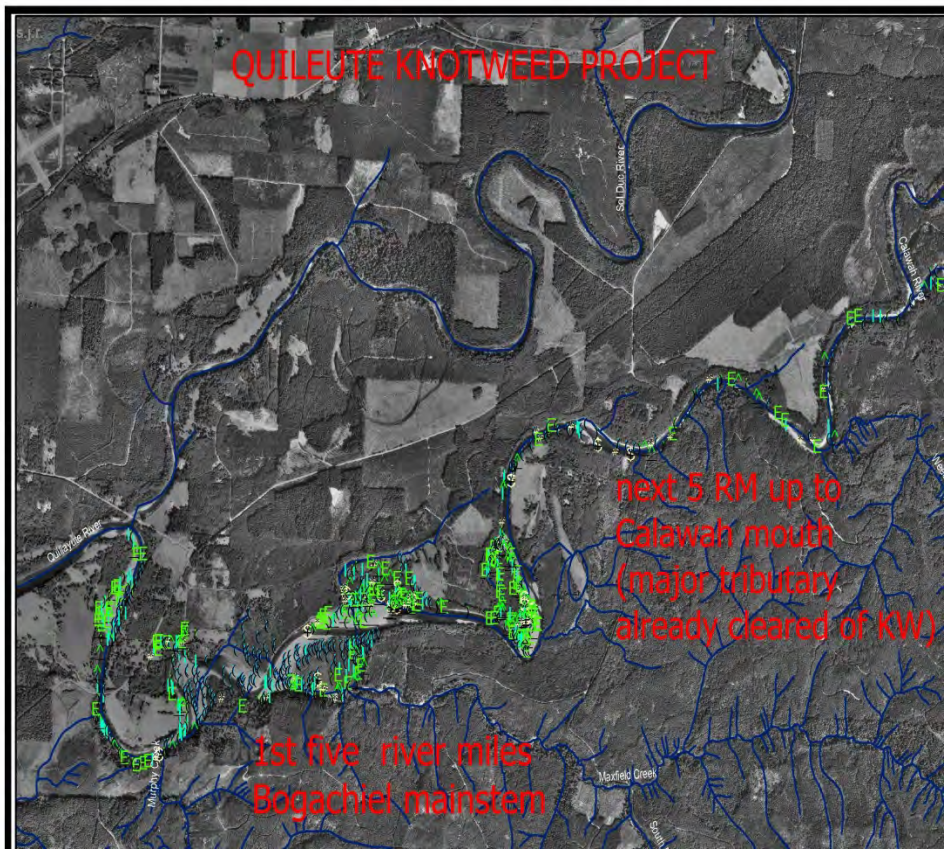
3.0 Management Program Summary:

The purpose of conducting a nonpoint source management plan is to insure that the Tribe's environmental goals are being adequately met through the ongoing programs of its Natural Resources Department. The goal would be to protect, and to restore as needed, the ecosytems vital to fish and wildlife in the reservation and within watersheds directly impacting it. The latter would be all the above-described tributary systems of the Quillayute River. We need the fish to remain at sustainable and harvestable levels, and provide a framework for these goals that invites partnering with the state, federal, and local or private entities that share in jurisdiction of adjacent lands and waters. To meet these goals it is essential to maintain the water quality of the Quillayute Basin, and in particular, the Quillayute River.

We are focusing on two programs here, and prioritize them in the order of our ability to control the likelihood of their success, since funding and shared jurisdiction both off and on the reservation are factors. On reservation, we share jurisdiction with the USEPA, BIA, Army Corps of Engineers, USCG, and (on land), sometimes with HUD. Off-reservation, USEPA, BIA, USDA Forest Service, and Olympic National Park are players, as well as state agencies like Washington's Department of Ecology, Department of Fish and Wildlife, and Department of Natural Resources. City of Forks and Clallam County are sometimes players. When work can impact ESA-listed birds, USFWS becomes involved. They also recently helped to fund knotweed eradication. This past year we commenced to attend tribal meetings with USDA Natural Resources Conservation Service, which has expanded services and grants to include more than programs related to irrigation. They may provide funding for projects in the additions to our reservation, in the future.

Our first priority would be to complete eradication of knotweed. We have mapped using GIS and GPS, the occurrence of knotweed throughout the Quillayute Basin. Knotweed is persistent and treating it one year is rarely effective (partly because we must use approved pesticides for the riparian ecology, not the strongest that exists). One has to go back more than once in a season and sometimes for two-three years afterwards to catch the recurring shoots from underground rhizomes. We have "eradicated"[1] it in the Dickey, Sol Duc, and Calawah watersheds that flow into the Quillayute through repeated treatments . The tribe has treated the entire Bogachiel basin more than once but still needs to deal with some of those emerging shoots in certain locations. The mainstem of the Quillayute River (those last 5.5 miles) has been done in part. The main target for the future is our reservation, near the mouth of the river. This has sandbars that have become re-infested despite treatment in the past by the Park and the Tribe. . This is because a mere portion of a cane can start a new plant Cutting by unenlightened upstream landowners (still some around despite major outreach by the County and the local tribes) often end up in our estuary. Finally, there is the potential for hybrids that presently only reproduce asexually to have sexually potent flowers one day. That would allow for spreading aerially. The race against time by anti-knotweed advocates is precisely related to that biological risk of sexual reproduction, which has already occurred in test plots.

1 While we have appeared to eliminate its presence in th med watersheds, this is a persistent weed for two reasons. First, it has an extensive rhizome system and it ssible for a stubborn segment to survive and issue new shoots a few years after eradication. So one must go bac l check and this is a time and money-consuming but necessary process in its own right. Second, despite stron blic outreach, people still dump cuttings for convenience and each cutting can make a new plant. So ave to be vigilant (and continue outreach with the county, which is expert and thorough and persistent on t ask).



Above is an example of one GIS map of several for Bogachiel knotweed.

. For the reasons mentioned in the footnote above, and because of continued presence in the Bogachiel drainage and the Quillayute mainstem, we think there will still be a need for funding from EPA. One thing we have not needed is funding for revegetation. The rainforest natives come back so quickly in our area, that we have not needed this, to date. .

Our second priority is to work with other agencies to supplement their programs for either culvert repair, road decommissioning, or bank reinforcement with large woody debris, to improve stream flow and reduce nonpoint source pollution that way. No one can do much with $30,000 but when it is partnered with other programs, it can make a difference. Quileute staff look for grant opportunities and partnering throughout their U&A. They are active in interagency programs to that effect. We did an extensive assessment of restoration needs in the Quillayute Basin in 2006 with all of the stakeholders. That assessment generated a list of priorities, many of which were culvert and road decommissioning. (See CD ROM attached.)

As noted above, we are part of the Lead Entity for WRIA 20 that develops salmon habitat restoration grants in our watershed and others of WRIA 20. Several projects in our basin are in the strategy for restoration. That strategy is updated annually by the Lead Entity technical committee. The most current one is downloadable/viewable at http://www.wcssp.org/northpacific.html along with coverage of the Lead Entity's purpose itself.

This past year Quileute has actively engaged Rayonier, USFS, and the WDNR to seek projects that might be eligible for the larger $100,000 national competitive CWA 319 funding. Rayonier has been going through considerable reorganization and has not come forth yet, but we do have lists of projects from the USFS and WDNR which are attached in the Appendix to this document. They all regard stream restoration activities that could reduce potential for nonpoint source pollution.

A former and third priority in the original NPSP Management Plan was dredging the Quillayute estuary. But we **are removing this from the NPSP Plan because the funding is so beyond the range of EPA** (ranges from $600,000 to $1,000,000 now) that we simply must rely on Congress to fund the Army Corps of Engineers to mobilize a dredger (contractor) for the path between the USCG dock and the river mouth. Briefly the situation is this: We have maps and depth soundings for the marina (generated by the ACOE) and with a pre-mobilized contractor, can extend the services beyond the USCG vessel path to do more of the estuary as funds permit. This estuary is not normally only 15 feet deep. It used to be 40 feet, according to memory of tribal elders. So the situation is very changed. The shallowing is certainly affecting the habitat for the variety of fish and birds that use the river and the *turbidity* in storms is presumed to be greater in a shallower river (15 feet) versus a deep mouth (c. 30-40 feet). The past couple of years, the USCG could not get past the bar that forms at the river mouth at low tide, until dredging took place. So they are an important ally for dredging funds.

Boats listing in marina because of shallowing.

We look forward to future assistance from the Army and the Coast Guard on this matter. There is actually a USCG regulation in place to close the river when the bar becomes unsafe. (See 33 CFR 165.1325.)

4.0 Nonpoint Source Pollution Management Plan

4.1 Description of BMPs and measures to reduce pollutant loadings from each category. Impacts on groundwater, if any.

Reduce impact from Timber Operations in the U&A.

To the extent that the tribe might harvest its modest timber on the current roughly 640-acre land base[2] of the reservation, it must follow the BIA forestry plan recently completed through meetings of the Aberdeen BIA office with our Timber Fish Wildlife (TFW) Biologist & TFW Manager. There are no immediate plans to do harvest but should it occur, we must follow that protocol.

The sedimentation load in the Quillayute River is coming from the Usual and Accustomed Area, mostly from timber operations. We acknowledge there is occasional mass wasting in the highlands, probably triggered by earthquakes. When this occurs, the affected tributary becomes muddy for a few days. Because Quileute is not the operator of the U&A timberlands, it can only use programs discussed below, to control the sediment. The leads are the TFW manager and his technical support staff, and the policy analyst/attorney, all staff of Quileute Natural Resources (QNR).

The TFW manager, and TFW biologist, review all proposed harvest applications on state and private lands, though notices from the WA Department of Natural Resources. There are "RMAPs" showing the work proposed. They also attend ID teams to examine proposals on site. Our technicians provide support for all of this. Either the TFW manager or TFW biologist provides comment to the agency from the Quileute perspective. Either also reviews all Hydrologic Permit Applications for work to be done in streams and reports back to WDFW on these, with the Quileute perspective. Either or both of these individuals is asked unofficially to go to a field site and provide input to the operator.

Sometimes there are violations (e.g., a contractor uses the wrong grade road bed and pollutes a stream through runoff). Quileute meets with the agency and offending party to go over acceptable mitigation.

QNR staff also goes over the state rules for forest practices on a regular basis and contributes to

2<Most of our land is for government buildings and housing. However, when the new lands are added to the reservation, there will be some 275 acres of timber. Even so, various regulatory buffers limit harvestable timber to some 175 acres.

the public comment when they are revised.

With respect to USDA FS, that agency has greatly reduced harvest right now, under the Northwest Forest Plan, but when it does plan harvests, it advises us of proposed sales and the TFW biologist reviews these and provides comment. Thinning operations have provided funding under the USFS Stewardship Program (revenue can be used for salmon habitat grants). A draft list of prospective Stewardship projects for the Sitkum subbasin of the Calawah River is attached. Our LEG and the WCSSP are working with the USFS on directing stewardship funds to such projects. This is a new program. It can take some two years for thinning funds to make it down to on-the-ground projects. The Calawah watershed itself was the subject of a focus study which resulted in a publicly reviewed and approved plan for restoration. That is attached in the Appendix as a potential project list on USFS lands.

There is are WA Department Natural Resources Habitat Conservation Plans for both state and private timber lands and when aspects of that are to be implemented (e.g., effectiveness monitoring) the tribe is brought into the process and sthe TFW team and the attorney/policy analyst may provide comment. Annually we also have a meeting with the regional office of the WDNR. It was at this most recent meeting that they provided us with the list of culvert work in our U&A that is attached in the Appendix for potential CWA 319 work. The tribe will analyze these and prioritize them as to use by how many salmon runs, area upstream spawning habitat blocked, or related criteria. A recent U.S. v Washington decision ("the culvert case", subproceeding 2001-01, 3/29/13) gave the WDNR a timeline (October 31, 2016) to replace/repair defective culverts. The legislature is scrambling for funding to accommodate the decision, which, however, is on appeal, and lack of funding is a major part of that appeal.So when the welfare of the salmon is at stake, it will greatly help if we can obtain additional funds to make these culverts operable.

The Tribe is able to assist the operators with compliance insofar as it may involve work such as culvert replacement and road decommissioning. These are perceived as salmon habitat endeavors and the tribe has access to various grant programs for that purpose. We have no engineers on staff but help the operators by writing grants when these are available, and the grants include engineering studies and implementation, by those with expertise (generally a match of operator in-house expertise or else hiring a contractor), as well as providing for materials (e.g., culvert or bridge).

Sometimes the Tribe is able to assist with habitat enhancement programs such as replacement of alders with conifers on the river banks, and with large woody debris placement to help trap sediment in rivers where the stream bed is scoured because of inadequate LWD. Again, these are areas where we would have to pay a contractor for engineering design and bring in contractors for equipment, like devices to remove or move trees. In the case of very small creeks our technicians, using ropes and saws, are able to bundle woody debris with cables and attach it to stream bank trees or rocks, to help trap sediment, but we need to engage the experts for creeks larger than, say, 6 feet across.

The only impact on groundwater we can imagine is positive. Any programs that reduce violation or ineffective operation of forest practices is likely to further good distribution of precipitation instead of sheet runoff and further percolation into the groundwater system.

Reduce/eradicate Knotweed in the U&A, prevent re-infestation of reservation

Often an old homestead is the original source of the problem. The knotweed has spread throughout the lots, not only along the banks. Many lot holders just cut it down and toss the clippings along the bank of the river to allow it to wash down. This creates a larger problem not only within the community but throughout the rest of the watershed as it floats down during high water events and lodges along the banks to re-grow. The Quileute Tribe assists and educates the lot holders in the proper control of the problem.

The Tribe has a strong in-house program for knotweed removal, led by the TFW Manager.Several years back, Clark County officials removed the weed successfully and engaged other counties to train on what chemicals and technique could safely do this, for the ecosystem and the applicators. Clallam County, home of the Quileute, has a strong Noxious Weed Control Program. Clark and Clallam trained Quileute on use of EPA and Ecology-approved chemicals to use, and our applicators took WA Dept. of Agriculture certification training. Clallam even provided some equipment initially—the tools to inject the cane. The protocol is lengthy and attached as an appendix. One general procedure to note here, however, is that one always works from upstream to downstream. Landowner education is part and parcel of this. Cuttings must never be thrown in the river where they can reinfest.

What's been done; what remains to do; Quileute experience. Quileute has been actively engaged in assessing and restoring salmon habitat, and conducting ungulate research and forage enhancement in the Treaty of Olympia (see treaty map in Appendix) for decades. More recently, as the impact of knotweed became known through the advocacy of Clallam County's Noxious Weed Control Board, Quileute wrote a pilot grant for knotweed eradication in the Dickey River System. The invasion here extended into forest land above the riparian zone. 3 During phases of the Dickey project, Quileute worked with Olympic National Park to control the weed. Eradication in the Dickey took some four years. Since that effort, Quileute has become active in an association of agencies, tribes, universities, and concerned citizens: the Olympic Knotweed Working Group ("OKWG"). This group shares knowledge, equipment, chemicals, personnel time, and other resources in advancing control of the knotweed species. It also provides valuable training in technique for control, and its meetings provide hours for licensed certification of herbicide application, required by the state of Washington Department of Agriculture.

With Clallam County and other cooperators4, Quileute has done an assessment of knotweed in

3 This Quillayute tributary had advanced invasions threatening Olympic National Park as well.
4 For example, the City of Forks and its citizens are within the Calawah and Bogachiel Basins and have been

the remaining three rivers (after Dickey) in the Quillayute Basin. We mapped the assessment on GIS (see Appendix for Bogachiel sites on maps—2 pages). We used the OKWG data dictionary. The county helped us to remove knotweed in the Sol Duc. With BIA funding we completed removal of the weed in the Calawah watershed. These past few years we worked on the Bogachiel watershed with EPA and USFWS funds and only certain persistent areas remain to be retreated. . This river channel is unconfined in many places, and sand bars are frequent. The knotweed gets a hold in these as well as in riparian forest zones. Four runs of wild salmonids are surveyed in the Bogachiel: summer and fall Chinook, fall coho, and wild steelhead. The state's Bogachiel Fish Hatchery, run cooperatively with Quileute, is located on the Bogachiel. This river is important to state and tribal commerce—not just fishing, but also the tourism so vital to this remote area, especially after the Northwest Forest Plan limited timber harvest.

The main tasks remaining lie in the Quillayute mainstem and the lower part near or on the reservation, in particular.

4.2 Description of Programs to achieve BMPs identified above. Regulations Funding, Education, Training, Technology, Demonstration.

Speaking generally, the **Coastal Zone Management Act does not apply here** because there are no state lands on the coast of our treaty area. There is no provision presently for tribes to become involved in consistency programs with the federal government should offshore siting of energy development be proposed. At present this tribe works through the state for marine spatial planning. Our attorney/geologist is a liaison on the Washington Coast Marine Advisory Council. Further, we have no agricultural activities. The only industry is timber harvest, which is governed by the state RCWs and WACs described below under Section B. Forest Practices. Quileute did a **Wetlands Survey under CWA 104 about 10 years ago**. There are small patches off the reservation in the Olympic National Park lands adjacent and totally surrounding the reservation. There is a narrow man-made one between the resort and Highway 110 that we simply leave alone. The Tribe does have a forestry management plan with BIA for its small acreage of timber.

We have a **CWA 106 grant Tier One** and are surveying the Quillayute River at the marina, the mouth of Smith Slough at the Quillayute, Settling Ponds (a water source for the tribal hatchery) and Lonesome Creek monthly for dissolved oxygen, temperature, turbidity, pH, conductivity, and chloride. After a storm we survey as well. After obtaining PPG status a few years ago, we now survey off-reservaion in the Quillayute Basin as well at 44 additional locations in the Quillayute River drainage basin, within the tribal U&A.

We also are in Year Two of surveying for macroinvertebrates in the U&A in partnership with Streamkeepers of Clallam County. However, on the reservation, we have too deep waters to do

working with the county and tribe to control knotweed in the smaller private tracts.

it; it requires riffle environment. The only one with riffles is Lonesome Creek. We have visually checked Lonesome Creek for bugs out of curiosity (lifted rocks) and it is rather tannic so they are not significant. Also the creek is cutoff for fish use since it is a water source for the hatchery; therefore no macroinvertebrate data is needed. Lonesome Creek is less than a mile long, and originates in Olympic National Park and ends in the Pacific Ocean and is not a water quality issue, in any case.

In addition to the Long-Term Ambient Water Quality Monitoring & macroinverbrate sampling, the Quileute Tribe has purchased and installed 24 Hobo Temperature Pro V.2 Loggers to record continuous stream temperature data. The loggers are taken out over the winter and re-installed each summer (July 1st -September 15th) to obtain the seven-day average daily maximum temperature (7DADMT). The Hobos monitor continuously for water temperature each hour.

In 2013, the Quileute Tribe purchased three Forestry Technology Services DTS-12 turbidity sensors, designed to be left in-situ, which record continuous turbidity measurements and transmit them by satellite and then to our designated computer. We have three major rivers—Dickey, Sol Duc, and Bogachiel--- whose confluences are with the Quillayute (the fourth tributary river, the Calawah, enters the Bogachiel 8.5 RM above its mouth). The Quillayute is the one that passes through the reservation. One DTS-12 will be installed on the Dickey River upstream of the tidal confluence to avoid corrosion (the Dickey's mouth is within a mile of the Quillayute estuary) and on the nearest state-owned land adjacent to the river. This location is off the Mina Smith Road upstream of the mouth of Larger Creek and is outside of flood-prone areas. The second location is at the Sol Duc River RM 6.5 at the Quillayute Prairie Road. This location was selected because it is near the lower end of the 78-mile river and can detect turbidity downstream of the stretch that contains a number of logging roads and abundant fish use. The third location is at the Bogachiel River RM 0.8 near the Hwy 110 crossing. This site contains a USGS river stage gage and the abutments for the bridge that will help with installation.

With the FY 2014 budget, we delegated a portion of the FY 2014 funding to a contract with Washington Department of Ecology to operate and maintain the Sol Duc Stream Flow Monitoring Gage for the balance of FY 2014. The Sol Duc Gage is located on the Quillayute Road crossing and has been recording water temperature, air temperature, flow, and stage since June 2005. Keeping the gage operating is important to understand trends in flow and temperature. (FY 2015 provides for purchasing this gage.)

Additionally, in FY 2013 we purchased an OTT MF Pro Flow Meter (OTT Current Meter) and collect discharge data during low flows at selected sites in the U&A.) The OTT MF pro computes discharge automatically based on USGS and ISO methods and it comes with a color display that graphs velocity in real-time. Unlike the turbidity sensors, which will be left in-situ, this is a light-weight and highly portable device that can be carried to the sites where we take readings with the Datasonde.

The reservation does not have any potable fresh water, neither lakes nor groundwater. Our

drinking water is piped from off-site, off-reservation 6 miles away from wells under state permit because the native groundwater is saline and has manganese. We have a sewage treatment plant discussed in the NPSP Assessment which was funded by Department of Ecology, Indian Health Service, and BIA that was built by KCM in Seattle and is managed by our Tribe's Utility Department. It is not a source of non-point pollution. All sewage is in conformance with Indian Health Service requirements and was built in accordance with their plans. All solid waste is hauled off-site to a transfer center of Clallam County with tribal garbage trucks engaging in regular pickup from a number of sites and homes.

From a GIS standpoint we have three biologists with capacity to do such work and one of them is actively engaged in it for the department. We have all requisite software, hardware, printers, etc. for the biologistand are fully integrated with all the state data sites regarding streams and forest practices.

We refer the reader to our Forest Practices section B below for our role in forest practices, stream erosion control, sediment, and participation in the **Salmon Funding Recovery Board** (in which our attorney/grant writer/geologist, environmental lead is active twice a month in the Lead Entity and **Washington Coast Sustainable Salmon Partnership (WCSSP)—the LEG region**, and is a lead writer in their strategies). We have written a number of successful grants for stream restoration and culvert repair under the SRFB program. The above-described attorney represented the tribe also in the WRIA 20 Watershed Planning/Implementation. She is also a geologist and serves on technical committees. Not only does she write grants, but also, she also develops scoring/ranking provisions and scores grants. Annually she has scored LEG and USFS grants (Title II funding, Resource Advisory Committee). She helped to write the regional salmon restoration/recovery plan currently from Columbia River to Neah Bay, in WCSSP and is now working on its implementation plan

The Tribe has no water quality standards, being too small to be able to manage this type of program, and relies on state standards, as mentioned before. For Army Corps of Engineers dredging, we rely on the EPA water quality certification (see Part C, below). For any wetlands activity (dredge/fill), we defer to **Army Corps of Engineers** and are not seeking TAS. We rely on the Corps to do dredging of the Quillayute under the Rivers and Harbors Act..

Forest Practices.
We have no immediate plans to do any harvest on reservation and have no jurisdiction over off-reservation lands. Further, our plans for implementation only include restoration. Nevertheless we include the following to cover this concern.

RESERVATION. On the reservation we use the 2006 Forest Management Plan for Quileute Reservation, prepared with BIA.(A copy is provided herewith.) Quileute is obligated to use this plan. However, there are no current plans to cut any wood on the reservation. This is because of the 500 or so acres of timber, it is not deemed harvestable—it is virtually all on riparian-zone/stream buffer land. Two years ago we cleared 8 acres for housing and that is it for quite

some time. Some time in the next year acreage is being added to the reservation pursuant to "tsunami legislation" in 2012. However, only some 175 acres of 275 will be available to harvest because of the buffer restrictions. In the event that harvest commences, Quileute within the confines of this plan (p. 7-8, Harvest Policy) must follow this protocol [bullets added for clarity; this was written in long paragraphs originally]:

- All harvesting must comply with **25 CFR 163 and 53 IAM Chapters 3 and 4** and state of the art logging practices similar to those practiced on other lands held in trust for timber management purposes." Timber harvest will occur at the request of the Tribe. Tribal staff will be part of the planning for harvest unit layout [Quileute Natural Resources Timber Fish Wildlife Biologist intended here, but not specifically named.] The majority of the timber sale activity will be under contract … [by bids].
- Roads will be constructed as part of the harvest operations and maintained until a new stand has been established. The road can then be closed subject to the approval of the Tribal Council.
- On even the gentlest slopes, depending on the road surface, tire ruts will provide the quickest drainage route for water, and become significant sources of sediment. Roads on the reservation will need to be monitored and maintained to prevent deterioration and sediment transport.
- All property corners and lines must be established prior to harvest operations. Most areas have slopes less than 30% and can be yarded with hydraulic shoves or other ground-based harvesting systems that may be approved by the Tribe and BIA. Cable yarding should be used on steeper slopes. Tree retention of a mix of both "hard" and "soft" snags at a rate of at least 3 stems per acre should be considered.
- Riparian Management Zones will be established on existing streams as part of any forest management activity. The RMZs will mirror the Washington State guidelines for stream zone protection and provide both stream protection and wildlife habitat.
- Streamside management zones will be established and managed to protect and improve the riparian habitat.
- On Lonesome Creek, a minimum of 80 feet will be excluded from harvest activ8ity except where species diversity is prescribed by 'tribal Biologist. Under that prescription, selective harvest may occur to create openings to plan desired species.
- Equipment will be excluded from operating in this Zone. All other stream zones will be managed for protection as determined by the tribal resource staff and Olympic Peninsula Agency [BIA] for forestry working together using guidelines developed for similar land classifications.
- On Trust Land the tribal requirements are coordinated with the BIA during development of the Environmental Assessment and incorporated in the BIA Contract/Permit for the project. The Tribe may also issue a permit prior to start of any activity. The Bureau of Indian Affairs along with the Tribe will work cooperatively to provide for the best management practices for all involved complying with all f3ederal laws that impact forest management.

An Environmental Assessment was done as part of the above plan. On page 4 of that addendum it is noted to protect/monitor the water in Lonesome Creek (this serves our hatchery). The Tribe is doing so by monitoring such water supply under CWA 106 in two places, monthly and after storm events. On page 7 of the EA, under Potential Impacts, it is stated that "timber harvest activities will be planned to avoid active channels and associated wet areas. Depending on the site, ground-based harvest operations will occur during periods of dry conditions to avoid potential impact to ground water. There should be no other restrictions to forest management activities…" With respect to endangered species (no fish listed out here, but we do still have potential for listed forest birds), vigilance for their presence should be exercised and if noted, reported to USFWS.

Quileute has reviewed the Yakama examples of BMPs. To the extent that these may be applicable and advisable, Quileute can implement below:

- Ground cover maintenance
- Limiting disturbed areas
- Log-removal techniques—per BIA management instructions using current regulations at the time.
- Pesticide-herbicide management—not used on reservation except for knotweed (see above)
- Access roads --Quileute only has one access road to the reservation at present, State Highway
- 110. However, the reservation may increase in size one day.
- Slash management –per BIA management instructions using current regulations at the time
- Forest Site Preparation –per BIA management instructions using current regulations at the time
- Forest Stand Improvement (These stands are not managed now, as we don't harvest because they are on riparian zones. BIA did the Plan with us as a matter of course, notwithstanding.)
- Riparian zone management (our current policy is simply not to harvest here)
- Road management (see above BIA policy)
- Tree/shrub establishment (as we are not harvesting, we are not planting; where any harvesting occurred in the past, it was to clear for housing. Quileute is not really in the timber business the way tribes like Makah, Quinault, and Yakama, with their larger reservations, are)
- Quileute will work with BIA in operations that might impact water and follow the USEPA site for guidance: http://www.epa.gov/owow/nps/tribal/index.html and other links available and current on the EPA website for nonpoint pollution when conducting federal trust land forestry. BIA has oversight, under the above-discussed plan. Our plan has a specific CFR cited within.

STATE LANDS. Quileute has no jurisdiction on state lands, other than co-management of the fishery. Even with respect to water, we can only work with state agencies to improve water

quality and instream flows, and cannot exercise jurisdiction ourselves. We can only monitor water quality on land with landowner permission and the timber companies out here are adverse to tribal monitoring on their lands, at this point. This is known directly from our 8 years of watershed planning under RCW 98.82 in WRIA 20. Monitoring as a duty was expressly left out of the final plan or it would have been vetoed by the affected parties.

The Quileute Tribe has no checkerboard land ownership in the commercial or DNR timberlands (like Yakama) and cannot directly intervene in state harvest programs. Our Timber Fish Wildlife Biologist and his technicians can and do attend ID teams after learning of forest practices applications (FPAs) and they can point out if any proposed activity would harm the habitat from the tribe's perspective of fisheries and/or water quality, and if the practices are not in compliance with state requirements. The Tribe through the ID teams and through review of all FPAs and Hydraulic Permits for work in streams has input on state timber in such manner.

The regulatory program operating in the Usual and Accustomed Area is the forest practices regulation of the Washington Department of Natural Resources: Forest Practices Act RCW 76.09 and 76.13, as well as the regulations promulgated thereunder: Forest Practices 222 Washington Administrative Code (WAC). Also operating: Washington state timber's Habitat Conservation Plan and private timber's Habitat Conservation Plan, each under Section 10 of the Endangered Species Act. Also operative, the WDFW rules and policy for Hydraulic Permit Applications. One application by the state for culvert correction is the Stream Simulation method espoused by WDFW and other state agencies. This is a model that applies the best culvert to a situation. This is not done by Quileute but by a landowner partner in a project. See, e.g., http://wdfw.wa.gov/hab/engineer/stream_monitor.pdf.

Technical assistance exists in the form of support from Northwest Indian Fisheries Commission (NWIFC) staff, who can provide expertise and training, but largely, the tribe's TFW biologists have to, and do, master the law applicable. They funded by BIA appropriations under PL 93-638. They review the RMAPs, HPAs, and other forms of application for the forestry or stream bed activities. Occasionally a seminar arises, from University of WA, or NWIFC, or a state agency, and they take advantage of that.

In addition, the attorney/policy analyst (who is also a geologist—BS and MS) attends salmon habitat restoration programs such as North Pacific Coast Lead Entity, Washington Coast Sustainable Salmon Program, and is a member of the Resource Advisory Committee for Title II to do habitat work on USDA FS (USFS) lands. She is funded under EPA GAP/PPG. She is aware of funding and habitat restoration strategy and communicates closely with the TFW biologist. She also takes advantage of training under GAP funding, either professional seminars or state agencies' presentations. When feasible, she and the TFW biologist either write grants for habitat restoration in timber lands, or partner/support others doing so. The funds available include state Recreation and Conservation Office funds, NOAA watershed programs, EPA watershed programs, and Title II through the counties and USDA FS. NOAA and EPA watershed programs usually require large areas with major community contribution and rarely focus on spot work, so are not generally useful for the type of projects we have in our

watershed. USFWS has certain habitat restoration programs available, but favors areas with listed species. All of our restoration needs have been identified as of 2006 by an assessment using BIA funds and participation of all stakeholders.

Because the state program for salmon restoration under the Recreation and Conservation Office will not cover indirect rates for tribal employees, it is not ideal for our purposes. Our tribe sees grants as means of employment in an area with 60% unemployment. We promote others without this constraint to do work in our watershed (e.g., landowners, NGOs), and partner with them by offering in-kind work of our staff. We have used this program successfully in the past to do culvert and cross drain work, as well as one log-jam project to restore an upland fish-bearing stream that lost wood in the Forks Fire of the 1950s. All these engaged contractors so the indirect issue was not relevant.

The regulatory program operating is the forest practices regulation of the Washington Department of Natural Resources: Forest Practices Act RCW 76.09 and 76.13, as well as the regulations: Forest Practices 222 Washington Administrative Code (WAC). Also operating: state timber's Habitat Conservation Plan and private timber's Habitat Conservation Plan, each under Section 10 of the Endangered Species Act. Also operative, the WDFW rules and policy for Hydraulic Permit Applications.

Technical assistance exists in the form of support from Northwest Indian Fisheries Commission (NWIFC) staff, who can provide expertise and training, but largely, the tribe's TFW staff has to, and does, master the law applicable. These people review the RMAPs, HPAs, and other forms of application for the forestry or stream bed activities. Occasionally a seminar arises, from University of WA, or NWIFC, or a state agency, and they take advantage of that.

In addition, other staff on the environmental end of things (water quality, salmon habitat) attend salmon habitat restoration programs such as North Pacific Coast Lead Entity and the Washington Coast Sustainable Salmon Program, , Our attorney/grant writer is a member of the Resource Advisory Committee for Title II to do habitat work on USDA FS lands. She is aware of funding and habitat restoration strategy and communicates closely with the TFW biologists. When feasible, she and they either write grants for habitat restoration in timber lands, or partner/support others doing so. The funds available include state Recreation and Conservation Office funds, NOAA watershed programs, EPA watershed programs, USFWS Tribal Wildlife funding, and Title II through the counties and USDA FS. NOAA and EPA watershed programs usually require large areas with major community contribution and rarely focus on spot work, so are not generally useful for the type of projects we have in our watershed. USFWS favors areas with ESA-listed species but does fund manangement concerns for tribally important species that are not ESA-listed. All of our restoration needs have been identified as of 2006 by an assessment using BIA funds and participation of all stakeholders. (See appendix of Assessment of NPSP.)

Because the state program will not cover indirect rates for tribal employees, it is not ideal for our purposes unless the project is clearly for a major contractor, like culvert work. Our tribe sees

grants as means of employment in an area with 60% unemployment. We promote others without this constraint to do work in our watershed (e.g., landowners, NGOs), and partner with them by offering in-kind work of our staff.

B. Knotweed eradication.

There are no regulations for removal of this weed, but we use protocol adopted by the local governments and agencies in Olympic Knotweed Working Group. There are EPA and Ecology requirements to use safe and biodegradable reagents such as glyphosate, that biodegrades, and protocol for how to apply it. The Tribe follows training of Olympic National Park for foliar spray and of Clallam County Noxious Weed Control Board for injection of cane. We use GPS to map (Trimbles) and the OKWG data dictionary. We use ESRI to make GIS maps. We have a trained GIS technician and several field techs are trained in use of Trimble GPS devices.

Continuous education and training, and recertification of applicators, comes from quarterly meetings of Olympic Knotweed Working Group, usually in Port Angeles, sponsored by Clallam County Noxious Weed Control Board.

The funding can come from a number of sources. USFWS funds knotweed removal but favors tribes with listed species and our salmon are not yet listed. Title II for projects on USFS land funds it but tends to give the lion's share to Clallam County Noxious Weed Control Board each time. Since they operate in our area to some extent we don't lose there but don't get the focus on the Bogachiel that we need. RCO funds it but we like to use our tribal techs and they won't pay for indirect so this provides a road block for our council's approving such grants. We would avidly support another's writing the grant for RCO and using a contractor to eradicate the weed. We would like EPA to fund it to the extent possible because 319 money would respect indirect costs. However, $30,000 would only reach some of the spots affected on the Bogachiel and not all of the affected infestations. It may be that with 319 funds we can partner with the County and get them to focus on the Bogachiel River.

There may be other funds we are not aware of. The USFS is slowly but surely catching up on doing its own lands after a lengthy period of doing a DEIS and finally a ROD. Olympic National Park manages its own lands. So the problem is largely on private and state lands.

We are taking estuary dredging off this program. The funding is beyond the scope of EPA and the accumulation of sediment at this major river mouth is not correctable by any restoration other than what might be done by forest practices, above.

4.3 Schedule of Milestones for implementation of the BMPs identified above.

A. To eradicate knotweed in theQuillayute mainstem and on the reservation. , we already have all the equipment and training. We just need funding. Each year the 319 funding notices go out, the Environmental lead at Quileute will write a grant application for the funding. This is if we prioritize knotweed, which we would like to do. We want to complete eradication of it in the Quillayute Basin.

We always seek to match funding from Clallam County, or volunteer work in kind through them. This will leverage the effort through EPA that we are making.

Each year that we get $30,000, we will use it directly that summer to eradicate weed until the funds are exhausted. This field work is always done June 15-September 10 or so, weather depending, because that is when the knotweed is above ground and has living canes to transfer herbicide down from the foliage or cane. (If it starts to pour continuously, and/or frost kills the weed, we end operations.) If it develops that revegetation is critical in an area, we can allocate some funds for that. Revegetation is on a case-by-case basis, as it depends on local bank situations, as described above.

We will begin upstream and work downstream each year until the weed is eradicated.
We will do this annually until the project is completed. If we receive sufficient funds to accelerate this work, and finish earlier we will use A on forestry or C, below.

Milestones (Years are FYs that run October 1 through September 30)

Activity in Quillayute Basin, having sub-basins of Dickey, Sol Duc, Calawah, and Bogachiel Rivers	**2015**	**2016**	**2017**	**2018**	**2019**
Each year Quileute grant writer will write grants for 319 funds or any other match or available funds. She also will do the reporting as required under such grants, with her partner biologist. This presumes partnering with Clallam County Noxious. Weed Control Bd.	x	x	x	x	x
For every grant, we have the approval process of first our elected Quileute Natural Resource Committee and then our tribal council. This has never been denied to our knowledge.	x	x	x	x	x
Insofar as funding permits, we will each summer eradicate spot knotweed reoccurrences in the tributary watersheds.	x	x	x		
Insofar as funding permits, we will go back to areas that need repeat applications.			x	x	x
Tribal staff will continue to go to Olympic Knotweed Working Group in Port Angeles for quarterly meetings to update on technical matters and keep up training for licensing.	x	x	x	x	x

B. To reduce impact from timber operations in the U&A: Recall from the Nonpoint Source Assessment that Quileute has already assessed the Quillayute River Basin throughout, working with stakeholders, landowners, and operators at every stage, to prioritize restoration projects. This is posted at : http://www.quileutenation.org/index.cfm?page=salmon_restoration.html. However, nearly all of the culverts are off-reservation on state-governed lands. Road decommissioning and culvert work are partner-dependent. We have a number of potential projects for culvert work, road decommissioning and bank stabilization with large woody debris. See Appendix for prospects on WDNR and USFS lands (Calawah watershed).

We would need to be able to assure partnering operators of available funding in order to schedule this, as they need to plan ahead in order to do culvert work. Actually, $30,000 is hardly enough to be a meaningful partner contribution for culvert costs, or road decommissioning, based on our grant

experience (either as an applicant or reviewer) in the past. Our last LWD bank stabilization grant cost c. $100,000 (finished in 2008). There are some small culverts. It may assist in planting after road decommissioning. Of course if we went for the $100,000 competitive fund, more is possible. Any selection of grant projects is partner-dependent. We do have the ability to go for SRFB moneys through the state for some of the expensive projects, as well.

Regularly at meetings with timber operators as time permits, our Timber Fish Wildlife Biologist can do the following (starting then to help with planning by the major financial players): Drawing on lists of small culverts from our 2006 assessment of restoration needs in the Quillayute, and later ones by landowners like the attached with WDNR, and/or road decommissioning: first, go over these with the landowner/operator and discuss what they can repair. If they agree, plan funding the small culverts for repair, or assist in restoring the contour and replanting, if a culvert is taken out and/or a road is decommissioned.

Quileute has no engineers. The culvert design and replacement is done by contractors and likely those approved by the operator in the case of private timber. In the case of WDNR, though, they have their own engineers. USFS has some in-house engineering, too. State entities rely on state of Washington documents on hydraulic modeling and type of culvert used (downloadable on the web—Design of Road Culverts for Fish Passages, WDFW, 2003.) The USFS has its own protocol. Based on CWA §319 grant size, this larger cost would be shouldered by the landowner/operator. Then Quileute would write a grant for CWA §319 funds from EPA. Then offer our match. Culverts are replaced during the dry summer months. Road decommissioning is likewise done then, to avoid disturbing migrating salmon. There is generally a hydraulic permit application that is required from WDFW. Quileute has blanket approval for these in the area from WDFW. This facilitates the process.

Although we want to prioritize knotweed with the uncontested $30,000, it could assist in replanting costs after restoration work. This would help to stabilize newly de-vegetated banks, or contoured land where a culvert was removed. Our schedule would be to contact operators each year and ask where these replanting can best be used.

Milestones (Years are FYs that run October 1 through September 30)

Activity	**2015**	**2016**	**2017**	**2018**	**2019**
Monthly or more often, Timber Fish Wildlife (TFW) Quileute biologist has opportunity to network with the timber operators/landowners when doing ID teams in the woods for their forest practices and can determine likely partnering for projects. This must be grant money, from Quileute's standpoint. The best time to plan this work is late fall/winter. Then grants are ready for the field season. [Sometimes the grant is written in Yr. 1 and done in Yr. 2. It depends on grant season timing.]	x	x	x	x	x

Annually in the spring, Quileute's Lead Entity (LE) representative meets with other salmon restoration parties in the watersheds of WRIA 20 and we discuss potential projects and partnerships. (This is the Salmon Funding Recovery Board process.)	x	x	x	x	x
Annually in the summer, Quileute's Lead Entity representative advises grantees (other than self) in the process from a technical standpoint, scores grants, and participates in the regional process to forward grants in the Quillayute Basin that protect water quality and fishable rivers. Thus even if we don't further a project, we can promote another's accomplishing same goal.	x	x	x	x	x
Partnering is not up to the Quileute because we don't own the land. Assuming a grant is feasible, and we have partner/landowner consent, we will write it and implement it for on-the-ground work to protect the stream from non-point source pollution. The layers of approval in-house are the elected Quileute Natural Resources Committee and then tribal council. The schedule is up to the granting agency. We will do this every year that we can find a partner and find the right grant vehicle.	x	x	x	x	x
The average culvert replacement is done in the summer and in the time of one summer. See above for conditions of implementation—whether we even can do this or not. The partner does engineering. Quileute would just secure the contract with grant money if that part is not a match. Same applies to buying the culvert. Some huge projects take two years. Engineering is done Yr. 1 and culvert/bridge is installed in Yr. 2.	x	x	x	x	x

4.4 Certification by Independent Legal Counsel that laws of the tribe provide authority to implement these programs, or description of what is needed to do so. Schedule and commitment by tribe to seek such additional authority.

No longer necessary. We have TAS for 319 now. However, the environmental coordinator writing this plan is an in-house WA State licensed attorney for the Quileute Tribe's Natural Resources Dept. We have no tribal attorney per se (all else is done with outside counsel, several different firms).

5.0 List of federal and other assistance/funding [other than 319(h)] available for supporting implementation identified.

The Quileute Tribe has access to PL 93-638 funds for matching, but it is significant to note that since the *US v Washington* decision of 1974 that first caused Congress to appropriate these funds for the tribal

fishery, they have not kept pace with salary increases and changes in cost of living. Tribes barely keep adequate staff to do the spawner surveys required by that case. Funds specific to timber management and shellfish biology have been added and are line items for that purpose. There are no water quality funds under PL 93-638. It may be that the tribe will give some hard dollars to these efforts, but it is a small and remotely located tribe with 60% unemployment (last census) and may find a need to direct its dollars for human services. We are 75 miles from Port Angeles and 100 miles from Aberdeen, surrounded by forest land, and jobs are scarce even in good times.

The USFWS has just funded Quileute for two years of knotweed removal in the Bogachiel River. This has a cap of funds and length of duration. We have easily 3-5 more years of work on this extensive, wide channel, according to our TFW biologist, and further, we need to go back over the Dickey, Sol Duc, and Calawah watershed sub-basins of the Quillayute to determine if any hardy little sprouts of this tenacious plant have returned (the knotweed is notorious for doing this and requires series of treatment over several years). That time line will be built into our plans for management herein.

The state **Recreation and Conservation Office (RCO, the old Interagency for Outdoor Recreation), which runs Salmon Funding Recovery Board,** also funds for knotweed removal but will not cover any tribal indirect costs, so is not a good program for this tribe. (We require using our tribal staff and that involves indirect costs.) It works well when all work is done by contractors, but we have trained staff and council prefers to keep using them. This Tribe is glad to partner with other entities which do not have the "indirect costs/need to employ tribal staff" issue that we have and through SRFB and the Lead Entity meetings (North Pacific Coast Lead Entity) we foster this. Pacific Coast Salmon Coalition is one such agency that we foster relations with in the Lead Entity through SRFB to fund work in our area. In other words, it does not have to be Quileute to do this.

The Quileute have written and been **SRFB grants** for stream restoration where contractors are used because the tasks require skilled planning and labor (e.g., culvert replacement, culvert to bridge, and steep slope harvest of large woody debris to be placed by helicopter in narrow upland fish-bearing streams, in log jams). For forest practices, this is always an option but the process is highly competitive and we just won and had our "turn" in the LEG for funds (only enough for one party to win, each year), for the LWD project described above. As planning with partners who *own* the land permits, we can do this in the future.

We know of funds for lands crossing **USFS** drainages under the **Title II** program but the lion's share of knotweed funds goes to **Clallam County Noxious Weed Control Board**, who has been supported by them for years. As noted above, we do benefit from their funding. *This provides the match to our own knotweed work so it is somewhat counterproductive to compete with it.* The Quileute environmental attorney/grant writer/geologist (writing this plan) sits on the **USDA FS Resource Advisory Committee** that awards the grants within each county. We were able to get match dollars from them in the amount of $15,000 for the Hyas Creek Large Woody Debris project finished last year to supplement the SRFB award, but as mentioned above we have used our current SRFB/LEG chip and the turn passes to someone else for a few years. Our LEG can only fund one grant a year and we have 6 governments and several NGOs in the LEG, as well as private citizens writing grants.

We used to get culvert repair/replacement grants through **BIA Watershed Restoration** grants but these were discontinued around 2007. The Recreation and Conservation Office (RCO) of Washington has stated it won't fund any grants for culvert repair in the timber lands because it claims the landowners have a duty to repair them. Of course they do, but (1) there are more than they can do all at once; culverts have a life span and high winds and weather in the rainforest also contribute to their damage; and (2) they have tended to put off repair until the regulatory deadlines of the state Forests and Fish regulations. This delay harms salmon, creating a period of default that harms their spawning capability for X number of years until the culverts are fixed.

While we have seen advertisements by **NOAA for major restoration projects**, they are generally on a *basin-wide basis and we don't have that kind of situation.* We have spot damage to culverts in diverse localities across several different stream basins. We don't have an entire basin in need of focus of that type.

Quileute previously submitted a proposal to **Wild Salmon Center** for the Quillayute Basin to be nominated as a wild salmon stronghold. This Oregon non-profit is one of the few that supports stream restoration where salmon are not yet ESA-listed. (Most funds of NOAA and others go to listed fish.) We were unsuccessful in having the entire basin so designated, but the Sol Duc River sub-basin did receive this stronghold status.

The state **Centennial Clean Water Fund** goes to utilities. Our Utilities Department has not been in need of these funds. The state **Revolving Loan Fund**—same as above.

6.0. Identification of any federal assistance programs and development projects to be reviewed by the tribe for their effect on water quality or inconsistency with the tribe's NPSP Management Plan.

The Quileute do not know of any federal programs that are inconsistent with the above, other than Congress' electing not to fund smaller ports of safe harbor like ours, for dredging.

7.0 Appendices.

7.1 References:

1. Army Corps of Engineers supplemental EIS, water quality data in Quillayute River on the reservation of Quileute Tribe, 2000-2001. Unpublished.
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Olympic National Forest, Olympia, WA. (Lead agency US Forest Service, Quileute a partner)
5. Dieu, J. and B. Shelmerdine. 1996. Sedimentation Assessment. In North Fork Calawah Watershed Analysis. Olympic National Forest, Olympia, WA. (lead agency US Forest Service, Rayonier and Quileute were partners)
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8. Hook, A. Sol Duc-Hoh Watershed (WRIA 20) Phase II Technical Assessment. 2004. For WRIA 20 Watershed Planning Unit.
9. Jackson, R. 1996. Hydrologic Change Assessment. In North Fork Calawah Watershed Analysis. Olympic National Forest, Olympia, WA. (lead agency US Forest Service, Quileute a partner)
10. Jackson, R. 1996. Hydrology. In Sol Duc Pilot Watershed Analysis. Washington State Department of Natural Resources, Olympia, WA. (lead agencies US Forest Service and WA Department of Natural Resources, Quileute a partner)
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12. KCM Wastewater Facilities Engineering Report (2 vols.). 1998. (for Quileute Tribe)
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16. Samuelson, C.E. et al. 1982. Effects of Current Logging Practices on Fish Habitat in Five Western Washington Streams. For Symposium of American Institute of Fisheries in Juneau, AK.
17. Smith, Carol, et al. 2000. Salmon and Steelhead Habitat Limiting Factors in the North Washington Coastal Streams of WRIA 20. (prepared by WA Conservation Commission)
18. WA State (Ecology) 303(d) list
19. Wilson, S. 1998. Channel. In Sitkum and South Fork Calawah Watershed Analysis. Olympic National Forest, Olympia, WA. (Lead agency US Forest Service, Quileute a partner)

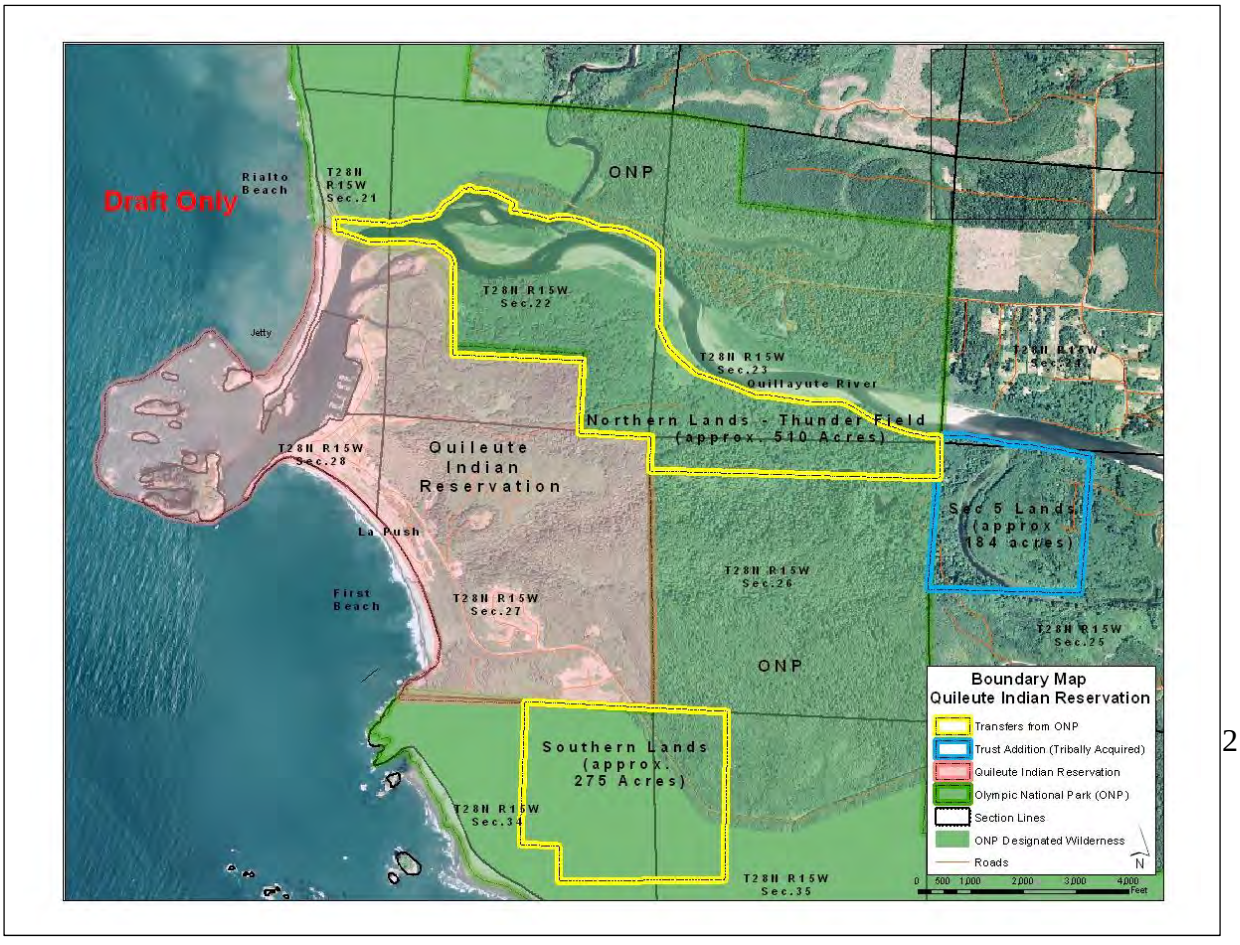
7.2 Examples of cooperative partnerships and processes in place

MOU with USFS
MOU with Olympic Natural Resource Center of University of Washington
WRIA 20 Watershed Planning/Implementation (currently inactive; no state funding, but plan in place to use for prioritization when writing grants). The relevant plans, assessments, and reports developed thereunder are now posted by WA Department of Ecology and downloadable at:

http://www.ecy.wa.gov/programs/eap/wrias/Planning/20.html

North Pacific Coast Lead Entity and
Washington Coast Sustainable Salmon Partnership.
The relevant plans, strategies, and other support material are downloadable at:
http://www.wcssp.org and http://www.wcssp.org/northpacific.html

A map of the Treaty of Olympia -- Quileute Treaty area -- can be found at http://www.quileutenation.org/natural-resources (pdf downloadable at bottom of that page). Further, we are showing herein below a map of new reservation lands, per federal legislation PL 112-97 (2/27/2012). We understand that only lands with drainage into the Quillayute River or any other waterbody flowing into the reservation (there is already a tiny independent creek, Lonesome Creek, "within former reservation boundaries", that runs through the reservation) are eligible for CWA 319 funding. We regret that we have not yet been able to prepare a map indicating the lands already transferred into tribal trust such as the Southern Tract but unless there is a small independent drainage that flows into the Reservation from that Southern Tract, we know that CWA 319 funds won't be applicable to it. As of this writing, the Northern Lands (about 500 acres) have been surveyed and the MOU with the Park has been signed; only the filing of the papers of record is pending before they part of the Reservation. That filing is imminent. They are on the Quillayute River. That Section 5 Tract of 184 acres is already tribal fee land and also adjacent to the Quillayute River. We are completing the last legs of PL 112-97 duties before it becomes trust land. That transfer to trust should be completed in FY 2015.



7.3 Acronyms

ACOE	Army Corps of Engineers
BIA	Bureau of Indian Affairs
BMP	Best Management Practices
BOR	Bureau of Reclamation
CWA	Clean Water Act
EPA	Environmental Protection Agency
ESA	Endangered Species Act
GAP	General Assistance Program of
EPA GIS	Global Information System
GPA	Global Positioning System
LWD	Large Woody Debris (logs, root
wads) MOU	Memorandum of Understanding
NMFS	National Marine Fisheries Service
NOAA	National Oceanographic and Atmospheric Administration
NPSP	Nonpoint Source Pollution
ONP	Olympic National Park
PPG	Performance Partnership Grant of EPA
QNR	Quileute Natural Resources
RCO	Recreation and Conservation Office (WA)
SRFB	Salmon Restoration Funding Board
TFW	Timber-Fish-Wildlife (WA process)
USFS	US Forest Service
USFWS	US Fish and Wildlife Service
USDA	US Department of Agriculture
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WSA	Watershed Analysis

7.4 Attachments

Knotweed Protocol
WDNR culvert list
PL 112-97 (map relating to this is embedded under 7.2 above)
Calawah Watershed Plan (USFS)
USFS Sitkum Stewardship materials
Quileute Forest Plan (BIA)

APPENDIX: KNOTWEED PROTOCOL

(1) OBJECTIVES: The overall goal is to eliminate knotweed from the Quillayute watershed. To achieve this end, the tribe has (some objectives are overlapping):

(a) Taken the prior assessment data of location, species, density, and such (using data dictionary of Olympic Knotweed Working Group), and developed a schedule for staff. Since we have virtually completed the watershed work as of this writing, we will be periodically canvassing areas visually that need retreatment.

(b) Hired needed staff/arrange for partner efforts

(c) Continued to work with our LEG and others to alert landowners (outreach, planned work)

(d) Made necessary purchases of chemicals, safety equipment, removal equipment, etc. (some equipment is on hand from prior grants)

(e) Obtained permits for land entry (some of this is done immediately upon notice of the grant award). For timberland such as DNR or Rayonier's, permits/permission documents are obtained for entry. Quileute contacts landowners directly for permission to enter smaller tracts. (Over the years our reputation of working with Clallam County and City of Forks on knotweed has greatly facilitated this process.)

(f) Removed the knotweed—Sequence: begin upstream, work downstream to remove the species. Foliar spraying e most effective on days of no precipitation; used where the stands are not adjacent to waterbodies. Canes are injected separately when adjacent to water. (See methodology, below—safety, environmental issues.)

(g) Repetition 2-3 times after initial application, where and when needed. (See timeline, below.) This is all in the first season of application.

(h) Year Two—follow-through with final "kill". Photograph returning native vegetation. Show photos of before/after.) We find that at least 2 years are needed to eradicate because the second year we often see return of deformed and stunted plants. Repeating treatments is therefore necessary.

(i) Interim and final reports when appropriate.

Other goals/objectives are to improve knowledge of knotweed control for both this tribe and the other entities who belong to Olympic Knotweed Working Group . This has no particular timeline; it is ongoing. Throughout the 10+ years that the tribe has been eradicating knotweed in the Quillayute Basin, we have been an active part of the informal Olympic Knotweed Working Group (OKWG), comprised of tribes, local government, state government, universities, and interested private citizens. We meet frequently, present Power Points on our projects, exchange data, and improve each year as a result. All the tribes benefit symbiotically from sharing their knowledge with each other: Quileute, Hoh, Makah, Quinault, Jamestown S'Klallam, and Elwha Klallam. The group includes federal, state, and local government agencies as well as non-profits and universities.

Quileute has worked with Laura Urgenson, a recent PhD at University of Washington, who has made knotweed a major topic of her research. We have prepared sample study plots under her

direction (see appendix for photo), and she has determined critical matters; e.g., that knotweed leaf litter has less nutritional value than that of the native plants. She is now looking into allelopathic impact of the plants.

With Clallam County Noxious Weed Control Board, we have helped to educate the local residents how to control knotweed before it enters the larger ecosystem (it originated here as a decorative plant!) from people's gardens and they are beginning to respond. Some of these locals are tribal members, living in Forks, the Reservation, or between. On the Reservation, we have treated knotweed over successive years and have educated the general public on this, so they advise us of outcrops when they show up.Unfortunately, because we are at the bottom of the huge watershed, some reinfestation has occurred which we need to address.

The benefit to the tribe is measured in salmon habitat preservation/restoration because the salmon are a traditional staple, culturally important for our ceremonies, and commercially a part of the tribal economy.

(2) PROPOSED TIME LINE: Before entering property we get needed licenses and agreements. It is understood that EPA has added NPDES as a new layer of authority before working in this arena. As mentioned in (g)-(h) above, two seasons are required at a minimum. We need to wait until mid-June/early July to start, so the canes mature enough to treat. We need to finish by September because then the canes die back and herbicide is not transferred through the plant. We estimate 10 weeks over two seasons will do the job, based on prior projects. This presumes two teams of two moving on each side of the stream. That having been said, at the downstream end of a huge watershed with a number of tributaries, re-infestation is a problem to watch for.
We always begin with the most upstream invasions and move downstream since water is a vector and thus we treat it all effectively.
The Quileute staff attends Olympic Knotweed Working Groups and other meetingsregularly and keeps current with licensing and permits as required for the field work .

(3) METHODOLOGY: The methods have been honed over 10 years, by working with the Olympic Knotweed Working Group, including training via that both association and Olympic National Park as well as some offered through agencies or universities. Injection of each cane is highly effective but costly in terms of staffing. In the absence of precipitation and high wind or location in water, foliar applications have been just as effective and less costly from a labor standpoint. After initial foliar applications, we go back as needed during the season and repeat. We also learned that some persistent plants return one more year, although distorted in appearance and clearly stressed. So a return trip the next year for final eradication is essential.

(a) Equipment and supplies needed: Some gear can be re-used such as injection needles or foliar spray. Rain gear may sometimes be good for two seasons. Small protective field gear like gloves, facemasks, safety goggles, waterproof markers, paper towels, and insect repellent and such need annual replacement. We use government vehicles already leveraged under other programs. The preferred chemicals are AquaNeet or GlyPro (herbidide) and Dyna Mark UV blue dye as well as surfactants. In the office we usually already have a desktop

computer with GIS programs, map printer, 2 hand-held GPS units with 1-3 m. accuracy (one per team), and digital camera,

(b) Meetings: Meet internally to establish staff schedules (first month after award. Meet with landowners to secure agreements and determine convenient times. Participate in Olympic Knotweed Working Group meetings (agencies, landowners, tribes, counties, universities) to coordinate strategies.

(c) Jobs involved: Quileute TFW Manager coordinates and supervises up to 4 technicians/biologists, works with landowners, obtains agreements, attends above meetings. We generally have at least two persons licensed to apply herbicides by WA Department of Agriculture. A team of two technicians handles a GPS unit. Each team of two goes on either side of a stream, upstream to downstream (walking or by raft. Spray/injection crews are usually one licensed applicator and two technicians.

(d) Techniques/protocols: We are using the protocols developed by Clallam County Noxious Weed Control Board and Olympic National Park. We have taken training from both entities on several occasions. The control products applied are deemed by the USEPA to be "practically non-toxic to fish, aquatic invertebrates and honeybees" and binds immediately with soil. They biodegrade to water and carbon dioxide in two days. This type of work only contemplates land applications in periods of low water in the summer. In that situation the WA Department of Ecology, with primacy over permitting applications, does not require its usual NPDES permit. Herbicide license training is through Washington Department of Agriculture; Quileute has two licensed applicators. That person can lead non-licensed teams. Access: Local DNR assists us with SEPA/land use licensing, which they expedite for us. It takes under a month. We use signed agreements for private land. As applicable we will obtain NPDES permits from USEPA.

Safety considerations of protocol: Applicators use protective gear that includes rubber or latex gloves, goggles, chemical suits or rain gear/waders. We use the county's spill plan. We carry a bee sting kit and first aid kit. Each team is led by a licensed applicator.

Locating the sites: Our riparian and roadside treatment sites have been previously located by GPS, during our assessment and have been mapped onto GIS (see the Appendix). However, if someone calls us in Forks with a private landowner site, we include it into our program and obtain signed agreement with this person.

Foliar spray applications.

We use Glypro or Aqua Neet® spray, diluted to 5 – 6 % solution. The fluid is mixed with surfactant and Dynamark UV blue dye to aid in absorption and to detect where the spray has been applied. Care is taken not to apply in rain or significant wind and to avoid brushing

recently sprayed plants. If gear requires cleaning, it can be washed off in areas where herbicide application is otherwise desirable. The chemical fixes to the soil and then biodegrades. Care is taken to loosen the cap of the container of spray mix, then retighten, to prevent pressure problems and potential spill in the truck bed.

We return a few weeks after initial application to ensure all plants have been treated/treat any plants missed initially. Sometimes large patches need to be treated in stages. The second year we go back and treat any new growth or missed canes. About 1-5% of canes will regenerate after initial treatment. We survey and treat again as may be needed

Injection methods: Wherever the licensed applicator deems foliar application to be a hazard to water, or in periods of high winds or precipitation, we use JK Injection Tools "guns" -- four times faster than the former "bore and needle injection" method. They became available in 2004 and have proven to be very successful. 3 cc of undiluted herbicide (Glypro or Aqua Neet® -- manufactured by Monsanto, trade names for Glyphosate--at 100% --undiluted), are injected into each cane, in the bottom-most segment, below the lowest visible node. The specific gravity of the herbicide is higher than water and so the material immediately goes down into the rhizome system and kills the whole plant systemically. The herbicide goes directly into the plant and does not migrate out before biodegrading. If any should fall onto the soil, however, it will bind with it, not migrate, and will then biodegrade.

Applicable to both types of treatment: Record treatment site on GPS and enter data into Data Dictionary for downloading onto GIS map. This is to link treatment to the previously noted features in assessment. Care is taken throughout not to cut or otherwise create new vegetative pieces that can generate new plants. Herbicide will be contained in tightly sealed floatable containers so that the possibility of spills into the water will not occur. All backpack sprayers will be emptied of contents.

Rafting of stretches of streams may be necessary where there is a lack of drivable access points throughout the system. Where a stream is easy to traverse along its banks by foot. rafts are not necessary. Rafts are be oared by QNR personnel with years of rafting experience on this system from doing salmon redd surveys. Two-man rafts are preferred over boats because of their maneuverability in the low-water conditions that will exist in summer. Quileute has provided skilled rafting/boating personnel and equipment to assist Clallam County and Olympic National Park in their efforts to control knotweed in difficult to access reaches of their projects.

Quileute shares site data with other entities that need the mapping information; e.g., Clallam County Noxious Weed Board, or Olympic Natural Resources Center of the University of Washington in Forks (metadata center).

(e) Dealing with Land Ownership: While the treatment areas are usually not on tribal

land, they are wholly within the Quileute's treaty area for fish and game management, co-managed with the state of Washington. Much of this infested area is private U.S. Forest Service has been for the most part treating its lands. Some infestation is on state forest lands, and whenever we work on DNR land, we obtain a permit (it is routine by now). The private lands are covered by landowner agreements (example at end). We only work on such land after this is signed. In the ten plus years of our work on knotweed we have become known in the community and have not had any problems accessing the lands. When we work around people's homes, our supervisor always assures that property concerns will be respected before we begin work. Each team always has at least one licensed herbicide applicator per Washington's Department of Agriculture.

(6) Monitoring Plan:

About 3 weeks after an application, the process is repeated to catch areas that might have been missed by foliar applications, or where canes might not have been injected. In the subsequent year we also monitor for regrowth and treat it. We also note and photograph returning native vegetation. Data are entered in the GPS. Salmon redd surveys also provide a means of monitoring for any occurrence after the project is completed (there is always a chance of reintroduction, although Clallam County Noxious Weed Control Board has done an incredibly fine job of outreach to the community, with presentations, brochures, and training.

Re Goal 4.1—Tribal government: This project will directly impact harvestable numbers, long-term, and its results will be integrated into program decisions and tribal regulatory management for fish and game. We have both fish and game regulations, and through them manage harvest numbers and times, gear, and many other considerations.

This department tracks the population, health, and habitat conditions; and also enforces the violation of regulations by its members (issues citations, handled in tribal court). Its program staff members make fish enhancement decisions, write grants for habitat restoration, survey population changes over the years and participate in harvest decisions on an intertribal, state, and federal level. They survey aerially and on the ground elk herd strength, calf-cow, and cow-bull ratios. They have checked for chronic wasting disease.

The tribal goal is to eradicate the knotweed in the Bogachiel to:

(1) Create an environment that will allow native plants to return to the riparian zone—We document the native vegetation return with photographs.
(2) Eliminate threat of return and harm to downstream treated Quillayute River areas—this project's target sites have been logged on the GPS, quantified, and mapped. Olympic National Park is at the Quillayute mouth, and is also at risk if the Bogachiel knotweed is not removed; ONP has expended considerable effort in removing knotweed from locations near the river mouth.
(3) Improve salmon habitat for the four commercial runs of salmonids—with healthier (native plant) banks, hyporheic zones support more macroinvertebrates for salmon;

regrowth of native vegetation will ultimately restore stream channel shade, LWD, and nutritive leaf litter. The current populations will be better protected and future ones have a better chance at adequate spawning and rearing conditions. We survey redd numbers throughout this river system on index and supplemental streams, annually.

(4) Improve riparian forage for native elk and deer and habitat conditions for other wildlife species—returning native vegetation nourishes cervids and improves habitat for small animals, birds, and amphibians. We conduct aerial surveys of the elk herds annually (total numbers, and ratios of cows/bulls, cows/calves). We also track herds by radio collar on land, and keep track of morts and presumed causes.

This type of work needs to be done over two summers (sometimes threre) for a respective area, to be sure we have thoroughly treated this stubborn invasive plant. We generally plan to apply herbicide ten weeks each season, with 4 techs full-time and with one supervisor, 16 hours/week. The practice has been the past several years for the Tribe to leverage vehicle use (we lease annually via other funds) and certain hardware, software, and durable small equipment (like visors). The past several years Clallam County has matched with roughly $1000 in herbicides although this may not be reliable in the future.

Partners/Support: Since most work we do is off-reservation, the partner is always the landowner. Clallam County has funds to eradicate noxious weeds on its own and works with us, as well as other tribes, in the region.

Subsequently we did raft and walking assessments of all the other tributaries to the Quillayute and with GPS and data dictionary developed by Olympic Knotweed Working Group (state, federal, and local governments, academia, counties, and tribes) made a GIS map of knotweed occurrence in the U&A.

USFWS grants provided funding for all tributaries and for the mainstem of the Quillayute, which remains to be completely treated. We are also in the process of repeat treatments on the Bogachiel mainstem. This in theory could impact groundwater if we did not use rapidly biodegradable materials approved by EPA and Ecology and Dept. of Agriculture for knotweed eradication. Also, the work is not done in the water. It is done in the summer months when the streams have receded and the work is entirely on land.

Inserted on next three pages: Our Landowner Agreement Form. However, when grants come from RCO of Washington State, they have their own Landowner Consent forms.

PERMISSION TO ENTER PRIVATE LAND AND WAIVER OF LIABILITY

THIS AGREEMENT INCLUDES PERMISSION TO ENTER PRIVATE PROPERTY AND A WAIVER OF CERTAIN CLAIMS OF LIABILITY. READ CAREFULLY BEFORE SIGNING.

This Permission to Enter Private Land and Waiver of Liability is made between the Quileute Tribe's Natural Resources Department, hereafter referred to as "the Tribe," and _____, hereafter referred to individually or collectively as "the property owner(s)."

INTRODUCTION

1. The control and eradication of noxious weeds on public and private lands is in the public interest and the presence of knotweed (*Polygonum* spp.) on private lands threatens fish/wildlife habitat and provides a source for renewed infestation of public lands. Effective eradication of knotweed requires concerted efforts on both public and private lands to protect public resources.

2. The Tribe and its agents desire to perform activities to eradicate and/or control knotweed on public and private lands within Clallam County. These activities are authorized and carried out under one or more of the following chapters: 17.04 RCW, 17.06 RCW, 17.10 RCW, 17.24 RCW.

3. The property owner(s) is/are the sole owner of property located at _____ in (Clallam, or Jefferson County—indicate which), Washington, hereafter referred to as "the property."

4. The property owner(s) is/are interested in and benefited by the eradication and/or control of knotweed on the property.

5. The property owner(s) and the Tribe desire to memorialize an agreement for the purpose of eradication and/or control of knotweed on the property.

AGREEMENT

1. **Permission.** In consideration of the benefits described above, the property owner(s) grant permission to the Tribe and its agents, contractors, cooperators and employees to enter onto the property, with at least twenty-four (24) hours notice, from May 1, 2014, to October 31, 2017, to perform activities to eradicate and/or control knotweed on the property. The property owner(s) acknowledge and agree that these activities may include the application of herbicide to the property.

2. **Expiration and Revocation.** The Tribe and its agents, contractors, cooperators and employees are permitted to enter the property on all of the above dates and until October 31, 2017, or until this permission is revoked, whichever occurs first. The property owner(s) may revoke this permission by presenting a written letter of revocation to the Tribe. The revocation is effective five (5) business days after receipt by the Tribe.

3. **Liability Waiver.** The property owner(s) expressly agree to hold harmless the Tribe, and the agents, contractors, cooperators and employees of the Tribe, and to waive any claim of liability against the Tribe, and the agents, contractors, cooperators and employees of the Tribe, for any injury, damage, or harm which may result from entry onto the property under this agreement or from activities to eradicate and/or control knotweed on the property, including but not limited to, the application of herbicide upon the property. As to any other act or omission of either party under this agreement, each party shall be responsible for its own acts or omissions and those of its officers, employees and agents under this agreement. No party to this agreement shall be responsible to the other for the acts or omissions of entities or individuals not a party to this Agreement.

4. **Entire Agreement.** This Permission to Enter Private Land and Waiver of Liability contains the entire agreement between the parties with regard to the matters set forth herein.

5. **Applicable Law.** This Permission to Enter Private Land and Waiver of Liability shall be construed and interpreted according to the laws of the State of Washington.

BY THE SIGNATURE BELOW, THE PROPERTY OWNER(S) DECLARE THAT THE TERMS OF THIS PERMISSION TO ENTER PRIVATE LAND AND WAIVER OF LIABILITY HAVE BEEN COMPLETELY READ AND FULLY UNDERSTOOD AND VOLUNTARILY ACCEPTED AND EXPRESSLY WAIVE ANY CLAIM THAT THIS PERMISSION TO ENTER PRIVATE LAND AND WAIVER OF LIABILITY IS NOT FAIRLY AND KNOWINGLY MADE.

Property Owner(s) Phone Number:

_____

Property Owner(s)

Address:_____

Street

_____

City **County** **Zip**

_____ _____ _____

Name of property owner **Signature of property owner** **Date**

Property Owner(s) Phone Number:
_____

Property Owner(s)

Address:_____
Street

_____
City **County** **Zip**

_____ **_____** **_____**
Name of property owner **Signature of property owner** **Date**

_____ **_____** **_____**
Name of authorized representative **Signature of authorized representative** **Date**
Quileute Natural Resources **Quileute Natural Resources**

Contact information for Quileute Natural Resources: **Garrett Rasmussen, (360) 640-5380**

P.O. Box 187, La Push, Washington 98350

WA DNR culvert project information

DNR Project Information Update

Project Name	Category	Specific Stream	Watershed	Area of Improved Habitat	Project Proponent	Notes		2014 Update
Completed or removed from RMAP fish barrier list								
T27R13W-1	FB	Tributary to Goodman Creek	Goodman Creek	4590	DNR	G-1000	69 + 63	2011
T27R13W-12	FB	Tributary to Goodman Creek	Goodman Creek	748	DNR	G-2100	159 + 34	2009
T27R13W-15	FB	Tributary to Goodman Creek	Goodman Creek	0	DNR	G-2100	197 + 99	Fish passage not required
T27R13W-18	FB	Tributary to Goodman Creek	Goodman Creek	0	DNR	G-2100	212 + 00	Fish passage not required
T27R13W-35	FB	Tributary to Goodman Creek	Goodman Creek	1376	DNR	G-2100	104 + 58	2008
T27R13W-36	FB	Tributary to Goodman Creek	Goodman Creek	0	DNR	G-2100	85 + 98	Fish passage not required
T27R13W-38	FB	May Creek	Bogachiel	1200	DNR	G-2100	55 + 94	2008
T27R13W-42	FB	Tributary to May Creek	Bogachiel	6108	DNR	G-2100	11 + 62	2007
T27R13W-44	FB	Tributary to Dry Creek	Bogachiel	6006	DNR	G-2000	120 + 67	2007
T27R13W-45	FB	Tributary to Dry Creek	Bogachiel	9453	DNR	G-2000	139 + 06	2007
T27R13W-47	FB	Maxfield Creek	Sol Duc	980	DNR	G-2400	4 + 17	2007
T27R13W-49	FB	Maxfield Creek	Bogachiel	6600	DNR	G-2500	18 + 88	2007
T27R13W-53	FB	Tributary to Goodman Creek	Goodman Creek	2500	DNR	G-1000	71 + 99	2011
T27R13W-58	FB	Tributary to Goodman Creek	Goodman Creek	2400	DNR	G-2100	119 + 85	2007
T27R13W-75	FB	Tributary to Goodman Creek	Goodman Creek	2100	DNR	G-1017_3714	31 + 83	2011
T27R13W-87	FB	Tributary to May Creek	Bogachiel	0	DNR	G-2100	25 + 85	Fish passage not required
T28R13W-32	FB	Tributary to Mill Creek	Bogachiel	500	DNR	F-1100	23 + 91	2008
T28R13W-33	FB	Tributary to Mill Creek	Bogachiel	1529	DNR	F-1100	21 + 38	2008
T28R13W-37	FB	Tributary to Coon Creek	Bogachiel	0	DNR	F-2200	65 + 21	Fish passage not required
T28R13W-39	FB	Tributary to Coon Creek	Bogachiel	1200	DNR	F-2200	36 + 65	2011
T28R13W-4	FB	Tributary to Bear Creek	Bogachiel	1371	DNR	F-4200	74 + 57	2012
T28R13W-40	FB	Tributary to Coon Creek	Bogachiel	580	DNR	F-2000	113 + 48	2011
T28R13W-42	FB	Tributary to Coon Creek	Bogachiel	1160	DNR	F-2000	117 + 56	2011
T28R13W-44	FB	Tributary to Grader Creek	Bogachiel	0	DNR	F-2000	105 + 90	Fish passage not required
T28R13W-58	FB	Tributary to Maxfield Creek	Bogachiel	4400	DNR	G-2000	347 + 78	2012
T28R13W-7	FB	Tributary to Bear Creek	Bogachiel	0	DNR	F-4200	133 + 81	Fish passage not required
T28R13W-8	FB	Tributary to Bear Creek	Bogachiel	10262	DNR	F-4200	146 + 02	2012
T28R13W-9	FB	Tributary to Bear Creek	Bogachiel	0	DNR	F-4200	156 + 56	Fish passage not required
T28R14W-5	FB	Secondary Tributary to Bagachiel River	Bogachiel	1341	DNR	M-2000	19 + 78	2009
T28R15W-3	FB	Tributary to Coal Creek	Dickey	0	DNR	D-5000	189 + 06	Fish passage not required
T28R15W-8	FB	Tributary to Coal Creek	Dickey	300	DNR	D-5500	29 + 50	2007
T29R13W-1	FB	Tributary to Shuwah Creek	Sol Duc	0	DNR	B-2100	57 + 05	Fish passage not required
T29R13W-2	FB	Tributary to Shuwah Creek	Sol Duc	8000	DNR	B-2130	14 + 01	2012
T29R13W-5	FB	Tributary to Gunderson Creek	Sol Duc	0	DNR	D-2000	88 + 76	Fish passage not required
T29R13W-6	FB	Tributary to Gunderson Creek	Sol Duc	644	DNR	D-2000	59 + 51	2011
T29R13W-7	FB	Tributary to Gunderson Creek	Sol Duc	666	DNR	D-2000	57 + 73	2013
T29R13W-8	FB	Gunderson Creek	Sol Duc	20897	DNR	D-2000	41 + 26	2012
T29R13W-9	FB	Secondary Tributary to Sol Duc River	Sol Duc	0	DNR	T-1000	28 + 75	Fish passage not required
T29R14W-11	FB	Tributary to Thunder Creek	EF Dickey	0	DNR	D-2000	450 + 71	Fish passage not required
T29R14W-12	FB	Tributary to Thunder Creek	EF Dickey	1299	DNR	D-2000	451 + 34	2011
T29R14W-13	FB	Tributary to Thunder Creek	EF Dickey	514	DNR	D-2000	442 + 73	2013
T29R14W-15	FB	Tributary to East Fork Dickey River	EF Dickey	0	DNR	D-2600	15 + 60	Fish passage not required
T29R14W-16	FB	Tributary to East Fork Dickey River	EF Dickey	0	DNR	D-2600	27 + 62	Fish passage not required
T29R14W-18	FB	Tributary to Thunder Creek	EF Dickey	0	DNR	D-2000	425 + 09	Fish passage not required

DNR Project Information Update

Project Name	Category	Specific Stream	Watershed	Area of Improved Habitat	Project Proponent	Notes		2014 Update
T29R14W-19	FB	Tributary to East Fork Dickey River	EF Dickey	6493	DNR	D-2400	12 + 52	2011
T29R14W-24	FB	Secondary Tributary to South Fork Dickey Creek	EF Dickey	20	DNR	D-2000	217 + 17	2011
T29R14W-31	FB	Tributary to East Fork Dickey Creek	EF Dickey	0	DNR	D-2324	16 + 95	Fish passage not required
T29R14W-33	FB	Colby Creek	Dickey	2358	DNR	D-2300	68 + 39	2012
T29R14W-35	FB	Tributary to East Fork Dickey Creek	EF Dickey	5483	DNR	D-2000	171 + 65	2011
T29R14W-38	FB	Tributary to East Fork Dickey River	EF Dickey	0	DNR	D-2600	36 + 58	Fish passage not required
T29R14W-39	FB	Tributary to Thunder Creek	EF Dickey	1500	DNR	D-2000	390 + 11	2013
T29R14W-4	FB	Tributary to East Fork Dickey Creek	EF Dickey	14454	DNR	D-5100	219 + 91	2012
T29R14W-41	FB	Secondary Tributary to South Fork Dickey Creek	EF Dickey	0	DNR	D-2000	222 + 91	Fish passage not required
T29R14W-42	FB	Secondary Tributary to South Fork Dickey Creek		1094	DNR	D-2000	189 + 53	2009
T29R14W-43	FB	Tributary to East Fork Dickey Creek	EF Dickey	6000	DNR	D-5102.3	14 + 49	2013
T29R14W-48	FB	Tributary to Thunder Creek	EF Dickey	0	DNR	D-2420	42 + 62	Fish passage not required
T29R14W-5	FB	Tributary to East Fork Dickey River	EF Dickey	800	DNR	D-5100	215 + 35	2010
T29R14W-52	FB	Tributary to East Fork Dickey Creek	EF Dickey	7447	DNR	D-5102.3	27 + 31	2013
T29R14W-56	FB	Secondary Tributary to South Fork Dickey Creek	EF Dickey	1555	DNR	D-2310	25 + 38	2013
T29R14W-58	FB	Tributary to Thunder Creek	EF Dickey	1750	DNR	D-2000	388 + 10	2010
T29R14W-6	FB	Colby Creek	Dickey	31051	DNR	D-5100	165 + 53	2007
T29R14W-9	FB	Secondary Tributary to Sol Duc River	Sol Duc	1932	DNR	D-2200	63 + 06	2011
T29R15W-10	FB	Tributary to Coal Creek	Dickey	3000	DNR	D-5600	67 + 17	2007
T29R15W-11	FB	Cedar Creek	Cedar Cr	4200	DNR	D-5050	124 + 22	2013
T29R15W-12	FB	Tributary to Cedar Creek	Cedar Cr	3100	DNR	D-5055	0 + 76	2008
T29R15W-15	FB	Coal Creek	WF Dickey	8795	DNR	D-5040	69 + 90	2008
T29R15W-20	FB	Tributary to Siwash Creek	Ozette	0	DNR	D-5089-17R	2 + 16	Fish passage not required
T29R15W-23	FB	Tributary to Coal Creek	Dickey	9080	DNR	D-5320.7	4 + 28	2008
T29R15W-25	FB	Tributary to Coal Creek	Dickey	10406	DNR	D-5320	57 + 16	2008
T29R15W-3	FB	Tributary to Coal Creek	Dickey	5151	DNR	D-5000	239 + 28	2007
T29R15W-5	FB	Tributary to Coal Creek	Dickey	10308	DNR	D-5000	267 + 74	2007
T29R15W-6	FB	Tributary to Coal Creek	Dickey	500	DNR	D-5600	9 + 90	2007
T29R15W-7	FB	Tributary to Coal Creek	Dickey	6363	DNR	D-5600	21 + 27	2007
T30R10W-2	FB	Secondary Tributary to Sol Duc River	Sol Duc	619	DNR	B-9000	50 + 40	2010
T30R12W-17	FB	Tributary to Beaver Creek	Sol Duc	378	DNR	B-1500	15 + 38	Forest Service road
T30R12W-18	FB	Tributary to Beaver Creek	Sol Duc	3646	DNR	B-1500	18 + 73	2011
T30R12W-2	FB	Tributary to Rainy Creek	Sol Duc	340	DNR	B-6000	113 + 07	2011
T30R12W-20	FB	Tributary to Beaver Creek	Sol Duc	2400	DNR	B-1500	32 + 27	2011
T30R12W-21	FB	Tributary to Beaver Creek	Sol Duc	0	DNR	B-1500	50 + 24	Fish passage not required
T30R12W-3	FB	Tributary to Rainy Creek	Sol Duc	831	DNR	B-6000	122 + 95	2009
T30R13W-17	FB	Tributary to Skunk Creek	EF Dickey	316	DNR	RY-9006-8	0 + 71	2012
T30R14W-10	FB	Tributary to Thunder Creek	EF Dickey	11700	DNR	D-5200	432 + 08	2010
T30R14W-7	FB	Tributary to Squaw Creek	WF Dickey	0	DNR	D-5009.6	16 + 03	Fish passage not required
T30R15W-3	FB	Tributary to Siwash Creek	Ozette	0	DNR	D-5090	49 + 95	Fish passage not required
T30R15W-7	FB	Tributary to creek flowing into Lake Ozette	Ozette	0	DNR	D-5096	132 + 21	Fish passage not required

Quileute Forestry Plan, Sitkum Stewardship materials, Calawah Watershed Plan, and PL 112-97 are attached separately. (pdf documents)

WATERSHED RESTORATION PLAN

for National Forest System Lands within the

CALAWAH RIVER WATERSHED

(Sitkum, North and South Fork Calawah and Elk Creek)

March, 2011

WATERSHED RESTORATION PLAN

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CALAWAH RIVER WATERSHED

(Sitkum, North and South Fork Calawah and Elk Creek)

The Forest Service's Pacific Northwest Region Aquatic Restoration Strategy is a region-wide effort to protect and restore aquatic habitat across Washington and Oregon. The strategy relies on a collaborative approach to restoration and on focusing available resources in selected high priority watersheds to accomplish needed restoration activities on national forest system lands as well as other ownerships. In 2010 the Olympic National Forest selected the Calawah River watershed (5th field) as its "Focus Watershed" for the Washington Coast basin. Over the next several years the Forest Service will emphasize restoration within the Calawah River watershed and will work with partners to complete the high priority projects needed to protect and restore salmon and steelhead habitat in the basin.

Salmon and steelhead habitat protection and restoration efforts are needed throughout the Olympic Peninsula. It is not feasible or reasonable to concentrate all potential recovery projects within a single watershed and ignore the needs of other basins. We recognize that the Washington Coast Sustainable Salmon Partnership, the North Pacific Coast Lead Entity, and other organizations interested in salmon recovery will continue to implement priority projects on various streams throughout the peninsula as opportunities present themselves and resources become available.

The first step in the "Focus Watershed" process was to form a collaborative group of interested individuals to develop and implement a multi-year action plan aimed at promoting recovery of key aquatic processes and functions in the Calawah River watershed. The objective was to identify all high priority actions needed to protect and restore salmon and trout habitat within the watershed. While the focus of the group was on National Forest lands, the group also identified high priority aquatic restoration needs on other ownerships throughout the watershed.

Partners in the collaborative team include some of the current members of the North Pacific Coast Lead Entity (NPCLE) such as the Quileute tribe, the City of Forks, the Pacific Coast Salmon Coalition, Rayonier Timberlands, the Washington Department of Natural Resources, the Wild Salmon Center, and Clallam County. Additional participants in the collaborative team include the Olympic Forest Coalition, outdoor recreationists, interested private citizens and area residents.

This action plan, developed within the collaborative group framework, identifies the high priority work which is needed to protect and restore watershed health, water quality, and fish habitat on National Forest System (NFS) lands within the Calawah watershed. It targets the correction and improvement of conditions that pose a high risk to aquatic resources, provides estimated costs for the work, and outlines a general schedule for completion. The plan also demonstrates the alignment to larger scale efforts including: Forest Service Pacific Northwest Region Aquatic Restoration Strategy; Olympic National Forest Strategic Plan; Olympic National Forest Site-Specific Invasive Plant Treatment Project; Washington Coast Sustainable Salmon Partnership regional salmon restoration and recovery plan; North Pacific Coast (WRIA 20) Salmon Restoration Strategy; Quillayute Watershed Prioritized Salmon Restoration Projects; and Clean Water Act water quality improvement plans.

WATERSHED BACKGROUND

The Calawah River watershed originates in the Olympic Mountains, with elevations ranging from 3000 feet at the ridge tops to below 500 feet in the lowlands. The watershed encompasses over 86,000 acres. The three main rivers within the watershed are the North Fork Calawah, the South Fork Calawah and the Sitkum River. Elk Creek is a significant salmon producing stream in the lower Calawah watershed. The Calawah River derives its English name from its Quileute name, meaning 'in between, in the middle,' since it was the river (and area) that lay between 2 focal watersheds of Quileute country, the Sol Duc and Bogachiel Rivers. The major landowners in the Calawah River watershed are the Olympic National Forest, Olympic National Park, Washington Department of Natural Resources, Rayioner Timberlands, the City of Forks, and individual small private landowners. Homesteading of the Forks Prairie in the extreme western portion of the South Fork Calawah mainstem occurred in the 1850's.

Some timber salvage operations may have occurred after the devastating windstorm of 1921. Commercial logging began along the Sitkum River mainstem in the 1940's. Hyas Creek and Rainbow Creek had been minimally entered at the time of the Great Forks Fire in 1951. The Great Forks fire, which originated in the Sol Duc watershed and jumped over to the North Fork Calawah watershed, burned 33,000 acres in 8 hours. The fire burned through Hyas Creek, the northwest half of the Rainbow Creek drainage and the north edges of the Lower Sitkum drainage. Subsequent to the fire both drainages underwent extensive roading and salvage logging. Since the early 1950's extensive road systems have been built to facilitate timber harvest. Chronological aerial photo analysis of the Sitkum, and the North and South Fork Calawah subwatersheds indicate an increased frequency in mass wasting following timber harvest and road building. Mass wasting has resulted in large amounts of fine and coarse sediment being delivered into the tributaries and mainstems. Clearcut logging continued until the 1990's when the Northwest Forest Plan was adopted.

There are currently 163.6 miles of National Forest system roads within the Calawah watershed (Appendix B). The Olympic National Forest Access and Travel Management Plan (ATM) which was completed in 2003, identified 145.3 miles of road as having a moderate , high, or very high risk to aquatic resources because of the location of the roads in unstable terrain, the number of stream crossings, or the proximity of the roads to stream channels (Appendix A). The ATM plan evaluated future projections for Forest Service road maintenance funding and the needs for vehicle access against the potential risks to aquatic resources and recommended decommissioning a total of 57.1 miles of roads within the watershed. The road mileage totals above do not include unclassified, abandoned roads that are not on the Forest road network. During the recent Sitkum and South Fork Calawah timber sale planning process an additional 29 miles of abandoned road were identified in those drainages.

One of nature's geological oddities is worth mentioning. In the North Fork Calawah stretches of the mainstem channel that drain between 22 sq. miles and 32 sq. miles go dry during the summer months and occasionally during winter dry periods. This unusual hydrologic regime is directly related to retreating glaciers some 12,000 years ago. Meltwater from the glaciers used the North Fork Calawah valley as an outwash channel and deposited the sands and gravels found there today.

The Calawah River watershed supports significant runs of native salmon and steelhead including winter and summer run steelhead, fall coho, summer and fall Chinook, river-run sockeye, resident and sea-run cutthroat trout, and chum salmon. The watershed also provides habitat for non-salmonid species such as mountain whitefish, pacific lamprey, and sculpins.

The South Fork Calawah and Sitkum River watersheds are utilized by substantial populations of Chinook salmon, coho salmon, and steelhead trout, along with small populations of river-run sockeye salmon and chum salmon. Pacific lamprey and mountain whitefish are present in the lower mainstems of both drainages, although information on habitat utilization is very limited. Resident and sea-run cutthroat trout and sculpins are found throughout most of the watershed.

Natural geologic processes and man-made disturbances have helped shape fish distribution and habitat productivity. Drainages on the northern slopes of the Sitkum and South Fork Calawah watersheds, such as Hyas Creek, Rainbow Creek and the North Fork Sitkum River have bedrock falls which are migration barriers for anadromous fish. Of these three drainages only Hyas Creek has limited anadromous fish usage up to a barrier falls at RM 1.9. Resident cutthroat trout and sculpins are found in the North Fork Sitkum River, while no fish of any species have been found in Rainbow Creek. Anadromous fish usage in Lost Creek, which drains off the watershed's southern slopes, is limited only by stream gradient. In the upper Sitkum River mainstem a large debris jam may be the limiting factor for anadromous fish migration.

The lower, middle, and upper South Fork Calawah subwatersheds are within the Olympic National Park and are subject only to natural disturbances. These subwatersheds function as refugia habitat. Lost Creek appears to be a relatively stable watershed with intact riparian vegetation, due to limited timber harvesting and road building. Hyas Creek has very limited amounts of LWD in the stream channel and young riparian vegetation, likely the result of the Great Forks Fire of 1951 and subsequent salvage operations. Significant numbers of winter steelhead and fall Chinook spawn in the wide tailouts and riffles of the mainstem Sitkum and South Fork Calawah Rivers. Fall coho utilize Lost Creek and Hyas Creek.

The South Fork Calawah River provides a high quality sport fishery between its confluence with the Sitkum and North Fork Calawah Rivers. Tribal in-river gillnet fisheries are active in the Quillayute and lower Bogachiel Rivers, well outside the Calawah watershed boundaries. A Washington State Department of Fish and Wildlife steelhead hatchery is located 8 miles

downstream of the South Fork Calawah River, on the mainstem Calawah River. All fish production in the Sitkum and South Fork Calawah Rivers is currently from natural production, though in past decades juvenile salmon may have been planted in some tributaries

According to the *2002 Salmonid Stock Inventory* (SaSi), Calawah River fall and summer Chinook, fall coho and winter steelhead are rated as healthy. Summer run steelhead is listed as unknown due to lack of information on which to make a rating.

There are no known spawning populations of bull trout/native char in the Calawah watershed. Within the Quillayute basin, the only identified population of bull trout/Dolly Varden is found in the Sol Duc River, above the Sol Duc Falls at RM 65.5. This population above the falls is a resident population (SSI, 1998). Until 2009, there had been no sport angler reports of native char caught in the lower Sol Duc River or Quillayute system. In 2009 a sport angler fishing the lower Calawah River mainstem at @ RM 1-2, caught a native char. There are no known populations of bull trout in the Quillayute system, but foraging individuals may “dip in” from systems along the coast with known populations.

WATERSHED RESTORATION WORK COMPLETED THROUGH 2009

A variety of restoration projects have been completed over the last several decades in the North Fork Calawah, South Fork Calawah and Sitkum River drainages. Projects have included road decommissioning, road stabilization, correcting culvert fish passage barriers, riparian vegetation improvement, invasive plant inventory, treatment and monitoring, and large woody debris placement. A total of 29.8 miles of road have been decommissioned, 2 anadromous barrier culverts have been corrected, and 2.5 miles of stream channel have been improved by placement of LWD. The following is a break down by drainage of previous restoration accomplishments:

North Fork Calawah

- Road decommissioning – 12.4 miles of Forest Service roads have been decommissioned including 4.7 miles of road along Cool Creek, a major salmon steelhead producing stream;
- Fish passage – Two anadromous culvert migration barriers have been corrected. One barrier culvert was replaced with a bridge. A second barrier culvert on the FS 2923-060 road was permanently removed, tributaries 0183A and 0184;
- Riparian restoration – conifer seedlings have been planted (Figure 1)and existing suppressed conifers have been released along several miles of the mainstem and tributaries 0183A and 0184;
- LWD placement – A series of log jams and individual logs (Figure2) have been placed throughout one mile of the mainstem and tributaries 0183A and 0184, in partnership with Pacific Coast Salmon Coalition.

Figure 1. Riparian conifer planting.

Figure 2. LWD placement, tributary 0184.

South Fork Calawah:

- Road decommissioning – 7.4 miles of Forest Service roads have been decommissioned, including 4.8 miles in Lost Creek, one of the least disturbed streams in the Olympic NF;
- LWD placement – A series of log jams and log complexes (Figure 3) have been placed throughout 1.5 miles of Hyas Creek, a significant salmon and steelhead producing stream;
- Off-channel habitat – An overwintering pond was constructed along the mainstem South Fork Calawah (Figure 4). It is utilized by juvenile coho, steelhead and cutthroat trout.
- Invasive plant treatments using manual and herbicide methods

Figure 3. Woody debris Hyas Creek.

Figure 4. Overwintering pond, mainstem South Fork

Sitkum River

- 8.7 miles of Forest Service roads have been decommissioned.

Elk Creek

- 1.3 miles miles of Forest Service roads have been decommissioned.

WATERSHED RESTORATION WORK REMAINING

Many of the remaining high priority watershed restoration projects that need to be completed to protect and restore aquatic habitat in the Calawah River watershed have already been identified in existing documents including the Quillayute Watershed Prioritized Salmon Restoration Projects (Hunter, 2006), the North Pacific Coast (WRIA 20) Salmon Restoration Strategy (North Pacific Coast Lead Entity, 2010), the North Fork Calawah Watershed Analysis (USFS et. al., 1996), the Sitkum/ South Fork Calawah Watershed Analyses (USFS and ONP, 1998), and the recent Sitkum and South Fork Calawah Restoration Summary (USFS 2010). These documents and subsequent field recon and data gathering by aquatic and road maintenance personnel form the basis of the restoration action plan.

A small working group comprised of representatives from the Forest Service, the Quileute tribe, the Pacific Coast Salmon Coalition and local citizens met to validate high priority restoration projects previously identified in existing documents and to identify additional high priority restoration projects on both National Forest lands and non-Forest Service lands. The following goals were used to identify high priority restoration projects within the Calawah watershed:

- Reconnect disconnected habitats;
- Increase Large Woody Debris in areas of potentially high productivity for salmon and steelhead;
- Reduce or eliminate the potential for road related landslides/sedimentation that directly impact salmon and steelhead;
- Develop off-channel overwintering habitat;
- Improve future sources of LWD recruitment in riparian areas dominated by alder or dense second-growth plantations.
- Restore native plants and treat Japanese knotweed and other invasive plants in riparian areas.

Table 1 lists the high and moderate priority projects needed to protect and restore salmon and steelhead habitat on Forest Service lands within the Calawah watershed. On National Forest System lands the group identified:

- 24.4 miles of road decommissioning on road segments that present high risk to aquatic resources.

- 67 miles of drainage and stabilization work on roads that will remain open and drivable on the National Forest road network.

- 10 miles of Level 1 storage to close the road to vehicles, stabilize the roadbed, and insure adequate drainage while maintaining the opportunity to use the road again in the future. Level 1 storage is an intermediate step between drainage and stabilization and full decommissioning which potentially involves more aggressive drainage treatment.

Total estimated cost for needed restoration work on national forest system lands is approximately $ 6,957,740. Costs include project planning and design, contract preparation, and contract administration as well as funds needed to award contracts.

Inventories of unclassified, abandoned roads are not complete and additional high priority restoration needs may be identified on some of these road segments in the future. An inventory of existing ORV trails within the watershed is also underway and may identify additional sedimentation or fish passage issues that need to be addressed to protect and restore aquatic habitat. Periodic inventories for invasive plants are needed, as well as restoration strategies for native plant species.

If additional restoration project needs are identified, they will be added to Table 1 and included in the restoration action plan.

This restoration plan just identifies the work needs to protect and restore salmon and steelhead habitat on national forest system lands within the Calawah watershed. It is not a decision document. As funding becomes available, an appropriate NEPA analysis will be conducted for each proposed project to evaluate alternatives and select the best course of action.

Table 2 lists some of the high priority projects needed to protect and restore salmon and steelhead habitat on other land ownerships within the Calawah watershed. This is not intended to be a complete list of all remaining restoration work needed on other land ownerships within the watershed. The listed projects simply represent prime opportunities for collaborative restoration.

TABLE 1. REMAINING HIGH AND MODERATE PRIORITY WORK ON NATIONAL FOREST LANDS							
RESTORATION TYPE	**LOCATION**	**Miles / Acres /Sites**			**PRIORITY**	**ESTIMATED COST**	**COMMENTS**
Decommission / Convert to trail	**FS Roads 2912, 2912-040, 045, 050, 060, 063**	**11.3**			**High**	**$ 1,485,000**	**Decommission; design decommissioning for future use as a trail;**
Decommission / Convert to trail	**FS Road 29-072 and spurs**	**3.8**			**High**	**$ 486,000**	**Decommission; design decommissioning for future use as a trail;**
Drainage (culverts)	**FS Road 2922**			**10**	**High**	**$ 618,240**	**Replace deteriorating culverts;**
Drainage (culverts)	**FS Road 29**			**11**	**High**	**$ 1,030,000**	**Replace deteriorating culverts;**
Drainage / Stabilization	**FS Road 2922**	**12.6**			**High**	**$350,000**	**Improve drainage; restore ditchlines, replace d failing culverts; pull back unstable sidecast; install grade sags where appropriate;**
Drainage / Stabilization	**FS Road 29**	**36**			**High**	**$650,000**	**Improve drainage; restore ditchlines, replace failing culverts; pull back unstable sidecast; install grade sags where appropriate;**
Drainage / Stabilization	**FS Road 2923**	**13.7**			**High**	**$210,000**	**Improve drainage; restore ditchlines, replace failing culverts; pull back unstable sidecast; install grade sags where appropriate;**
Drainage / Stabilization	**FS Road 2900-030 (Mp 0.0 – 2.0)**	**2.0**			**High**	**$270,000**	**Continually failing culverts deliver directly to anadromous fish habitat in Hyas Creek.**

TABLE 1. REMAINING HIGH AND MODERATE PRIORITY WORK ON NATIONAL FOREST LANDS							
RESTORATION TYPE	**LOCATION**	**Miles / Acres /Sites**			**PRIORITY**	**ESTIMATED COST**	**COMMENTS**
Decommission	**FS Road 2923-015, 020**	**3.3**			**Moderate / High**	**$ 486,000**	
Decommission	**FS Road 2952-000**	**2.0**			**Moderate / High**	**$ 162,000**	
Pre-commercial thinning, young stands <20 years, in Riparian Reserves	**Sitkum, upper NF Calawah, South Fork Calawah, Albion Creek**		**474**		**Moderate/High**	**$ 75,000**	**Pre-commercial thinning of young forest stands, focusing on stream adjacent riparian areas to improve stand growth for future LWD.**
Level 1 (Storage)	**FS Road 2900-800, 815**	**7.0**			**Moderate/High**	**$ 364,000**	**800 road was partially decommissioned back in 1990's – roads look fairly stable, suggest removing shallow pipes**
Decommission	**FS Road 2900-810**	**1.3**			**Moderate/High**	**$ 162,000**	
Survey abandoned FS roads in Hyas Ridge area to determine risk to aquatic resources	**SF Calawah / Hyas Creek**	**29**			**Moderate / High**	**$20,000**	**Long abandoned roads crossing streams draining into Hyas Creek, may be landslide initiation points.**
Decommission	**FS Road 2922-200, 250, 300**	**2.7**			**Moderate**	**$ 270,000**	**Work may be limited; surveys needed to identify the scope of decommissioning**

TABLE 1. REMAINING HIGH AND MODERATE PRIORITY WORK ON NATIONAL FOREST LANDS							
RESTORATION TYPE	**LOCATION**	**Miles / Acres /Sites**			**PRIORITY**	**ESTIMATED COST**	**COMMENTS**
Level I (Storage)	**FS Road 2922-020**	**0.9**			**Moderate**	**$ 78,000**	**Road bed stable; remove culverts on live stream that deliver to mainstem NF Calawah, put in Level 1**
Level I (Storage)	**FS Road 2929-030**	**1.8**			**Moderate**	**$ 97,500**	**Road bed mostly stable; Bonidu Creek drainage; ATM consider for trail conversion.**
Decommission	**FS Road 2900-030 (MP 2.0 – 3.6)**	**1.6**			**Moderate**	**$ 92,000**	**Need to survey to identify level of work needed – above anadromous reach.**
Level I (Storage)	**FS Road 2900-105**	**0.5**			**Moderate**	**$52,000**	**Major aquatic risk is large culvert on non-fish trib. at end of road**
Total Estimated Cost for Needed Restoration Projects on NF Lands						**$ 6,957,740**	

TABLE 2. REMAINING HIGH PRIORITY WORK ON NON-FOREST SERVICE LANDS

RESTORATION TYPE	LOCATION	Miles / Acres /Sites			PRIORITY	OWNERSHIP	COMMENTS
Develop overwintering pond/habitat for juvenile salmonids	NF Calawah mainstem		2		High	Rayonier	
Assess feasibility of constructing engineered log jams in NF Calawah	NF Calawah mainstem	8			High	Rayonier	
Survey for noxious weeds along riparian corridors	Watershed wide				High	All ownerships	Initial knotweed surveys and treatments complete. Continuing need for periodic monitoring and follow-up treatments.
Work with landowners to identify riparian alder conversion to conifer, for future LWD recruitment	Watershed wide				High	All ownerships	

ALIGNMENT WITH LARGER SCALE MANAGEMENT STRATEGIES

Since the early 1990's watershed restoration within the Calawah watershed has been directed and/or guided by various land management plans, watershed assessments, forest-wide management strategies. Appendix B within the 2009 Sitkum / South Fork Calawah Watershed Restoration Summary (USDA 2010) outlines in chronological order the land management plans, watershed assessments and programs guiding watershed management within the Calawah watershed since the early 1990's.

The Calawah Watershed Aquatic Restoration Plan aligns well with larger scale management efforts including the Olympic National Forest forest-wide management strategies, Forest Service Pacific Northwest Region Aquatic Restoration Strategy, and WRIA 20 salmon restoration plans. The sections below provide a brief summary of how this plan tiers to these key larger scale management strategies.

Olympic National Forest Strategic Plan

In 2004, a team of aquatic, wildlife, silviculture and fire resource managers developed the Olympic National Forest Strategic Plan, a key management tool aimed at integrating projects among different resource areas to accomplish aquatic and terrestrial wildlife restoration objectives. The strategic plan ranked the North Fork Calawah River and South Fork Calawah/ Sitkum River watersheds as high aquatic priorities for restoration, based primarily on the amount of anadromous habitat on national forest system lands within the watersheds and the number of relatively healthy stocks of wild anadromous fish present in the watersheds.

Pacific Northwest Region Aquatic Restoration Strategy

The Forest Service Pacific Northwest Region Aquatic Restoration Strategy is aimed at improvement of watershed and aquatic/riparian habitat conditions at a Regional scale, using a combination of passive and active restoration efforts. Passive restoration is the broad-scale natural recovery of aquatic ecosystems and involves resource support, coordination and analysis and planning/design activities aimed at maintaining or improving habitat conditions. Active restoration involves active intervention (implementation of project activities) specifically designed to influence recovery. The Strategy relies on an increased diverse and close working network of internal and external partnerships.

Under this strategy, the Washington Coastal basin is ranked as a high priority for aquatic restoration. The Olympic National Forest selected the Calawah River watershed as the "Focus Watershed" within the Washington Coastal basin in which to emphasize restoration work. This decision was based in part on its ranking as a high priority watershed in the ONF Strategic Plan and the high level of partnership involvement in restoration through the North Pacific Coast Lead Entity.

Olympic National Forest restoration activities within the Calawah watershed resound well with the purpose of the Pacific Northwest Regional Strategy. Implementation of the Northwest Forest Plan is key to both ongoing passive and active restoration efforts. In addition, Forest aquatic specialists are actively engaged in coordination, analysis, planning, design and monitoring of projects that promote watershed recovery.

2001 Clean Water Act Memorandum of Agreement

The 2001 U.S. Forest Service Pacific Northwest Region and Washington Department of Ecology (DOE) Clean Water Act Memorandum of Agreement (MOA), is an agreement intent on meeting responsibilities under Federal and State Water Quality Laws. The MOA is aimed at improving water quality throughout the state and recognizes roads as the most significant contributor to water quality degradation within managed forests.

Work identified in this aquatic restoration plan meets the intent of implementation of the Clean Water Act. It emphasizes treatments that remedy of watershed conditions that pose a risk to aquatic resources, including water quality, riparian conditions and beneficial uses.

Westside Forest Water Quality Improvement Plan

The Total Maximum Daily Load (TMDL) process was established by Section 303(d) of the Clean Water Act (CWA). Federal law requires states to identify sources of pollution in waters that fail to meet state water quality standards, and to develop Water Quality Improvement Reports to address those pollutants. The TMDL establishes limits on pollutants that can be discharged to the water body and still allow state standards to be met. The Forest Service, Pacific Northwest Region is currently working with the Environmental Protection Agency and Washington Department of Ecology to develop a water quality improvement TMDL for water temperature for national forest system lands on the Gifford Pinchot, Mt. Baker-Snoqualmie and Olympic forests, and will therefore include the Calawah River watershed. The Westside Forest TMDL will address two water bodies listed as degraded on the Clean Water Act 2004 303(d) list for temperature within the Calawah watershed.

Appendix A - Olympic National Forest Road Management Strategy Aquatic Risk Factors

Geologic Hazard

Description of Indicator

The Geologic Hazard Factor uses landslide mapping and certain topographic, materials, and geologic conditions as an indicator of potential future mass wasting and sediment production. In general, this factor identifies those roads located within potentially unstable terrain or within areas with high sensitivity to erosion. In this context it is used primarily as an aquatic habitat and water quality risk factor. This factor evaluates the terrain that the road is located within and not the terrain above the road (refer to the Upslope Hazard Factor for assessment of the latter condition). Therefore, this factor is an indicator of the potential to initiate mass wasting or erosion from roads rather than the potential for impacts to roads from processes initiated upslope. This factor can also be viewed as an indicator for potential damage to the road system, cost of storm damage repair, or as an indicator of high maintenance needs.

The Geologic Hazard Factor and the Proximity (Delivery) to Fish Habitat Factor are weighted the highest among the aquatic risk factors. A numerical geologic hazard score of 3, 6, or 9 is assigned for each road segment as follows:

3 = No portion of the road segment lies within areas identified as high geologic hazard, and less that 30 percent of the road segment length is located within areas identified as moderate geologic hazard.

6 = 0 to 30 percent of the road segment lies within areas identified as high geologic hazard; OR greater than 30 percent of the road segment is located within areas identified as moderate geologic hazard.

9 = 30 percent or more of the road segment is located within areas identified as high geologic hazard.

Units of Indicator

The units are expressed as the percentage of road length within areas identified as low, moderate, or high geologic hazard.

Data Sources

The geologic hazard map was created by combining hazard units from the following Geographic Information System (GIS) map layers: 1) Slope Morphology, 2) Geomorphic Map Units (GMU), 3) Olympic National Forest Cooperative Soil Survey, and, 4) The Geologic Map of the Olympic Peninsula. Units from the slope morphology layer combine steep slope gradients with converging topography (or hollows) and are used as an indicator of potential for shallow rapid landslides and debris flows. Units from the GMU layer include those landforms that have a mass wasting origin, or a high incidence of mass wasting (GMU 70, 71, 72, 74, 77,78, 90 and 91). Units from the Soil

Survey layer include mapped landslides, glacial lacustrine (lakebed) deposits, mountain headwalls, and inner gorge landforms. Units from the Geologic Map include relatively weak bedrock units with a tendency toward large-scale landsliding and/or fine sediment production (Tlct, Tmsl, Ttru, and Ttrm), or mapped landslides (Qls).

Data Limitations

Complete Forest-wide coverage is available for the following data layers: Slope Morphology, Olympic National Forest Cooperative Soil Survey, and The Geologic Map of the Olympic Peninsula. The scale of the Geologic Map of the Olympic Peninsula is 1:125,000. Due to its scale, many existing slope movement features (landslides) are too small to be identified on this map. Therefore, only larger slope movement features are included.

Forest-wide coverage of the Geomorphic Map Units is incomplete. GMU maps have been produced for watershed analysis. Therefore, GMU data, including coverage of known slope movement or landslide features is available for some but not all watersheds. Availability of GMU data is expected to improve in the future as data layers are built and updated.

Proximity (Delivery) to Fish Habitat

Description of Indicator

The Proximity (Delivery) to Fish Habitat Factor combines criteria for sediment delivery efficiency based on landform type and physical distance from the fish bearing portions of the stream network. The purpose of this factor is to provide an estimate of how direct any road effects would be to fish and fish habitat. Direct effects (as defined below) receive high ratings, while indirect effects and moderate ratings are assigned to those areas that may deliver directly to the stream network, but are well upstream of the salmonid fish bearing portions of the network.

Sediment delivery efficiency is rated for all landforms as low, moderate, or high sediment delivery efficiency based on three primary factors: slope gradient, slope shape, and drainage density. Fish bearing streams are determined based on fish distribution data for all salmon species including anadromous and resident (cutthrout trout) salmonids. In order to connect landforms to the salmonid fish bearing portion of the stream network a proximity or distance factor was applied. For roads within moderate sediment delivery efficiency landforms, a distance of 150 feet was used to indicate a direct connection. For roads and streams within high sediment delivery efficiency landforms, a distance of 2,250 feet was used to indicate a direct connection.

The Proximity (Delivery) to Fish Habitat Factor and the Geologic Hazard Factor are weighted the highest among the aquatic risk factors. A numerical score of 3, 6, or 9 is assigned for each road segment as follows:

3 = Road segment is located within low sediment delivery efficiency landforms.

6 = Road segment is located within moderate or high sediment delivery efficiency landforms but the fish habitat is not, or it is further than 2,250 feet from fish habitat (at the nearest point).

9 = Both the road segment and the fish bearing stream are located within high sediment delivery efficiency landforms; AND 10 percent or more of the road segment is located within these areas; AND the road is within 2,250 feet of fish habitat; OR the road is located in a moderate sediment delivery efficiency landform and is closer than 150 feet from fish habitat.

Units of Indicator

The rating is assigned as low, moderate or high based on the highest rating given for greater than 10 percent of the road segment.

Data Sources

Sediment delivery efficiency is rated for all landforms on the Forest as a part of the Olympic National Forest Ecological Unit Inventory (EUI). Landforms are rated low, moderate, or high sediment delivery efficiency based primarily on three factors: slope gradient, slope shape, and drainage density.

Fish distribution data taken from the Olympic National Forest GIS coverage was used to identify fish bearing streams. Fish distribution included data for all salmon species anadromous and resident (cutthrout trout) salmonids.

To develop a direct connectivity of high sediment delivery landforms to fish bearing streams, a distance of 2,250 feet was applied. This value was used because in a population of 410 landslides and debris flows identified in three watersheds on the Olympic Peninsula, 80 percent of all mass wasting features ran out within 2,250 feet from the initiation site.

Discrete pathways, such as debris flow run-out models or 1st and 2nd order streams were not used to develop criteria for this factor.

Stream Crossing Density

Description of Indicator

The Stream Crossing Density Factor determines the relative hazard associated with stream crossings within the road segment. This factor is defined in terms of the frequency of stream crossings per road mile for each road segment. Frequency values are generated from GIS based on the number of times a stream segment intersects the road segment. A numerical rating for the stream crossing density factor is assigned to each road segment based on the following criteria:

0 = Road segment has no stream crossings.

1 = Road segment has a density of 1 to 2 stream crossings per road mile.

2 = Road segment has a density of 3 to 4 stream crossings per road mile.

3 = Road segment has a density which exceeds 4 stream crossings per road mile.

Units of Indicator

The units for stream crossing density are expressed as the number of stream crossings per road mile for each road segment.

Riparian Zone – Stream Proximity

Description of Indicator

The Riparian Zone – Stream Proximity Factor determines the relative degree of connectivity between the road system and the stream system. This factor is related to the portion of the road segment within the riparian zone or in close proximity to a stream. For this factor, riparian zones are defined as a 100-meter buffer width, which spans both sides of the channel, as measured from the center of the channel (50 meters either side of the stream). Values are generated from GIS based on the portion of road segment that intersects the riparian zone. A numerical rating for riparian zones is assigned to each road segment using the following criteria:

0 = Road segment has no road miles within the riparian zone.

2 = 1 to 33 percent of the road segment is within the riparian zone.

4 = 34 to 66 percent of the road segment is within the riparian zone.

6 = 67 to 100 percent of the road segment is within the riparian zone.

Unit of Indicator

This indicator is based on the percentage of road segment within 50 meters of the stream.

Upslope Hazard

Description of Indicator

The Upslope Hazard factor identifies those roads located downslope of steep converging topography or terrain designated to have a high potential for landslides. Impacts to both the road and the aquatic system often occur in areas with upslope hazard conditions. These hazard elements may initiate new hillslope failures or increase the magnitude of initial mass wasting events. Roads selected with this factor are often those with the highest frequency of storm damage. Culvert “blow outs”, dam break floods, debris torrents, diversions and cascading failures are the types of mechanisms often associated with these hazard conditions. Geologic (landslides, debris flows, etc.) and hydrologic (peak flow) hazards may both be factors in this type of environment. Traditional peak flow factors (percent of area in the rain-on-snow zone combined with hydrologically immature vegetative condition) were considered for this factor by ultimately not utilized.

The area above the road that is considered to have high geologic hazard and a well-defined pathway is used to make this assessment. The definition for geologic hazard for this factor is the same one used in the Geologic Hazard Factor. However, this factor differs from the Geologic Hazard Factor in that the road itself may not be on terrain that is considered hazardous, and the problems/disturbances affecting the road or the aquatic

system may not be initiated from the road itself. Well-defined pathways are defined as steep 1st, 2nd (or 3rd) order streams with gradients in excess of 15 percent that connect upslope areas of geologic hazard with the road below.

A numerical rating for upslope hazard is assigned to each road segment using the following criteria:

0 = Road segment has no terrain upslope rated as high geologic hazard that is connected to the road through a well-defined pathway.

1 = Road segment has < 1 acre of terrain upslope that is rated as high geologic hazard and is connected to the road through a well-defined pathway.

2 = Road segment has 1 to 10 acres of terrain upslope that is rated as high geologic hazard and is connected to the road through a well-defined pathway.

3 = Road segment has > 10 acres of terrain upslope that is rated as high geologic hazard and is connected to the road through a well-defined pathway.

Unit of Indicator

This indicator is based on the area above and connected to the road that is considered to have high geologic hazard conditions.

Aquatic Risk Factor Composite Rating

A composite rating of low, moderate, high and very high was assigned to each road segment based on combining values of the aquatic risk factors. Two methods were utilized to determine a final rating. Method 1 developed a cumulative aquatic score, given a sum total of all risk factors. The lowest possible score within the aquatic matrix is 6, the highest is 30, and the range of points is 23. Threshold scores were established by dividing the possible range the cumulative scores into thirds. Each category assigned this way has a range of 8 to 9. Method 2 based the rating on the combination of Geologic Hazard Factor and Proximity (Delivery) to Fish Habitat Factor. Method 2 does not include rating based on the other three aquatic risk factors. Road segments with high ratings for both factors were assigned a high composite aquatic rating. The composite rating of aquatic risk for each road segment is therefore based on the following criteria:

Low = Road segment has a combined numerical value that ranges from 6 to 14.

Moderate = Road segment has a combined numerical value that ranges from 15 to 22.

High = Road segment has combined values from the Geologic Hazard Factor and Proximity (Delivery) to Fish Habitat Factor rating equal to or greater than 15.

Very high = Road segment has a combined numerical value that ranges from 23 to 30.

For the purposes of combining groups of factors (aquatics, access, silviculture and wildlife, etc.), the high and very high categories are combined and considered to be a high concern for aquatic resources.

Appendix B - Forest Service Road Maintenance Levels

The following excerpt taken from the Forest Service Handbook 7709.58 Transportation System Maintenance Handbook provides descriptions objective maintenance levels 1-4.

Level 1. Assigned to intermittent service roads during the time they are closed to vehicular traffic. The closure period must exceed 1 year. Basic custodial maintenance is performed to keep damage to adjacent resources to an acceptable level and to perpetuate the road to facilitate future management activities. Emphasis is normally given to maintaining drainage facilities and runoff patterns. Planned road deterioration may occur at this level. Appropriate traffic management strategies are "prohibit" and "eliminate."

Roads receiving level 1 maintenance may be of any type, class, or construction standard, and may be managed at any other maintenance level during the time they are open for traffic. However, while being maintained at level 1, they are closed to vehicular traffic, but may be open and suitable for nonmotorized uses.

Level 2. Assigned to roads open for use by high clearance vehicles. Passenger car traffic is not a consideration. Traffic is normally minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation, or other specialized uses. Log haul may occur at this level. Appropriate traffic management strategies are either to (1) discourage or prohibit passenger cars or (2) accept or discourage high clearance vehicles.

Level 3. Assigned to roads open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities.

Roads in this maintenance level are typically low speed, single lane with turnouts and spot surfacing. Some roads may be fully surfaced with either native or processed material. Appropriate traffic management strategies are either "encourage" or "accept." "Discourage" or "prohibit" strategies may be employed for certain classes of vehicles or users.

Level 4. Assigned to roads that provide a moderate degree of user comfort and convenience at moderate travel speeds. Most roads are double lane and aggregate surfaced. However, some roads may be single lane. Some roads may be paved and/or dust abated. The most appropriate traffic management strategy is "encourage." However, the "prohibit" strategy may apply to specific classes of vehicles or users at certain times.

Forest Stewardship Program

Helping Private Forest Landowners Develop Plans for the Sustainable Management of their Forest

Program Purpose

Approximately forty-five percent of all forestland in the United States, or 354 million acres is under nonindustrial private ownership, contributing significantly to America's clean water and air, wildlife habitat, recreational resources and timber supplies. Authorized by the Cooperative Forestry Assistance Act of 1978, the Forest Stewardship Program (FSP) provides technical assistance, through State forestry agency partners, to nonindustrial private forest (NIPF) owners to encourage and enable active long-term forest management. A primary focus of the Program is the development of comprehensive, multi-resource management plans that provide landowners with the information they need to manage their forests for a variety of products and services. For more details on how the Forest Stewardship Program operates, see the National Standards and Guidelines.

- FSP Strategic Plan

- The Forest Stewardship Plan Resource Elements Guidance is a resource for plan preparers who are working to fully meet multi-resource management objectives of their landowner clients.

- Landscape Stewardship Guide (NA)

- Guiding Principles for Delivery of Coordinated Planning Assistance to Private Forest Landowners

"A new Appendix to the national standards and guidelines provides additional guidance for foresters preparing plans to expedite and facilitate participation in USDA cost-share programs when requested by the forest

suggestions for improvement.

USDA Forest Service
1400 Independence Ave. SW
Washington, D.C. 20078-5500
(202) 205-8333

landowner."

Forest Stewardship Management Plans

As of 2013 the Stewardship Mapping and Reporting Tool (SMART) has over 91,000 approved plans covering approximately 24 million acres of nonindustrial private forest (NIPF) land. Forest Stewardship plans lay out strategies for achieving unique landowner objectives and sustaining forest health and vigor. Actively managed forests provide timber, wildlife habitat, watershed protection, recreational opportunities and many other benefits for landowners and society. Forest Stewardship plans motivate landowners to become more active in planning and managing their forests, greatly increasing the likelihood that their forests will remain intact, productive and healthy, and that the social, economic and environmental benefits of these lands will be sustained for future generations. For guidelines relating to Forest Stewardship plan development, see Caring for your Forest with a Forest Stewardship Plan and Planning for Forest Stewardship: A Desk Guide.

- The Spatial Analysis Project (SAP) is a GIS-based strategic management tool that allows participating State forestry agencies to identify and spatially display important forest lands (rich in natural resources, vulnerable to threat), tracts currently under Forest Stewardship Plans, and areas of opportunity to focus future Forest Stewardship Program efforts.

Landowner Participation

Participation in the Forest Stewardship program is open to any non-industrial private forest landowners who are committed to the active management and stewardship of their forested properties for at least ten years. The FSP is not a cost share program. Cost-share assistance for plan implementation may be available through other programs such as the Forest Land Enhancement Program. To find out how you can participate in the Forest Stewardship Program offered by your State, please contact your State Forester's office. For a list of State Foresters, click here.

Rural Forestry Assistance

The Forest Stewardship Program also assists State forestry agencies with a variety of programs to further support NIPF owner planning and management efforts including tree improvement and seedling production, and landowner education programs. The Rural Forestry Assistance component of the Forest Stewardship Program also provides for tree

planting and timber stand improvement projects on non-federal forest land the development of discrete, resource targeted management prescriptions or practice plans for landowners.

For more information on how this program is managed nationally, contact Karl R. DallaRosa, Program Manager at kdallarosa@fs.fed.us.

Back to: Cooperative Forestry Home| Landowner Assistance

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Planning for Forest Stewardship: A Desk Guide

By D. Ramsey Russell, Jr., and Susan Stein

About the Authors

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INTRODUCTION

Since 1991, the U.S. Department of Agriculture (USDA) Forest Service Forest Stewardship Program has assisted over 200,000 landowners in preparing multipurpose management plans for areas encompassing more than 20 million acres of nonindustrial private forest (NIPF). These plans promote the long-term sustainability of private forests by balancing future public needs for forest products with the need for protecting and enhancing watershed productivity, air and water quality, fish and wildlife habitat, and threatened and endangered species.

After an assessment of 100 forest stewardship plans, it was recommended that a guide be developed to help field foresters better address forest stewardship values when writing plans for their States and regions. This desk guide is a response to that recommendation.

As established in the Forest Stewardship Program's *National Standards and Guidelines*, the plans must meet certain minimum standards:

> *Plans must identify and describe actions to protect, manage, maintain and enhance relevant resources listed in the law (soil, range, aesthetic quality, recreation, timber, water, and fish and wildlife) in a manner compatible with landowner objectives. The plan must be approved by the State forester or a representative of the State forester.*
>
> *(USDA Forest Service, Forest Stewardship Program, National Standards and Guidelines, p. 4.)*

This guide offers assistance to writers of the plans and includes instructions, requirements, excerpts from well-written plans, and specific recommendations for developing a plan. Plan writers vary among States and include State foresters, private consultants, and, through a coached planning process, landowners themselves.

The guidelines contained in this document should complement existing strategies for forest stewardship planning in each State. The detail included in the final plans should reflect the needs and standards of each State. Certain States have more comprehensive criteria for forest stewardship plans than is federally mandated; therefore certain recommendations in this guide may be used selectively to meet each State's unique situation. The suggestions included are drawn from current forest stewardship plans that were reviewed while preparing the guide; they are presented strictly for example.

Not all subjects discussed will apply to every property or forest stewardship plan. A major principle for organizing a plan is that each State must retain the greatest amount of discretion in identifying the needs of NIPF landowners in its region,

developing plans that reflect those needs, and putting to use those practices that best achieve their resource objectives. As the writer of a plan, you must be flexible in your thinking, allow for future changes, and incorporate, as it becomes available, new knowledge about dynamic ecosystems.

Finally, a copy of the Forest Stewardship Program's *National Standards and Guidelines* (Revised January 1994) is included in the appendix of this desk guide. Please refer to it for a complete presentation of forest stewardship philosophy, values, and requirements for written plans.

Larry Payne
USDA Forest Service
Director, Cooperative Forestry Staff

Writing a Forest Stewardship Plan

The purpose of the Forest Stewardship Program is to assist private forest landowners in more actively managing their forest and related resources; to keep these lands in a productive and healthy condition for present and future owners; and to increase the economic and environmental benefits of these lands.

Forest stewardship starts with landowners who care about their forest lands. They view their land as a source of family enjoyment, a chance to leave something special for future generations, as well as a potential source of income. They may need technical advice and financial assistance to make their vision for the land a reality.

From: Forest Stewardship Program, National Standards and Guidelines

Overview

The *National Standards and Guidelines* of the Forest Stewarship Program state that a "Landowner[‘s] voluntary participation in the Forest Stewardship Program represents a good faith commitment to implement strategies suggested in the land-owner forest stewardship plan." Participation in the program will not jeopardize private property rights. The plans, which "...identify and describe actions to protect, manage, maintain and enhance relevant resources listed in the law (soil, water, range, aesthetic quality, recreation, timber, water, and fish and wildlife)" will be written to be compatible with the landowner's goals and objectives for his or her property.

There is as much variation in the format of forest stewardship plans as there are writers of them. However, the Federal Government mandates certain elements of a plan and many States require additional criteria. This desk guide lists the Federal requirements; refer to your State guidelines for State criteria.

We recommend that you develop a standard format for your office (or better yet, State) that is succinct and easy to read. There is no length requirement, but the plan should describe the land and habitat conditions, identify the management objectives, and present management recommendations fully.

The basic requirements of a forest stewardship plan are to: 1) identify

the plan, 2) present management objectives, 3) describe baseline habitat conditions, 4) present management recommendations, and 5) include supplemental information relevant to the plan. A State forester or an assigned professional resource manager must verify that the plan meets minimum standards of forest stewardship.

Components of a Forest Stewardship Plan

1. Identify the Plan

A form, cover page, or cover section is generally sufficient to identify the plan and provide the basic information about the subject land and its surrounding property. At a minimum, the cover page(s) should include:

- Landowner's name, address, and phone number (some States require the landowner's signature)
- Plan writer's name, address, phone number, and signature
- Acreage under stewardship
- Date of plan

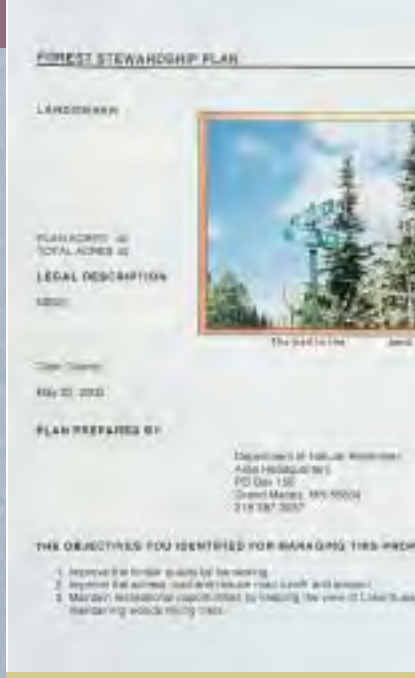
In succinct, perhaps bulleted, style, include the following additional data in the cover section.

- Landowner's objectives (stated in measurable terms)
- General property description with supporting management, or stewardship, objectives
- List of known threatened or endangered species
- Soils information

Also include maps depicting property boundaries, cover types, water, roads, and other topographical features.

The following data is optional but recommended to include in the cover section.

- Legal description for locating the site (plat survey information, tax book information, or written directions to the property)
- Interaction of site with surrounding properties
- List of Federal, State, or private landowner assistance programs for which the plan might also qualify



2. Present Management Objectives

After the cover section, which identifies the plan and presents an encapsulated version of the stewardship values, the plan must include a section on goals and objectives. This is perhaps the single most important element of a successful plan. Identifying and articulating a few, specific goals for the landowner to achieve in his or her forest management plans will increase the plan's overall effectiveness and landowner satisfaction. Moreover, once the goals and objectives have been identified, the plan will be easier to write because clear goals suggest straightforward, actionable solutions.

Landowner Objectives

The first and most essential task for you, the writer of forest stewardship plans, is to help the landowner identify and articulate his or her forest management objectives. It is important to develop goals by which the plan can be evaluated. Often the landowner does not have defined objectives or his or her objectives may be vague. You can help to clarify them.

Property deeds should be inspected to determine whether the property has restrictive easements. Certain easements may list specific conservation goals or place restrictions on activities that may be lawfully performed on the property. These restrictions must be considered when identifying goals and objectives.

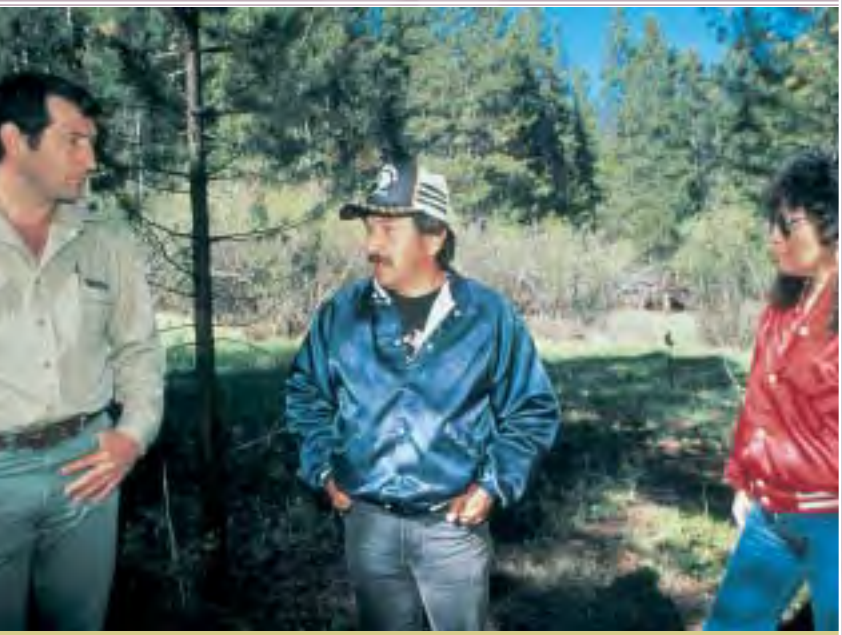
Planning brochures that include useful forest management facts and a brief questionnaire or application, which NIPF landowners may complete when inquiring about the Forest Stewardship Program, can serve to collect important data about the subject forest land. These fact-sheets, brochures, and questionnaires can help landowners identify their own needs and interest in forest resource management.

To determine a landowner's objectives, identify his or her interests, preferences, priorities, and financial and philosophical commitment to forest stewardship. Also determine the extent of the landowner's knowledge about natural resource management. This information is key to successfully implementing forest stewardship values. Knowing the landowner's expectations and abilities will enable you to set priorities for forest management and tailor management alternatives. The information will also help set priorities for field assessments.

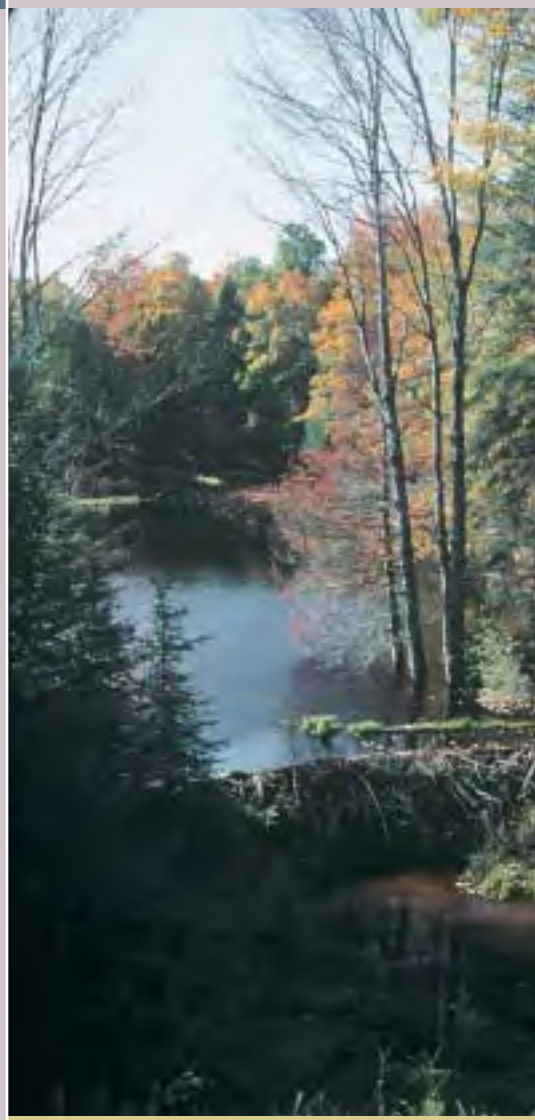
Solutions for Collecting Information

Kentucky and Minnesota forestry programs have designed pamphlets that contain a Forest Stewardship application, which is available to landowners through the offices of State Forestry and Wildlife agencies, the Natural Resources Conservation Service, and other sources. North Carolina has a stewardship request form available online at http://www.dnr.state.nc.us/managing/stewform.htm. North Carolina has received as many as 20 applications per month from its Web site when coupled with a media release or article.

To develop accurate landowner assessments, Michigan's Forest Management Division implements the Michigan Forest Stewardship Assessment Form, which the plan writer helps the landowner complete prior to preparation of the plan.



Plan writers should hold personal meetings with each landowner and complete a checklist of subjects pertinent to the stewardship plan. Foresters may also advise the landowner to contact a consulting resource planner or enroll in a coaching program, if available, for developing a plan on his or her own.



Complete the following exercises and ask the NIPF landowner the following questions.

1. **Place in rank order the following values for your property:**
   _____ aesthetics
   _____ recreation
   _____ timber production
   _____ fish and wildlife
   _____ range
   _____ water
   _____ soil
   (All the above resource values must be addressed in the forest stewardship plan, but it is important to help the landowner narrow the scope of his or her objectives. The forest stewardship plans will be most effective if they are directed toward achieving one major landowner objective.)

2. **How do the above priorities translate into specific objectives, and how can those objectives be evaluated? Define specific outputs desired.**
   (For example, is successful timber management best evaluated in terms of increased net present value? If so, specify the amount. Is successful wildlife management best expressed by number of songbirds on summer visits to the property or by average weight of white-tailed deer? If so, specify the number.)

3. **What is the landowner's timeframe for results?**
   (When does the landowner want or need results? How might the landowner's commitment to forest stewardship change if these time preferences are not achieved?)

4. **Are the landowner's financial expectations consistent with the anticipated results of the forest stewardship plan?**
   (How much time or capital can the landowner contribute to the plan? For noncommodity outputs (such as aesthetics or wildlife), how much is the landowner willing to forfeit in timber-related revenues?)

5. **Include any other considerations specific to your State.**

Discussion of Landowner Objectives

Many different factors influence a landowner's goals and objectives. You must help weigh all of the factors that will have an impact on a plan and the successful implementation of stewardship values. The following information highlights some of the matters that you must help a landowner consider before he or she settles on his or her final stewardship objectives.

Identify the realistic potential of the property from the perspectives of each type of habitat. Evaluate the property as a sum of its parts and as a part of its surroundings. Many wildlife species use different habitat types during their life cycles, and habitat attributes change as the forest matures. A covey of bobwhite quail has an average home range of 1 mile; the accepted minimum acreage required to sustain a breeding population of cerulean warblers is about 10,000 acres; and male whitetail deer range 5 or more linear miles during the breeding season. Knowing this kind of data is important for developing actionable goals. For example, a proposal to manage a 7-acre hardwood stand for black bear and grouse is not feasible. Instead consider the objective to sustain those parts of bear and grouse life cycles that can be satisfied by the present and future habitats, and then address how the species might interact with surrounding stand types for other parts of the life cycle.

Local economic forces may have an impact on a landowner's objectives. For example, timber buyers may have minimum volume or value margins below which they cannot or will not bid. A realistic objective might be to combine several timber harvests and decrease the number of operations. Base financial stewardship objectives on present and future economic considerations.

Consider the social and ecological value of each property in relation to its surrounding landscape and create goals that will have a positive impact, not only within plan boundaries but also beyond them. Take into account the current and future economic and environmental benefits associated with the forest resources at the county, State, and watershed levels. Consider the age, amount, and distribution of forests in relation to habitat gaps within the landscape and at the local, county, State, and national levels. Consider further the impact of prescribed habitat modifications to achieving a landowner's objectives, as well as State and national goals. How do all these factors affect the subject property? In short, of what importance are NIPF lands to the economic, ecological, and social issues in your county, State, and region? In addition, how do they relate to national conservation objectives?

Keep landowners informed of the decisionmaking process by showing them how their property fits into the big picture. When formulating alternative management strategies, plan writers should ask the following questions:

- Are there any constraints on the tract (that is, size, type, location) or on surrounding or adjacent land uses that may affect the landowner's objectives?

- What is the local pattern of land use?
- Are nearby or adjacent lands afforded long-term protection (that is, conservation or floodplain easements, tree farms, State wildlife management areas, national parks, or wildlife refuges)?
- Are the landowner's interests conducive to the long-term conservation of the property? If so, what groups or agencies in the area might provide such protection?
- Are there deed restrictions or easements that may limit the landowner's goals?
- Which forest management practices complement surrounding land-use practices and State or watershed priorities and needs?
- Are the landowner's priority objectives compatible?
- What effect will local economic forces, State regulation, adjacent landowners, or special interests have on implementing the Forest Stewardship Plan? (For example, the State of Mississippi assesses a special tax on landowners in the Delta that have restored forest wetland habitat on previously farmed lands.)
- Are prescribed management activities compatible with the landowner's goals? (For example, will recommended harvests generate sufficient wood products to generate positive cash flow for the landowner?)

Writing Landowner Objectives

Use clear, concrete language when writing landowner objectives. Goals must be achievable and should be expressed in terms that are easily measured. Bullet formats usually work best when listing objectives, and short phrases using the landowner's own words are preferred. Proper forest terminology can be included in parentheses at the end of the objective.

The following are examples of concise, specific, and achievable objectives drawn from written forest stewardship plans. Notice how compatible objectives are listed in rank order and include management recommendations.

Sample Objectives from a Forest Stewardship Plan

Landowner objectives are described as follows:

1. Improve bottomland hardwood timber resources.

- *Increase the quality, size, and distribution of merchantable timber in hardwood stands.*
- *Perpetuate red oak species in hardwood stands.*
- *Restore fallow fields to hardwood forests comprised of site-specific, native species.*

2. Improve wintering habitat for migratory waterfowl.

- *Establish 45-acre moist soil impoundment in fallow field located in central portion of property.*
- *Improve manageability of water levels in existing beav pond located on south side of property.*
- *Create 62-acre green tree reservoir in stand #2.*
- *Reduce the density of shade tolerant stems from within the mid- and under-stories of hardwood stands.*
- *Create a few 1/2-acre openings within the green tree reservoir.*

3. Reduce nonpoint source pollution from agricultur fields located on the property.

Objectives from a Florida Forest Stewardship Plan

The primary objective of the landowner is to enhance the quality of habitat for both game and nongame species. Th landowner has a particular interest in management for white-tailed deer, wild turkey, quail, and songbirds. Othe objectives include wise management of timber resources.

Objectives from a North Carolina Forest Stewardship Plan

The landowner wishes to open up the area immediately surrounding an existing home for the purposes of improve aesthetics, safety, and fire prevention. Beyond this the landowner desires to establish woodland trails for recreation. Timber production is a secondary objective.

Other Considerations: National Programs, State Programs, and Partnerships

A landowner's objectives can sometimes be addressed by existing national or regional programs that target water quality, wildlife, or timber resources. For example, North Carolina has developed the Early Succession Species (Quail) Initiative to encourage landowners to conduct management activities that benefit early-succession species. The bobwhite quail, one such species, is suffering drastic population declines throughout the Southeastern United States. All NIPF landowners will potentially benefit from the statewide implementation, by 2002, of this program. Check to see whether there are programs like this in your area that will benefit landowner's management objectives and stewardship plans.

Landowners may state objectives that are best addressed by an agency or group other than the USDA Forest Service. Many public and private groups, both local and national, are available to form partnerships for achieving the goals established in a plan. These groups may conduct site visits and participate in addressing stewardship objectives. They offer a broad perspective of planning in the area. Partnering with certain agencies can advance soil and water conservation, wildlife, recreation, and aesthetic objectives more effectively. When cooperating partners differ as to a course of action, present several options to the landowner to consider and select the option that fits best. Include only the landowner's preferred alternatives in the final forest stewardship plan.

Partnership programs within the Federal system that complement forest stewardship planning are:

- USDA Natural Resources Conservation Service (NRCS) Wetland Reserve Program (WRP), Wildlife Habitat Incentive Program (WHIP), Environmental Quality Incentive Program (EQIP), and Conservation Reserve Enhancement Program (CREP)
- USDA Farm Service Agency (FSA) Conservation Reserve Program (CRP)
- USDA Forest Service Forest Legacy Program
- U.S. Fish and Wildlife Service Partners for Fish and Wildlife Program

Examples of other sources of assistance for NIPF landowners, which may be more local in scope and purpose include:

- Nature Conservancy
- Ducks Unlimited Private Lands Program
- Quail Unlimited, Pheasants Forever
- National Wild Turkey Federation
- Delta Wildlife
- Mississippi Wildlife
- Environmental Synergy, Inc.

Many States also have State-funded forest landowner assistance programs. If you are not aware of these, contact your State forester's office.

3. Describe Baseline Habitat Conditions

A description of habitat conditions should begin with an overview of the subject property. The overview should include information such as how to access the property, its significant features, and its past and current uses. This general description may include data such as cover types, soils, and topographical features. It should also include any cultural or natural heritage resource that may be on or near the property.

The required elements of a forest stewardship plan are field inspection, maps, cover type/stand description, soils information, wildlife and fish, water quality, recreation and aesthetics, wetlands, and heritage resources. The sections that follow discuss the required elements in describing the subject property and its habitat conditions.

Field Inspection

A thorough examination of forest resources is the necessary starting point for any forest stewardship plan. The plan writer should lead or be a part of the examination team along with the landowner or his or her assigned representative. A biologist from the State department of wildlife or the district conservationist from the NRCS may also be helpful in identifying the multi-resource issues of the subject property. Identifying and explaining forest management needs are best done in the field where the landowner may interact with resource specialists.

Gather supplemental material about the property such as maps, aerial photos, sample plot data, quad sheets, published soil surveys, cultural resource maps, natural heritage maps, and anecdotal information shared by other owners or resource specialists. Mandatory field methods vary among the States. Once collected, this material should provide sufficient data upon which to base reliable recommendations. Consult your State guidelines for required State information.

Within the subject property, variations in forest cover type, size class, age, stocking, origin, stand condition, and site capability, which all produce diverse habitat conditions, may also require different management strategies. Divide the property into units, stands, tracts, or compartments as necessary and practical for making management recommendations. Keep it simple. Delineating management units must also reflect the landowner's objectives, multiple-use considerations, environmental protection factors, and prevailing timber markets.

Maps

Include one or more maps that clearly depict property boundaries, management units, water, trails and roads, and other significant features. Label maps with their appropriate scale and north arrow. Include any important features of neighboring property such as lakes, roads, stands, and structures, particularly if they influence stewardship objectives. Label the management units and other special sites referenced in the forest stewardship plan.

Cover Type/Stand Description

Describe existing forest resources in detail. Discuss the property's potential for timber, even when this commodity is not a high priority for the landowner. The economic potential of the forest land is an important characteristic to document. Descriptive detail of forest stand characteristics may facilitate timber production, but stand descriptions should be tailored to the landowner's objectives.

Address all stewardship values when describing the forest land. If specific resources are absent (that is, cultural or recreational), they should nevertheless be referred to as *None or None found*. Color photographs may be helpful to show current stand conditions. Photographs provide a visual image of the site and can be very useful in documenting seasonal changes or the effects of the passage of time.

Consider outlining objectives for the desired future vegetative community in the description. Describe the outcomes of implementing recommendations, that is, what the stand will eventually look like when the landowner's goals are achieved. Contrast the future vision to existing forest conditions.

Identify important and unique stands or cover types by name or number and size (in acres) in the narrative and correspondingly in the plan maps. Include information that is unique to the stand.

States vary as to whether State forestry personnel or private forestry consultants under contract to the landowner should complete the stand description. Similarly, whether or not timber cruising or appraisals should


Management Unit Map

be included in the forest stewardship plan or funded by the program is at the discretion of the State agencies.

A description of forested habitats will be a major emphasis in most plans. While estimates based upon observations may be sufficient to make reliable recommendations, the detail required in the final plan should always reflect your State's needs and standards.

Regardless of the level of detail, descriptions should provide an accurate assessment of forest resource conditions and opportunities, and they should indicate whether there is a need for private forestry consultants to perform a more comprehensive appraisal.

Stand volumes should be clearly emphasized to the landowner, whether or not the data is sufficient for sale purposes. Consult your State guidelines for more information on stand volumes.

The following data may be included in stand descriptions, depending upon the objectives identified in the plan.

- Timber type classification
- Volume/density
- Growth
- Age
- Species composition
- Size-classes, distribution
- Stocking
- Stand history
- Stand significance due to location/other attributes
- Forest/stand health
- Wildfire hazards and risks
- Pests and disease
- Other wildlife-specific criteria
- Snags
- Den trees
- Edge
- Mast availability
- Browse
- Ground cover
- Canopy cover
- Canopy layers
- Stand diversity
- Noxious/nonendemic species
- Other

The following stand description is a good example of a complete assessment of cover type. Notice the number of criteria included in the description and the emphasis placed on the insufficient volume data for purposes of sale.

Stand Description from a Minnesota Forest Stewardship Plan

Objective: *Timber management*

Cover Type: *Mature Aspen*

Summary Data:

Age:	*70+ years*
Growth Potential:	*High*
Site Index:	*75 (aspen)*
Timber Quality:	*Good*
Tree Density:	*Average*
Basal Area:	*100*

Estimated Volume/Acre (not accurate for sales):

Aspen	*25.4 cords*
Spruce	*1.7*
Birch	*1.4*
Total	*28.5 cords/ac*

This stand contains mature 12-inch diameter aspen and birch and 20-inch diameter spruce. The birch and aspen are beginning to deteriorate from heart rot. This timber should be harvested now or in the near future. The understory is medium density and consists of hazel brush, alder, red stem dogwood, and thimbleberry growing over a layer of grass and other herbaceous annuals. Regeneration consists of about 2,000 aspen seedlings per acre where there are openings in the canopy. Deer, moose, wolves, bear, and small mammals utilize such habitats. The terrain is gently sloping. (A description of soil features was also included.)

Some stand descriptions are written to reflect specific management objectives, as the examples below show.

Sample Stand Description from a Forest Stewardship Plan

Objective: *Increased utilization by waterfowl, perpetuation of southern red oak in a green tree reservoir habitat.*

High stem density (overstocking), coupled with a low occurrence of openings within the main canopy for use by waterfowl as entrance points, is less than optimal for use of green tree reservoir areas by wintering mallards and wood ducks (Reference 1.1, Appendix A). Dominant and codominant crowns are receding drastically. The paucity of advance red oak reproduction throughout most of the stand indicates a progression towards predominantly more shade-tolerant, non-oak species composition. Stand regeneration at this time would likely produce a future stand with an oak component far less than desired. The herbaceous component is sparse; of little or no use as source of waterfowl forage. Soils are of the Alligator Series and productivity is very good for species comprising this stand. No historical or cultural resources exist in this unit. Implemented thoughtfully, a prescribed timber thinning will enhance the use of this stand by migrating and wintering mallards and increasing advance red oak reproduction by opening the stand and creating small gaps within the canopy-both of which increase sunlight that reaches the forest floor and facilitates access by mallards and wood ducks. Long term, establishment of red oak in the understory will foster the replacement of felled stems by this species and assure the continued availability of hard mast. Refer to management recommendations for this stand.

Descriptions may also include references to other stewardship programs.

Stand Description from an Indiana Forest Stewardship Plan

Owner's Goals: *Income from commercial timber production. Hunting and personal enjoyment are secondary objectives.*

Stand Description: *These stands, 26.5 acres in aggregate, appear to have the best timber on the property. Generally pole to medium sawlog sizes and fully stocked. A few veteran sized stems and a good number of damaged, poorly formed or otherwise undesirable trees are present. Species include sugar maple, yellow poplar, hickory, black gum, eastern red cedar, chinquapin oak, black oak, white oak, sassafras, red oak, sycamore, and black walnut. Grapevines pose a moderate problem in most places. Except for the bottomland site this area is only mediocre productive potential. Note: This stand qualifies for the Indiana Classified Forest Program, for which an application and instructions are enclosed.*

Soils Information

All forest stewardship plans should include a discussion of soil features in a manner compatible with the landowner's objectives. Include the series as well as pertinent properties, drainage, or associated topography, particularly as they relate to restrictions or site productivity. Diverse conditions and cover type may necessitate several different descriptions for the property. Consult any published county soil surveys; they are invaluable sources of information.

The following is a good example of soils information. Notice that the description is property-wide and addresses the limitations on the property because of the soil type.

Soils Information from an Indiana Forest Stewardship Plan

The property is characterized by hilly terrain and short, steep slopes. Maximum relief is 130 feet. Primary soil types are rider silt loams along the ridges and Berks-Weikert soils along the slopes. These soils have potential for excellent tree growth. Site limitations include limited access (for logging operations) due to steep slopes, impassable ravines; high potential for erosion. Trail or road construction should include establishment of permanent water diversion structures and perennial vegetation cover.

Forest Management Plan

For the soils of this property the classification is either **VIe-1or VIe-1**. This translates to "severe limitations", unsuitable for cultivation; appropriate uses would be for pasture, woodland, wildlife.

Soils of this area are also placed in **tree suitability groups** to indicate their suitability for trees and shrubs. These soils of the same group have the capability to produce similar trees and shrubs.

Tree suitability group 1 includes the Fern Cliff soils, supporting Douglas-fir, ponderosa pine, or lodgepole pine.

Tree suitability group 2 is capable of supporting native timber, but is now generally covered with brush and scattered trees. Juget and Peyton soils are in this group.

Tree suitability group 3 are generally deeper soils on lesser-sloped areas. These soils are fine sandy loams to silty clay loams (not found on this property), and will support any native tree species.

Soils Map

Peyton-Juget: very gravelly loamy soils; yellow
Fern Cliff-Atkins: Flat-Rock subsoil, soil, gravel

Juget soils are a gravelly loamy sandy type, shallow, and excessively drained. Generally, bedrock is at a depth of 20" and the soil is suitable for forestry, recreation and homesites. Capability class is VII-1, and its tree suitability group is group 2.

Fern Cliff soils are deep, well drained sandy loams and stony sandy loams. They are suitable for pasture, recreation, forestry and homesites. The Capability class is VII-e-1 and tree suitability group 1.

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Wildlife and Fish

Federally protected species will affect a stewardship plan. The species of concern in your State might be noted in local databases or the State natural heritage records. Contact the ecological service office of the U.S. Fish and Wildlife Service, or the fish and wildlife staff in your State for technical assistance to identify endangered species and their implication for management plans. All forest stewardship plans should address rare, threatened, or endangered species.

Plan writers should include a statement on whether or not endangered species were found or are likely to exist on the property. If they do, then writers should refer the landowner to the appropriate entity for information and assistance, and/or include relevant information in the plan.

Examples of Statements on Threatened and Endangered (T&E) Species

The State's T&E databases were checked for indications that T&E species might be present on this property. No records were found. Likewise, no evidence of T&E species was seen during an inspection of the property. Nevertheless, in this part of the State, this habitat type may be inhabited by.... The management practices presented in this plan will not degrade habitat conditions favorable for this species. Or, The State's T&E databases were checked for indications that T&E species might be present on this property. No records were found. Likewise, no evidence of T&E species was seen during an inspection of the property.

T&E species from a New York Forest Management Plan

A search of New York State Department of Environmental Conservation records indicates no endangered, threatened, or rare flora or fauna on this property at the present time.

Whether the landowner embraces wildlife as a primary objective or simply as a side benefit to the production of forest products, species habitat and life cycle must still be considered in the plan. Primary emphasis on timber products may limit the range of wildlife to be managed. When timber is the primary objective, describe which wildlife species will be affected when the plan is executed. Silvicutural practices do affect forest wildlife and active consideration of the effects of habitat change on the forest flora and fauna is an important part of the stewardship plan.

When the landowner places wildlife as the primary objective, focus the plan on habitat conditions that are specific to the needs of wildlife species. List the habitat attributes that are of greatest benefit to the range of target species. Describe the strengths and weaknesses of present conditions and what changes, if any, are required.

The following is an example of a good description of wildlife habitats in a management plan. Notice the references to wildlife and fish populations and habitat and their national and regional status. Fish and wildlife habitat and T&E species were addressed in separate sections of the plan.

Wildlife and Fish Descriptions from a California Stewardship Plan

Although the summer flows in Indian Creek are quite low and the creek goes underground in some sections, it nevertheless supports a resident and an anadramous fishery. The riparian habitat along Indian Creek and its tributaries support a variety of wildlife, including deer, bear, ring-tail cats, and various reptiles and amphibians.

Sierra Pacific Industries located northern spotted owls on their lands to the east of this property. In 1989, a northern spotted owl was heard during the course of two consecutive nights of survey in the vicinity of the property. A fisher (of significant interest to California public) was observed in the same location. Bald eagles (T&E species) have occasionally been observed flying up the creek, a goshawk (special concern species) nested on the property over a period of 3 years during the mid eighties, and great egrets and great blue herons (special concern species) are often seen along Indian Creek.

Water Quality

All forest stewardship plans must address watershed and water quality issues in a manner compatible with the landowner's objectives. Additionally, all management activities must protect water quality. The plan can be the guide to preserving and protecting this forest resource. Each State will have guidelines and recommendations on water quality specific to its region.

The following is an example of a brief assessment of water quality.

Water Quality from a New York Forest Stewardship Plan

Water quality is excellent. There is no active soil erosion at this time.
Important considerations include:

- *Streamside management zones (SMZ)*
- *Filter strips*
- *Stream crossings*

A Forest Service Watershed Coordinator recommends the following:
"Identify the watershed(s) in which the property lies by name and/or Hydrologic Unit Code (HUC) available from State, U.S. Geological Survey, or Natural Resources Conservation Service maps. Locate perennial and intermittent streams on the property and estimate their length in (miles or linear feet). Identify known water quality problems on or upstream of property and any opportunities for improvement on the property. Existing riparian forests adjoining agricultural fields currently serving as buffers and potential opportunities for afforestation of other buffer areas should be identified. If known, identify streams that are currently in use as drinking water sources and the location of any intakes on the property requiring special protection. Identify management objectives and proposed management or protective measures for existing riparian stands."

Recreation and Aesthetics

Management practices to enhance the objectives of recreation and aesthetics are comparatively easy to implement. Measures to enhance natural aesthetics include converting agricultural fields to hardwood forests, favoring large-sized hardwood stems within forest stands, and creating wooded buffer zones to protect riparian areas and enhance wildlife suitability. Other considerations include:

- Types of forest-oriented recreational activities valued by the landowner or area residents
- Diversity of habitat
- Visual impact of various forest management practices

The following statement addresses the landowner's priority of aesthetics and recreation.

Aesthetics and Recreation from Colorado Forest Stewardship Plan

There are unique scenic viewsheds from the higher elevations of this property, especially of the Continental Divide from Management Units 7 and 9. The expansive, green meadow of the drainage is a pleasant green change in scenery to an otherwise arid landscape. Recreational opportunities abound in the forms of hiking and wildlife observation.

- Plant species favored in the area because of color, flower, or other characteristics
- Key access routes and areas commonly viewed by public
- Objects of special value to landowner, that is, vistas, bluffs, old home sites, unique stands of trees, rare flowering plants
- Streams, other waterways
- Hiking trails
- Picnic areas

Wetlands

Wetland values should be considered and evaluated in all forest stewardship plans. Three criteria are used to identify wetlands: hydrology, vegetation, and soils.

Wetlands are subject to Federal protection. It is important to make the landowner aware of the ecological value of wetlands and important legal issues associated with wetland areas. Management activities that require moving soil in a wetland area, for example, will likely require a Government permit. At least three governmental agencies administer regulatory authority concerning wetlands. They are the county or city planning and zoning office, the State department of natural resources, and the U.S. Army Corps of Engineers. Before initiating a wetland project, be sure that the appropriate permits have been secured. Most wetlands conservation practices, and many other forest management practices, are eligible for cost sharing through various programs. Some States or counties may offer forest management incentives or wetland tax credits or deductions. Direct inquiries to the State forester. Sources of technical assistance include the State forestry agencies, U.S. Fish and Wildlife Service, and the Natural Resources Conservation Service.

The following examples address wetland areas.

Wetlands from a New York Forest Stewardship Plan

All streams on this property are classified "D" and do not require a permit for minor projects which would alter their bed or banks. There are no protected wetlands or streams on the property.

Water Sources from a Colorado Forest Stewardship Plan

Dutton Creek is a permanent water source that flows through the northwest corner of the property. A small pond located between a driveway and homesite catches runoff. An old irrigation ditch located on the lower bench collects runoff and has water intermittently. About 1 mile upstream from the property is a reservoir that seasonally stores water from Dutton Creek. Another reservoir is located across the road from the property. Both nearby reservoirs serve as water sources in the event of wildfire. With respect to existing land use practices, risk of diminished water quality is minimized.

The following guidelines for wetland protection should be incorporated into forest management activities.

- Do not route roads through wetlands or on steep slopes subject to erosion. Fillings for roads may destroy wetland habitat, obstruct or modify the flow of water to or through wetlands, and may contribute to sedimentation.
- Restrict timber harvest activities to those times of year when rutting and soil compaction are minimized. In the South for example, late summer is usually an ideal time. The winter months, when wetlands are frozen, may be best in other parts of the country.
- Do not establish log landings in wetland areas when other sites are available. Heavy equipment usage damages wetland vegetation, compacts hydric soils, and increases contamination from pollutants (that is, oil and gas) into wetlands.
- Leave buffers of vegetation around wetlands. Trees provide nest sites and cavities for many wildlife species, provide shading to wetlands to reduce desiccation and maintain lower aquatic temperatures, and help to prevent sedimentation.
- Avoid the use of pesticides not labeled for aquatic use on or near wetlands.
- Establish vegetation on disturbed soils adjacent to or near wetlands.
- Keep slash out of wetland areas. Slash accumulation accelerates wetland filling and may deplete oxygen levels in water.

Heritage Resources

A key element in all forest stewardship plans is a description of the historical and cultural resources of the general area and the subject property. Heritage resources are nonrenewable; they can never be replaced once destroyed. Good stewardship implies valuing the evidence of past human occupation on the land. Federal and State laws protect heritage resources from disturbances, destruction, or removal. Landowners should be made aware of laws pertaining to historical and cultural resources in their State. Planners should consult local authorities within the plan area.

Plan writers should include a statement as to whether or not these resources exist on the property. If they do, then writers should refer the landowner to the appropriate entity for information and assistance and/or include relevant information in the plan. Consider the following elements for protecting heritage resources on private forest lands.

- Determine the locations of these resources, particularly cemeteries, prior to implementing the project.
- Plan natural resource management practices to avoid disturbing the ground on or near historical sites, if possible.
- Work with existing land contours rather than reshaping the landscape to reduce the chance of disturbing these resources.
- Retain any objects or artifacts discovered during a project and record the location from which they came to preserve their value for research.
- Cease all work and immediately notify local law enforcement and the office of the State archaeologist if human remains are accidentally unearthed.

- Revegetate agricultural sites to reduce long-term degradation of heritage resources by eliminating cultivation as a source of continued disturbance.
- Establish riparian buffer zones and filter strips (which will also protect water quality).
- Use conservation easements to protect sensitive environmental and cultural qualities.

The following is a good example of how to address the historical and cultural resources in your plan.

Heritage Resources from a California Forest Stewardship Plan

No prehistoric sites, features, nor artifacts were discovered. Some historical sites were found.

An old water ditch runs along portions of the southern boundary. The water ditch was used to transport water needed to mine the property. Three ditches and piles of river rock is evidence of placer mining, which occurred. On a small glade at the southwestern corner of the property are the remains of a cabin basement, which is a 12-feet-wide by 30-feet-long by 7-feet-deep hole in the ground partially lined with stacked, unmortared river rock.

Recommendations:

1. *Check with Northeast Information Center, California Archeological Inventory, Department of Anthropology... and have a trained archeologist conduct a site survey before executing ground disturbing projects. Protect any known, significant sites as per their instructions.*
2. *If a site is located during project implementation, protect the site from further disturbance until a trained archeologist can determine if the site is significant and warrants further protection.*

For more information on this important subject, contact the historic preservation office, department of archives, office of archaeology, or other agency in your State responsible for distributing heritage resource information and implementing laws.

Other Items of Importance

Although they are not required, the following elements are common in forest stewardship plans around the country.

- Good records for tax purposes
- Sources of recognition for which the stand might qualify (that is, Tree Farmer Program)
- Opportunities for alternative sources of income (for example, harvest of morel mushrooms, bird watching tours, recreational activities)
- Opportunities to restore endemic plant or animal communities.
- Mineral resources
- Cleanup and rehabilitation needs

The following examples show additional elements to include in forest stewardship plans.

Recognition Program from an Indiana Forest Stewardship Plan

Your woodland is eligible for inclusion in the Classified Forest Program. This program allows landowners with a minimum of 10 contiguous acres of forest that are being managed under the Woodland Stewardship Program to receive significant tax and technical assistance benefits. Once classified the forest is assessed at $1.00 per acre per year for property tax purposes, which can result in substantial tax savings. A no-cost woodland inspection from a professional forester is provided once every 5 years.

Clean-up from a Missouri Forest Stewardship Plan

The remnants of an abandoned sawmill, constructed for prior harvest activities, detract from aesthetics. Scrap metal and refuse should be eventually removed.

Income Potential from a Vermont Forest Stewardship Plan

There is excellent potential for generating revenue through production of maple syrup and Christmas trees in some areas of the property.

4. Present Management Recommendations

The next section of the plan will contain the essential strategy for achieving the landowner's objectives. This part should be operational and action-oriented. The management recommendations will be the landowner's own road map to implementing the stewardship plan successfully. In this part you will include the necessary steps for accomplishing the goals, that is, the how, what, when, where, and who of active forest management.

Recommendations should be at the stand or management unit level and may specify maintenance activities and change over time. Specify exactly what is required to achieve the objectives and avoid using ambiguous phrasing such as "may need to do this" or "might need to do that."

Consider future needs and include sources of future support in the recommendations to convey that the objective can be achieved and sustained for many years to come. Include the sources of professional expertise that will help guide and implement a plan.

You might also include an estimate of costs and revenues over time, specifying cost-share or partnership opportunities that foster sound habitat management practices and increase the value in the landowner's investment in forest stewardship. Providing a cost comparison of assistance programs or management practices will convey the benefit of forest stewardship in concrete, measurable terms that NIPF landowners and everyone else readily understand—dollars and cents.

Alternative management strategies, and their environmental and economic consequences, should be discussed with the landowner throughout the development of the plan, but do not cite all the alternatives in the plan. Include in the final document only those strategies that satisfy the landowner's objectives and include a schedule for reviewing and updating the plan. Landowners always have the option to do nothing, or to do something other than what was advised, but this alternative need not be elaborated upon in the final document.

The following excerpts are good examples of management recommendations for a forest stewardship plan. Notice the goal-specific recommendations.

Stand Description from a Minnesota Forest Stewardship Plan

Stand Number: *2*
Stand Objective: *Forest products, habitat*
Prescription: *Prep-cut Shelterwood*
To Be Removed:

BA/acre:	*65*
Total Vol.:	*20/cds/12mbf*

Timing: *Fall 2002*

Treatment targets the gradual regeneration of this mature stand, over a period of 20-25 years, to the same species composition. It is intended that the white pine component will increase with the shelterwood system. Many trees that need to be removed shall be felled or girdled as a means of timber stand improvement in the absence of nearby pulp markets. Ideally, timber harvest should occur in a year that the white pine mast crop is good. Mechanical felling should be conducted when the ground is not covered with snow to facilitate scarification of the duff layer and promote the establishment of white pine.

Management Recommendations from a North Carolina Forest Stewardship Plan

Landowner objective: *Establish recreational trails.*

The proposed trailhead should be located at the terminus of an existing logging road, just up the hill from your home. The old logging road system running throughout your property provides an ideal skeleton for the proposed hiking trails. Please refer to the enclosed map for estimated trail routes. The following are major considerations for recreational trail construction:

- *Follow land contours and avoid establishment of trails on slopes over 20 percent if at all possible to minimize the potential for erosion and to ensure ease of traverse.*
- *Prune limbs 1 to 2 feet from either side of the actual trail, and extend height clearance to 12 feet to prevent injury or discomfort while on horseback.*
- *Perform annual maintenance that includes removal of woody regeneration from the trail to maximize the trails' recreation potential.*
- *Don't remove large trees from the trail-simply route the trail around them.*
- *To increase wildlife viewing, erect birdhouses and wildlife feeders along the trail. Plant sunlit portions of the trail with ryegrass, clover, or wildflowers.*
- *Install erosion control devices on steeper portions of the trail to prevent sedimentation of adjacent creeks and wash out of the trail.*
- *If desired, educate persons using the trail by posting informational signs. Contact the North Carolina Forest Service to help identify tree species and ecotypes.*

Provide a brief summary of management recommendations that support stewardship objectives. Highlight anticipated benefits of active forest management to landowners, forest resources, and society.

Management Recommendations from a Mississippi Forest Stewardship Plan

Located near Crowder, MS, the Smith property is located 0.75 miles west of 4,200-acre Coldwater National Wildlife Refuge. The surrounding area is characterized predominately by row crop agriculture and traditionally winters many thousands of migratory waterfowl. Past management practices have greatly impoverished timber and habitat values on this property. Completion of the stewardship goals described herein will provide recreational and financial benefits to the Smith family and will fulfill crucial life cycle requirements for migratory waterfowl in this area of Mississippi, particularly as part of a much larger habitat complex that encompasses surrounding properties and land-use practices.

Management Recommendations from a Florida Forest Stewardship Plan

Wildlife management practices on this property...will provide optimal habitat conditions for deer, turkey, quail, and songbirds...and are conducive to the conservation of the threatened and endangered species known to occur locally.

Management Recommendations from a California Forest Stewardship Plan

Improved soil, water, and forest quality...as enhanced through the stewardship practices advocated in this plan fulfill the landowner's objective to...create and maintain a land-based homestead that provides resources and amenities to support the occupants of the homestead, their lifestyles, and their land ethic and social values. These values include sharing the abundance of their lives with family and friends and passing on a world that has been enhanced by their stewardship.

With creativity and initiative, plan coordinators can forge partnerships with other organizations that will provide technical assistance, services, and materials at little or no cost to the landowners or the State.

Timeline

The minimum duration for a plan to meet forest stewardship program requirements is 5 years, although some States require a longer period of time.

It is always helpful to provide a timeline for prescribed activities. Include in the

Management Recommendations from a Minnesota Woodland Stewardship Plan

Stewardship Objective:

Restore these wetlands to natural conditions to recreate quality habitat for waterfowl, furbearer, amphibian and reptile habitats that were lost during conversion. Restorations will improve watershed quality conditions-reduce runoff, sedimentation, nutrient loading, and groundwater discharge.

Recommended Management Activities:

1. *Conduct feasibility surveys to determine desired water levels and appropriate water level control structures. (Project: U.S. Fish and Wildlife Service has currently completed surveys on Sites W1, W2, and W3. Will complete survey on Site W4 and provide details and designs. Technical assistance from U.S. Fish and Wildlife Service will be provided at no cost to the landowner.)*
2. *Determine acceptable restorations and install water control structures. (Project: Installation of structures, dams, and dikes will be completed by U.S. Fish and Wildlife Service with funds through the Partners for Fish and Wildlife Program, and through the Rush Lake Watershed Improvement Project, at no cost to the landowner.)*

timeline information on when the plan will be reviewed and updated. Be specific, but be realistic about the time that it will take to achieve the landowner's objectives. The timeline will probably be more important to landowner than almost any other section of the plan, particularly where future revenues are expected.

Consider converting the timeline into an action list, which the landowner may use as a check-off list for prescribed activities. Some plans place the timeline at the front of the plan rather than at the end. Some States include a "check when completed" column in the stand prescriptions to serve as a record of accomplishing the objectives. These tips have been highly effective in keeping landowners on the right track.

The following examples show timelines for implementing objectives in differe formats. The first example was included in the front of the plan with a referen to supplemental information at the back. The second two examples emphasize t actions to be accomplished in each season.

Timeline from an Indiana Forest Stewardship Plan

YEAR	STAND	ACTIVITIES
1999	*1*	*Thin with combination of intermediate/regeneration cutting practices*
1999	*2*	*Harvest cedar component to release hardwoods*
1999	*3*	*Harvest cedar component*
2000	*1-3*	*Timber stand improvement to complete regeneration openings and remove grapevines and undesirable speci*

Timeline from a North Carolina Forest Stewardship Plan

YEAR	AREA	ACTIVITIES	ASSISTANCE AVAILABLE
1998	*1-3*	*Regrade logging roads*	---
		Precommercial thinning	---
		Establish food plots on logging	---
		Decks	*Yes*
	5	*Plant trees along entrance*	*Yes*
		Establish warm season grasses	*Yes*
1998-2004	*4*	*Broadcast Japanese millet on exposed pond banks at rate of 25 lbs/acre in late June.*	*Yes*
1999	*1*	*Install culvert and waterbars in new road*	---
1997-	*4*	*Install wood duck nest boxes along creek and beaver pond, 1 per year, remember predator guards*	*Yes*
2008	*2,3,4*	*Commercial pulpwood thinning. Thin to residual spacing of about 15 feet between residual trees (Basal area 70 sqft/acre).*	---
2009	*All*	*Revisit property for update of stewardship plan. Identify future needs.*	---
2030	*2,3,4*	*Regeneration harvest for portions of these stands for financial returns.*	*Yes*

Timeline from a North Carolina Forest Stewardship Plan

June 2001 - 2005	*Hire a consulting forester and have Area #3 harvested at the earliest opportunity. Leave 10 nonmerchantable black cherry trees standing per acre. Fell all other resi ual stems for erosion control and natural regeneration*
July 2001 until	*Mow food plots in Area #2 to stimulate growth, vigor, and reproduction of clover and grasses. Be mindful of nesting birds, although they should have completed nesting by this time.*
September 2006	*One year post harvest, evaluate Area #3 for natural stocking.*
September 2010	*Perform necessary trail maintenance. Reinforce erosion control devices. Evaluate species composition in Area #*

Communicating the Plan

When the forest stewardship plan is completed, you must present it to the landowner. This is an important event and should be approached thoughtfully. Forest stewardship plan packages come in many shapes and sizes. They may be photocopied, stapled pages, or they may be carefully bound and include color photographs and inspirational quotes. Organize the material in the plan in an easy-to-follow and attractive manner. Each State has discretion for how the plan will be presented to the landowner.

Information specific to the major stewardship issues in each State may be important to include with each plan so that the landowner will gain a greater appreciation for stewardship issues as a whole. Each plan should be a living document that can be updated and will easily accommodate new information relevant to the health and stewardship of forests.

5. Include Supplemental Information

Include relevant supplemental documents and information in an appendix at the end of the plan. This additional material will support the recommended practices and offer more complete information on a number of topics touched on in the plan. Many States and resource consultants have standardized packages of supplemental material that may be added to the plan. Include or remove materials as needed to suit the landowner's needs. Federal and State agencies, cooperative extension programs, industry, and special interest organizations will also have well-prepared documents on relevant subjects that are available for

Minnesota's Sample Format

The Minnesota Division of Forestry provides NIPF landowners with an appealing and useful format for forest stewardship plans. Their plans are bound in attractive three-ring binders, and colored tabs separate the information in the following subjects.

- *Table of Contents*
- *The Forest Stewardship Plan*
- *Correspondence*
- *Cost-share Records*
- *Tax Records*
- *Other Records*
- *Forest Ecology*
- *Wildlife*
- *Soil*
- *Water*
- *Tree Species*
- *Forest Products*
- *Harvest*
- *Regeneration*
- *Timber Stand Improvement*
- *Protection*
- *Forest Facts*
- *Tax Issues*
- *Information Sources*
- *Assistance Directory*
- *Glossary*
- *Index*
- *Past Plans*

this purpose. Rather than duplicate in the plan the general information contained in these materials, simply append them to the back of the plan. Include a list of these documents in the Table of Contents so that the reader knows what is included and organize the material by topic.

More helpful suggestions of items to include:

- *Glossary of technical terms or forestry practices common to natural resource management*
- *Brochures, newsletters, publications*
- *Publications specific to State Best Management Practices*
- *Extension bulletins, fact sheets, "how to do it" handouts, Woodland Fish and Wildlife publications*
- *Sources of planting stock, forestry and wildlife equipment supplies*
- *Directories of natural resource consultants, contractors, loggers, and agencies that are available for assistance in completing various resource activities*
- *Descriptive materials, enrollment forms, and applications relevant to receiving additional technical, financial, or educational assistance from State, Federal, or other partners programs*
- *Bibliography of useful references, such as Web sites and scheduled workshops*
- *Explanations of applicable regulatory programs, especially as they apply to:*
  - *Historical and cultural resources*
  - *Wetlands*
  - *Threatened or endangered species*
  - *Logging regulations, required permits, licenses*
  - *Reforestation or wildlife food plantings*
  - *Nest boxes and predator guards*
  - *Other*

Additional Information Section from a Minnesota Forest Stewardship Plan

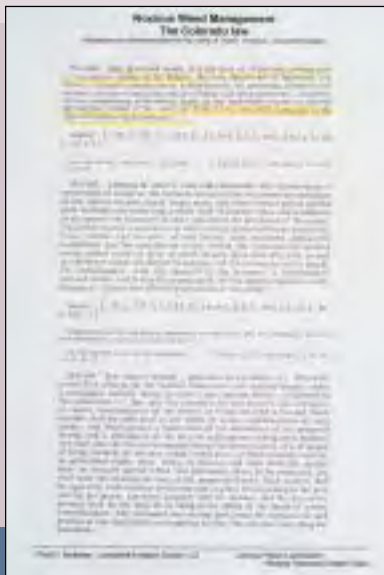
For additional information, please refer to the following sections of your stewardship plan binder:

TAB	***REFERENCE MATERIAL***
Wildlife	*Managing for ruffed grouse and deer; Woodlands and nongame wildlife*
Trees	*White spruce, white pine*
Regeneration	*Tree planting BMP Booklet Protecting water quality and wetlands in forest management*
Protection	*Bud capping*

Additional Information Section in a North Carolina Forest Stewardship Plan

APPENDIX LIST

1. *North Carolina Trees for North Carolinians (Seedling Catalog) 1997.*
2. *Working with Wildlife*
   - *a) White-tailed Deer*
   - *b) Wood Duck*
   - *c) Bobwhite Quail*
   - *d) Woodland Wildlife Nest Boxes*
   - *e) Low-Cost Habitat Improvements*
   - *f) Managing Beaver Ponds*
   - *g) Herbaceous Plants for Wildlife*
3. *Woodland Owner Notes*
   - *a) Thinning Pine Stands*
   - *b) Understanding Forestry Terms*
4. *The Layman's Guide to Private Access Road Construction*
5. *Stewardship Incentives Program Practices Planning Outlines*
   - *a) SIP 8-Wildlife Planting-Clover*
   - *b) SIP 8-Wildlife Planting-Orchard Grass and White Clover*
   - *c) SIP 8-Wildlife Planting-Va-70 Lespedeza*



Conclusion

Developing and writing a forest stewardship plan with each landowner may be the most important service you can provide for the long-term sustainability of private forests in your region. Establishing a relationship of trust and respect with landowners will contribute not only to your professional success but also to your personal fulfillment in your job. Identifying and articulating clear stewardship objectives will help landowners understand the array of environmental concerns and their interrelationship, and clear goals will assist landowners in managing their property into the future. Management recommendations that are easy to implement will contribute further to the overall success of the plan. A well-crafted, well-written forest stewardship plan will be an encyclopedia of facts and an indispensable guide that will have a long and lasting impact on the environment.

Refer to this desk guide before you meet with landowners and before sitting down to write the plan. Collect for ready reference any other State and local resources that will help you write the plan. Have on hand information about State and Federal programs that will also have an interest in the plan, and get to know those people who can help you at various stages of plan development. Finally, be sure to establish contact with the key people in the USDA Forest Service programs who are available to help and guide you through the planning process. Good luck!

Forest Stewardship Program National Standards and Guidelines

Forest Stewardship Philosophy:

The purpose of the Forest Stewardship Program is to assist private forest landowners to more actively manage their forest and related resources; to keep these lands in a productive and healthy condition for present and future owners; and to increase the economic and environmental benefits of these lands.

Forest stewardship starts with landowners who care about their forest lands. They view their land as a source of family enjoyment, a chance to leave something special for future generations, as well as a potential source of income. They may need technical advice and financial assistance to make their vision for the land a reality.

For purposes of this program, nonindustrial private forest (NIPF) acreage includes lands owned by any private individual, group association, corporation, Indian tribe, or other private legal entity, such as Alaska Native corporations. Further, it includes rural lands with existing tree cover, or suitable for growing trees.

The Forest Stewardship Program focuses on providing services to landowners not currently managing their forest land according to a resource management plan that embodies multi resource stewardship principles. Private nonindustrial forest lands that are managed under existing Federal, State, or private sector financial and technical assistance programs are eligible for assistance under the program if forest resource management activities on such forest lands meet or are expanded or enhanced to meet the requirements of the Forest Stewardship Program.

State Forest Stewardship Coordinating Committee:

Each State forester must establish a State forest Stewardship Coordination Committee, administered by the State forester or equivalent State official. The committee must include individuals representing the following:

- The Forest Service; Natural Resources Conservation Service; and the Cooperative State Research, Education, and Extension Service.
- Local Government.
- Soil and water conservation districts.
- Consulting foresters.
- Environmental organizations.
- Forest products industry.
- Forest landowners.
- Land-trust organizations.
- Conservation organizations.
- State fish and wildlife agency.
- Any other appropriate interests.

Existing State committees may serve as the State Forest Stewardship Coordinating Committee if their membership includes the interests specified above. A State forester may seek an exemption to full representation on the above. To do so, the State forester must submit a request for exemption in writing, with a supporting recommendation by the regional forester or Area Director to the Director of Cooperative Forestry for approval. The request for exemption must include a justification of why a representative of a particular interest is unable to participate.

The committee must be ongoing to address stewardship planning and implementation concerns and overall program coordination, and not convened on a temporary basis. Normally, committee members serve 3-year terms and may be reappointed for consecutive terms.

Terms for persons who by virtue of their positions are committee members (e.g., State conservationists, State chairperson of forest landowners association.) would be ongoing during their tenure in the position. Membership may be staggered to ensure committee continuity. The duties of the committee include the following:

- Provide advice and recommendations to the State Forester concerning implementation of Forest Stewardship Program, Stewardship Incentive Program, and Forest Legacy Program.
- Provide assistance and recommendations concerning development, implementation, monitoring and updating of the State Forest Stewardship Plan.

State Forest Stewardship Plan:

A Statewide Forest Stewardship Plan is required. The purpose of the plan is to serve as a dynamic framework for the implementation of the State Forest Stewardship Program and the Stewardship Incentive Program. The plan should be updated as needed to reflect significant modifications in emphasis areas, delivery systems partnership, priorities, and other factors affecting program implementation over time.

- The plan must be action oriented, multidisciplinary in scope, and concurred in by a majority of the State Stewardship Coordinating Committee members. Such concurrence should be in writing.
- The plan must spell out partnerships with other agencies and organizations, particularly those that will become part of the delivery system involved in providing technical assistance.
- The plan as a minimum must address the following:
  - Baseline data on forest resources of the State.
  - Conditions that threaten the forest resources of the State.
  - Economics and environmental opportunities associated with forest resources of the State.
  - Management programs, opportunities, and objectives for intermingled Federal, State, and private land ownership patterns within the State.
  - The need for NIPF lands to be managed for all forest resources, including soil and water, wildlife and fish habitat, recreation and aesthetics, and timber and other forest products.

The plan may incorporate by reference other documents that include information on the above subjects.

- The plan must cover a 5-year period and identify a goal for NIPF acreage to be placed under forest stewardship management during the period.
- The plan must set priorities for achieving the goal and objectives identified for the State for each of the fiscal years.
- The plan must identify its intended delivery system to reach qualified landowners, develop a landowner forest stewardship plan, and assist the landowner in meeting his/her plan objectives. State foresters should cooperate with other agencies and the private sector in the delivery of this program and should share funding with other agencies, organizations, and/or consultants, to provide technical assistance to landowners.

Landowner Requirements:

There must be a recommendation and approval process for a landowner to qualify for full forest stewardship status. States should develop standards for landowners to qualify for forest stewardship recognition. Following are the national standards that must be incorporated into State standards.

- The landowner must demonstrate that he/she is a good steward. This may or may not require a probationary period. Withdrawing recognition from the landowner fails to follow the plan or chooses to withdraw from the program.

- At appropriate intervals, the landowner's plan should be reviewed and the landowner recognition status reviewed.
- Standards for stewardship recognition must be established by States.
- If ownership changes, the new owner is required to sign up for a forest stewardship Plan consistent with the new owner's objectives or the farm/property is withdrawn from recognition status.

Landowner forest Stewardship Plan:

Landowner voluntary participation in the Forest Stewardship Program represents a good faith commitment to implement strategies suggested in the landowner forest stewardship plan. Private property rights cannot, by law, be jeopardized through participation in this program.

Landowner forest stewardship plans must be prepared or verified, as meeting the minimum standards of a forest stewardship plan, by a professional resource manager. Plans must identify and describe actions to protect, manage, maintain, and enhance relevant resources listed in the law (soil, water, range, aesthetic quality, recreation, timber, water, and fish and wildlife) in a manner compatible with landowner objectives. The plan must be approved by the State forester or a representative of the State forester.

Landowners must be involved in plan development by setting clear objectives and should understand clearly the completed plan. A well prepared plan will:

- Clearly state landowner objectives.
- Have a cover page.
- Provide for authorship and/or signature lines within the document.

The plan preparer should consider and evaluate resource elements present and include a brief description of those that are applicable and their importance to the ownership. Resource elements to be considered are:

1. Soil interpretations.
2. Water.
3. Range.
4. Aesthetic quality.
5. Recreation.
6. Timber.
7. Fish.
8. Wildlife.
9. Forest health.
10. Archeological, cultural, and historical sites.
11. Wetlands.
12. Threatened and endangered species.

Management recommendations, or where appropriate, alternative strategies should be provided for those resource elements described. Prescriptions or treatments should be integrated and stand or site specific. An ownership map drawn to scale, or photo, to include vegetation cover types, stream and pond location, with a legend, will enable the landowner to implement the plan. Landowners' understanding may be improved by including activity summaries and appendices. Appendices might include:

- Description of assistance available and incentive programs.
- Educational materials.
- A glossary of terms.
- An explanation of applicable Federal, State, and/or county regulatory programs, especially as they apply to:
  - Archeological, cultural, and historical sites.
  - Wetlands.
  - Threatened and endangered species.

These last three items are covered by legislation other than the Cooperative Forestry Assistance Act of 1978, as amended by Title XII of the Food, Agriculture, Conservation and Trade Act of 1990 (16 U.S.C. 2101, et seq.), but must be considered for federally funded programs.

The professional resource manager should discuss the forest stewardship plan with the landowner, following completion, to assure understanding.

Funding Considerations:

The State forester in cooperation with the State Forest Stewardship Coordinating Committee should periodically set a maximum dollar limit, per acre and/or plan, for Federal funding to prepare the basic landowner forest stewardship plans. Intensive and complex computations such as allowable cut calculations, intensive wildlife habitat assessments, boundary surveys, growth, yield and financial analysis, timber sales preparation or marking, and intensive timber cruises are examples of activities that State Forest Stewardship Coordinating Committees shall exclude from Federal funding in a basic landowner forest stewardship plan. Care should be taken that federally funded services provided to the landowner do not adversely impact services provided by natural resource professionals in the private sector.

Continuing Education for Stewardship:

The State Forest Stewardship Coordinating Committee will develop a continuing education program to provide landowners with multiresource information. The State forester and committee should work closely with the Extension Service and others in pursuing this effort. The continuing education program could include:

- Landowner tours and demonstrations.
- Informational "landowner" brochures and pamphlets.
- Extension bulletins/newsletters.
- Access to membership in woodland owner associations.
- Subscriptions to natural resource publications.
- Invitation to technical workshops, seminars, etc.

Forest Stewardship Recognition:

Recognition is appropriate for landowners, and perhaps agency and organization cooperation, for special efforts made to accomplish program goals. The national standards for recognition of qualified forest landowners are a forest stewardship sign and a formal forest stewardship certificate.

- Forest Stewardship Signs: The signs are viewed as an honor award, and provided to landowners only as long as they are maintaining their qualifications standards. Landowners who are withdrawn from recognition status should be required to remove their signs from their property and return them to the State forester. State foresters should develop a policy on replacement of signs. Foresters should work with landowners to see that signs are properly placed and posted to get maximum visibility. This needs to be balanced with posting the sign in as safe and secure an area as possible.
- Forest Stewardship Certificates: A National Forest Stewardship Certificate, suitable for framing, will be developed for stewardship qualified NIPF landowner presentation. It is recommended that certificates be signed at the State forester/Director of Natural Resources or Governor's level and presented, if possible, at a special occasion, possibly at a local Woodland Owners Association meeting.
- Other Recognition Symbols: Decals and other types of recognition will be left up to individual State forestry agencies and Forest Service Area and Regions. Any expertise for other recognitions symbols will be the sole responsibility of the States.

State/National Recognition:

While the focus of the recognition activities is on the individual landowners, State foresters in consultation with their State Forest Stewardship Coordinating

Committee, may choose to develop additional recognition activities within State. Further, recognition activities may be developed at the regional and national level. These options could include the following approaches:

- State: States are encouraged to develop a forest stewardship award of recognition program for individual forest landowners, groups, organizations, etc. Several top stewardship landowners could complete for the honor of being selected for "Stewardship Forest" of the year, or Forest Stewardship Landowner/Manager of the year.
- Regional: Regional recognition by the Northeastern Area Association of State Foresters, Southern Group of State Foresters, and Council of Western State Foresters should also be considered.
- National: NASF, possibly in conjunction with other national groups, might recognize groups and organizations and select/recognize a National Forest Stewardship Landowner.

Forest Stewardship Accomplishment Reporting:

As a minimum, statistics must be maintained by the State and reported annually for:

- The number of forest stewardship plans completed. This should translate to landowners assisted; plans should only be reported once.
- Acres included in forest stewardship plans. This translates to acres under forest stewardship management; acres should only be reported once.

The collection of such information will be coordinated with the Cooperative Forestry Annual Accomplishment Report.

Funding Guidelines and Management:

The Forest Stewardship Program should strive to fund the delivery of a maximum amount of "on the ground" information and technical assistance to individual forest landowners. Program administrative cost must be kept to a minimum. Administrative costs are defined as indirect costs per the Grants Management Handbook.

Additional Guidelines:

- Federal funds must be matched by non-Federal cash, services, or in-kind contributions.
- The Washington Office will make the initial funding allocation on a North, South, and West geographic area basis (i.e., Northeastern Area, Region 8, and Regions 1-6 and Region 10 comprising the West).

Forest Stewardship Program Funding Procedure:

- Remove Washington Office assessments, earmarks, and a base amount of $50,000 per State and $25,000 per Territory.
- The remaining funds are distributed to the three geographic areas (North, South, and West) in proportion to the number of NIP landowners and the number of NIPF forest acres. The two factors are weighted equally.
- No geographic area may receive less that 20 percent of the remaining funds.
- If a geographic area is raised to the minimum 20 percent of remaining funds, the procedures are adjusted for the other two geographic areas in proportion to the number of NIPF landowners, and number of total NIPF forest acres.
- The base amounts and earmarks are then added back in and the amount of funds distributed within the western geographic area is recommended by the Western Stewardship Committee to the Council of Western State Foresters and the Western Regional Foresters for approval.

United States
Department of
Agriculture

Forest Service

Forest
Stewardship
Program

FS-733 MAy 2002

Olympic National Forest

Sitkum Thinning EA Planning Area

Map 4
Alternative B - West

Legend

- Sitkum Project Area

Proposed Logging System

- Ground
- Cable
- Helicopter
- HeliCable
- HeliProcess

Proposed Temporary Roads Type

- Decommissioned
- Proposed
- UnClassified
- Unclassified Convert to System Road
- Potential Helicopter Landings
- Gravel Pit
- Inventoried Roadless Area

FS_Roads

Forest Service Roads

- Operational ML 5
- Operational ML 4
- Operational ML 3
- Operational ML 2
- Operational ML 1
- Forest Service Ownership
- NPS_Boundary
- Private Land
- State Land

1:40,000

0 1 Miles

Coordinate System: NAD 1983 Albers

Modified On: May 4, 2011

KLAHANIE

RUGGED RIDGE

Shelter TS

OLYMPIC NATIONAL PARK