

7 RECOVERY PROGRAM ACTIONS

This chapter presents a suite of recommended actions that may be necessary to achieve recovery of the Lake Ozette sockeye salmon ESU. These recommendations were developed by NMFS with input and suggestions from the Lake Ozette Sockeye Steering Committee. At their November 2006 meeting, Steering Committee members proposed a range of strategies and actions (programmatic and site-specific) to restore biological processes and address limiting factors in the Lake Ozette watershed. NMFS refined these suggestions in relation to the scientific process that forms the basis of the plan – the process of forming hypotheses and moving from those to strategy and action. This section contains the combined results. Many of the Committee's suggestions are also included in Chapter 8, Research, Monitoring and Evaluation.

The proposed recovery actions are voluntary and are listed here as guidance and for planning purposes only. These actions are proposed for future consideration; they are not required or mandated as a result of being in this proposed recovery plan. Proposed recovery actions will need to be refined during development of an Implementation Schedule (see Section 9.1). The public will be involved in developing the Implementation Schedule and selecting future projects. To decide whether to implement any of the proposed recovery actions, it will be necessary to develop project budgets, seek funding, get permits from the relevant authorizing agencies, evaluate potential social and economic effects, and coordinate actions with Olympic National Park and other appropriate entities.

The proposed voluntary actions in the recovery plan are designed to be integrated with current, ongoing programs or regulations that may benefit sockeye and that are also described in this plan, such as the forest HCPs or current fisheries regulations. These ongoing programs or regulations that are currently being implemented have been previously evaluated and approved through appropriate local, state, and Federal environmental impact review processes. Some of the ongoing actions that are integrated into the plan, such as implementation of forest HCPs, maintenance of county roads, operation of the sockeye hatcheries, or regulation of fisheries, are not voluntary, as they are already subject to an existing permit, contract, or regulation. In that sense, the plan incorporates some required actions because of their potentially significant contribution to achieving recovery, as well as the new, proposed, voluntary actions detailed in this chapter. Table 7.1 lists the proposed actions.

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

Table 7.1. Summary of proposed recovery program actions.

Plan Section	Proposed Actions
7.1 Fisheries Management	<ol style="list-style-type: none"> 1. Maintain all currently closed or restricted sockeye fisheries (Section 7.1). 2. Continue timing, location, and method limits on current ocean fisheries and other salmon-directed fisheries, to ensure that these fisheries do not interfere with Lake Ozette sockeye salmon recovery (Section 7.1.3.2). 3. Continue current commercial and recreational fisheries ban on directed and incidental harvest of Lake Ozette sockeye salmon in Lake Ozette, Ozette River and all Lake Ozette tributaries (Section 7.1.3.1). 4. Depending upon ESA evaluation and determination that recovery would not be compromised, resume limited ceremonial and subsistence fisheries (section 7.1.3.1). 5. Subject to ESA review and approval, as sockeye populations recover, commercial and recreational fisheries directed at sockeye salmon may be allowed in Ozette watershed (Section 7.1.3.1). 6. Minimize incidental harvest impacts on juvenile and adult sockeye salmon by regulating fisheries on other fish species (Section 7.1.3.1). 7. Study impacts on sockeye of increased cutthroat trout population, and consider changing cutthroat trout non-retention regulation if necessary (Section 7.1.3.1). 8. Continue Lake Ozette watershed recreational fisheries designed to reduce non-native fish species that prey on juvenile sockeye salmon (Section 7.1.3.1). 9. Long-term future sockeye marine fisheries harvest may be resumed after evaluation of proposed harvest plans for tribal commercial, ceremonial and subsistence, and all-citizen recreational fisheries (Section 7.1.4.2).
7.2 Habitat-Related Actions	
7.2.1 Habitat-Related Programmatic Actions	<ul style="list-style-type: none"> • Implement the Washington Forest Practices Habitat Conservation Plan on private timber lands in the Lake Ozette watershed (Section 7.2.1.1). • Implement the Washington Department of Natural Resources Habitat Conservation Plan on state timber lands in the Lake Ozette watershed (Section 7.2.1.2). • Implement Clallam County Critical Areas Ordinance and Storm Water Management Plan in the Lake Ozette watershed (Section 7.2.1.3).

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

Plan Section	Proposed Actions
	<ul style="list-style-type: none"> • Implement the Clallam County Road Maintenance Plan in the Lake Ozette watershed (Section 7.2.1.4). • Implement the Olympic National Park Management Plan in the Lake Ozette watershed (Section 7.2.1.5). • Implement the Olympic Coast National Marine Sanctuary Management Plan (Section 7.2.1.6). • Implement the Washington State Department of Fish and Wildlife Hydraulic Code (Section 7.2.1.7). • Implement the Washington State Department of Ecology’s water quality and water resource programs in the Lake Ozette watershed (Section 7.2.1.8).
<p align="center">7.2.2 Habitat Protection, Restoration and Enhancement Projects</p>	<ul style="list-style-type: none"> • Implement Broad-scale Sediment Reduction Projects (Section 7.2.2.1) that may be carried out as part of the Forest Practices HCP, WDNR HCP or by other landowners. • Implement Hydrologic Restoration Projects by carrying out computer modeling to analyze impacts of past land use and large wood removal actions, and identify potential future actions to improve natural hydrologic functions in the watershed (Section 7.2.2.2). • Research and identify options for large wood placement projects (Section 7.2.2.3). • Implement site-specific large wood placement projects in Umbrella Creek (Section 7.2.2.3.2). • Implement broad-scale and site-specific riparian and floodplain restoration projects (Section 7.2.2.4). • Seek conservation easements and encourage market-driven transfer of development rights for conservation (Section 7.2.2.6).
<p>Section 7.3 Hatchery Supplementation Actions</p>	<ul style="list-style-type: none"> • Implement the current hatchery practices as required in Makah Tribe’s 2000 Lake Ozette Sockeye Salmon Hatchery and Genetic Management Plan (Section 7.3). • Continue to use Umbrella Creek sockeye salmon for hatchery broodstock collection actions (Section 7.3.1.1). • Continue to use broodstock spawning procedures in accordance with NMFS guidelines under the ESA (Section 7.3.1.2). • Continue to use ESA-approved protocols for juvenile sockeye salmon rearing and release actions (Section 7.3.1.3). • Implement the ESA-approved hatchery program practices and return adult carcasses to Umbrella Creek (Section 7.3.1.4). • Implement beach spawner supplementation research as defined in the ESA-approved hatchery plan (Section 7.3.1.5).

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

Plan Section	Proposed Actions
Section 7.4 Predator Control	<ul style="list-style-type: none"> • Implement potential long-term hatchery enhancement actions (Section 7.3.2.1.1). • Create an incentive program, as appropriate within NPS regulations, to encourage or require lethal take of largemouth bass and other non-native fish species, with a goal of reducing or eliminating non-native fish species. • Create fishing regulations that will limit take of native species while maximizing the removal of non-native species. • Develop a management plan for northern pikeminnow, based on field assessments of the species' impact on sockeye salmon survival and productivity. Control the abundance of this species if reduction in the number of pikeminnow in Lake Ozette is determined to be necessary to meet sockeye population viability criteria. • Work with NMFS and other appropriate agencies to study impacts of marine mammals and river otters on sockeye salmon, particularly on beach spawning grounds. Based on this information, develop a NMFS-sanctioned plan to address these impacts through a variety of predator control measures being tested and used in the NMFS Northwest Region. • Working in coordination with NMFS, ONP, and other agencies, analyze the impacts of seals and sea lions on sockeye salmon and identify options to minimize these impacts, including reinstating ceremonial and subsistence hunting of seals and sea lions in Tribal Usual and Accustomed hunting and fishing areas. • Modify sockeye adult enumeration techniques at the Ozette River weir to reduce any predation mortality on adult and juvenile sockeye. • Implement research and monitoring actions proposed in Chapter 8 to analyze fishing regulations, predator-prey interactions, and predation at all life stages for beach spawners.
Section 7.5 Research, Mon. & Adapt. Mgmt	<ul style="list-style-type: none"> • Implement research, monitoring and adaptive management actions (see Chapter 8).

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

Plan Section	Proposed Actions
<p>Section 7.6 Public Education</p>	<ul style="list-style-type: none"> • Develop an education and outreach program regarding negative impacts of non-native fish and plants. • Produce a 3-5 page summary brochure or handout describing the key parts of the Lake Ozette Sockeye Recovery Plan and highlighting the recovery actions that can be carried out by the public and landowners • Develop a clearinghouse of information about recovery plan implementation to keep partners and the public informed about progress on recovery actions. • Work with landowners in the watershed to provide information and help identify appropriate recovery actions on landowner property. • Produce educational materials that can be used in the local schools, community colleges, and community centers. • Develop cooperative educational and outreach programs with existing organizations and nonprofit groups to include information about sockeye recovery in their materials. • Develop exhibit materials that can be used at fairs, festivals, or other venues. • Work with Olympic National Park staff to develop materials, posters, and display boards to educate the public visiting Lake Ozette about the need to recover sockeye salmon and the recovery actions being carried out within the Park. • Seek funding to carry out the proposed education and outreach actions. Develop a clearinghouse of information on funding sources. Support local entities, landowners, and Tribes to seek funding for recovery actions. • Identify which entities and individuals will carry out the education and outreach actions. • Develop public education information that can be posted on the NMFS, Olympic National Park, Olympic Coast National Marine Sanctuary, and Clallam County's NOPLS web sites. Identify other opportunities for web postings of recovery information. • Carry out briefings and presentations to civic, business, trade, environmental, and conservation organizations. • Lead seasonal tours of the watershed so the public can observe spawning sockeye salmon and visit recovery project restoration sites.
<p>Section 7.7 Action Integration</p>	<ul style="list-style-type: none"> • Implement priorities for actions based upon the recovery strategy hierarchy, subbasin prioritization, and limiting factors presented in the recovery plan.

7.1 FISHERIES MANAGEMENT ACTIONS

This section of the plan addresses recovery-directed actions and regulatory measures that will be applied over the short and long terms (i.e., 50 years) in the management of fisheries directed at the harvest of Lake Ozette sockeye salmon. This section also addresses short- and long-term actions and measures applied for fisheries that may incidentally affect the population through harvests directed at other fish species.

These harvest actions will apply to all fisheries under the jurisdiction of Federal, Washington State, and tribal resource management agencies and entities that, because of their timing and/or location, have a moderate to high likelihood of harvesting Lake Ozette sockeye salmon. All fisheries that historically occurred in Lake Ozette, Lake Ozette tributaries, and the Ozette River, but that are presently closed or restricted for conservation purposes, are subject to the sockeye salmon preservation and recovery actions described in this plan. Recently extant, but now closed or restricted freshwater area fisheries covered by this plan include any proposed tribal commercial, ceremonial, and subsistence fisheries regulated by the Makah and Quileute Tribes, and all recreational fisheries managed by the Olympic National Park and WDFW. Nothing in this plan is intended to address or define the respective treaty rights of the Makah or Quileute Tribe to fish in Lake Ozette, Lake Ozette tributaries or the Ozette River, including the equitable allocation of harvestable fish.

Marine area fisheries that will be guided by conservation-directed measures included in this plan are tribal and non-tribal commercial and recreational fisheries in Washington marine waters regulated by the tribes, WDFW, and NMFS through the Pacific Fisheries Management Council, North of Cape Falcon, and Pacific Salmon Treaty fisheries management forums. Under current management regimes, ocean salmon-directed fisheries in Washington, British Columbia, and Alaska, including those managed under the terms of the Pacific Salmon Treaty, are not likely to substantially affect Lake Ozette sockeye salmon (LFA Section 5.6.1.1) (Haggerty et al. 2007). The expectation is that fishing patterns for these fisheries, and their attendant unsubstantial impacts on Lake Ozette sockeye salmon, are unlikely to change to the detriment of Lake Ozette sockeye salmon over the short or long term. However, management actions for these potential interceptory fisheries, including their timing and location relative to sockeye migration routes, will be monitored by NMFS. In the event that any interceptions of Lake Ozette sockeye are documented through monitoring of these fisheries, NMFS will notify and work with the managers overseeing the fisheries to implement management measures that will minimize to the extent feasible any mortality resulting from the fisheries as the sockeye population recovers. Measures that may be required by NMFS to minimize ocean area interceptions in the fisheries may include time and area closures and gear restrictions.

7.1.1 Tribal Fishing Rights and Lake Ozette Sockeye Salmon Recovery

As noted in Section 1.6, sockeye salmon population recovery goals are accentuated by the need to comply with treaties made between the U.S. Federal Government and the

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

Makah and Quileute Tribes that guaranteed tribal fishing rights, and the Federal trust responsibilities attendant with the treaties. The 1855 Treaty of Neah Bay and the 1856 Treaty of Olympia secured to the Makah and Quileute Tribes the right of fishing “at all usual and accustomed grounds and stations,” which would include fishing in the areas ceded to the U.S. Government in the treaties. Lake Ozette lies within the area identified in these treaties as ceded lands for the Makah and Quileute Tribes, and the fishery of Lake Ozette has been of historical, cultural, and spiritual importance to both Tribes. Under the Federal trust responsibility, Federal agencies, including NMFS, have a legal obligation to support the Tribes in efforts to preserve and rebuild treaty salmon fisheries in the Tribes’ usual and accustomed fishing area. The U.S. Government has an obligation to protect tribal land, assets, and resources, as well as a duty to carry out the mandates of Federal law with respect to Tribes. This unique relationship provides the Constitutional basis for legislation, treaties, and Executive Orders that grant unique rights or privileges to Native Americans to protect their property and their way of life.

Implementation of a recovery plan that achieves the basic purposes of the ESA will lead to major improvements in the status of the species (ESU) and its habitat over time, such that the Lake Ozette sockeye salmon ESU reaches the point where it no longer needs protection under the Act. However, stock status improvement resulting from implementation of this plan, and recovery of the ESU to the point of delisting, may not fully meet treaty-reserved tribal fishing rights and expectations. Ensuring availability and sufficient abundance of sockeye salmon to allow for, and sustain, harvest can be important elements in fulfilling treaty fishing rights and the Federal trust responsibilities for them, as well as garnering public support for the recovery plan. It is appropriate for this recovery plan to take the need for a harvestable abundance of sockeye salmon into account and to plan for recovery strategies that include harvest. NMFS’ policy is therefore that the process of recovery of the Lake Ozette sockeye salmon population must achieve two goals: (1) recovery and delisting of the listed ESU under the provisions of the ESA, and (2) the restoration of the meaningful exercise of tribal fishing rights. It is NMFS’ view that there is no conflict between the statutory goals of the ESA and the Federal trust responsibility to Indian tribes regarding the allowance for, and restoration of, treaty-reserved fisheries.

The Makah and Quileute Tribes have indicated that their opportunity to exercise treaty-reserved fishing rights, while stated as an objective in the plan, is not currently being achieved. Declines in the abundance and productivity of Lake Ozette sockeye salmon from historical levels led to the complete cessation of Makah tribal fisheries in the watershed in 1982. An important objective of this recovery plan will therefore be rebuilding of the Lake Ozette sockeye salmon population to allow sustainable, directed tribal ceremonial and subsistence and commercial sockeye salmon fisheries in the Lake Ozette region. An important companion goal is restoration of sustainable recreational and subsistence fisheries for sockeye salmon for the benefit of all citizens in the region.

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

7.1.2 Considerations and Criteria for Re-Establishment of Sockeye Salmon Fisheries

The fisheries restoration goals described above are part of the broad-sense goals in the Steering Committee's vision statement. As this recovery plan is implemented and changes resulting from other recovery-directed measures have an effect, the protective approach currently applied regarding adult sockeye salmon harvest management will be reassessed and revised. Specifically, the harvest approach will be adjusted to allow re-establishment of sockeye salmon-directed and/or incidental harvest fisheries in the Lake Ozette basin and its nearshore marine areas. However, any fisheries must not compromise rebuilding and recovery of the population and the eventual attainment and maintenance of a viable population. Key considerations regarding re-establishment of sockeye-directed fisheries will include:

- The trajectory and status of the sockeye salmon population relative to ESU viability criteria, based on analyses using viability status detection and measurement parameters developed by the co-managers, NMFS, and the PSTRT, respectively, addressing spawner abundance status, fish recruitment, population age structure, and other viability metrics;
- The abundance status of each of the component beach and tributary aggregations relative to population abundance targets set for these spawning areas, and considering their contribution to ESU spatial structure and diversity criteria;
- Improvements in the condition of habitat in beach and tributary spawning areas;
- Effects of the tributary hatchery programs in returning adult fish, and in establishing self-sustaining natural spawning aggregations;
- Determination of a total returning population abundance threshold above which directed harvest could be allowed consistent with ESU rebuilding objectives; and,
- Derivation of a "rebuilding exploitation rate" of harvest that defines a harvest impact level that will not significantly impede the opportunity for the population to consistently achieve, or grow towards, identified recovery targets. The rebuilding rate will incorporate assessment of the habitat and abundance considerations described in the above bullets, providing a structure in which harvest is constrained to appropriate levels as the population rebuilds from current abundance to recovery.

The parties to this recovery plan are working toward restoration of a viable Lake Ozette sockeye salmon population, as defined by criteria developed by the PSTRT. Recovery of the population to a viable level is considered highly unlikely without commensurate improvements in limiting factors identified as of moderate and high risk to the listed population. Sockeye salmon harvest regimes implemented over the long term would likely be based on a conservative assessment of maximum sustainable harvest, accompanied by monitoring, adjustment for survival and productivity conditions in the Lake Ozette basin, and taking into account uncertainties in data, data analysis, and management implementation. As other recovery strategies take effect, such an approach will allow the majority of the expected, increasingly abundant fish to pass through to the spawning grounds. Objectives for fisheries directly or incidentally affecting Lake Ozette sockeye salmon will address catch accounting, risk management in the conduct of

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

fisheries, and adherence to the principles of overarching salmon management plans, court orders, and agreements as follows (generally from PSTT and WDFW 2004):

- Conserve the abundance, diversity, spatial structure, and productivity of the ESU;
- Manage all fisheries to account for uncertainty and risk in estimating population sizes and the impacts of harvest;
- Meet the section 7 standards of the ESA for any Federal authorizations to ensure that harvest is not likely to jeopardize the continued existence of the ESU;
- Provide opportunity to harvest surplus production from other species/populations originating from the Lake Ozette basin or adjacent watersheds;
- Account for all sources of fishery-related mortality;
- Adhere to the principles of the Puget Sound Management Plan and legal mandates of *United States v. Washington* to ensure equitable sharing of harvest opportunity among Tribes and among treaty and non-treaty fishers; and
- Ensure the exercise of Indian treaty rights in “usual and accustomed” areas.

7.1.3 Short-Term Actions (Initial 1-12 Years)

In both freshwater and marine fisheries, harvest management in the initial 1- to 12-year period of the recovery plan will continue to emphasize sockeye population protection and rebuilding.

7.1.3.1 Freshwater Fisheries (RS#4)

The primary short-term harvest management approach will be to continue to protect Lake Ozette sockeye salmon from directed and incidental commercial and recreational fisheries harvests in Lake Ozette, the Ozette River, and all Lake Ozette tributaries. This action will be accomplished by continued implementation of current ONP, WDFW, and tribal fishing regulations that prohibit the directed harvest and retention of Lake Ozette sockeye salmon in recreational and tribal commercial fisheries.

Makah commercial sockeye harvest was discontinued in 1977, but the Makah Tribe continued a ceremonial and subsistence fishery in the Ozette River until 1982 (MFM 2000). No directed *O. nerka* (sockeye salmon and kokanee) harvests have occurred since that time, and harvest prohibitions for the species have applied to all freshwater recreational, commercial, and ceremonial and subsistence fisheries in the watershed. There are no open fisheries within the Ozette River during the juvenile sockeye emigration period and therefore there are no impacts on sockeye salmon from permitted in-river fisheries. For example, the Ozette River is closed to all sport fishing until August 1st. When the river is open, selective fishery rules apply and all sockeye salmon encountered must be released immediately. The current protective fisheries management approach has resulted in categorization of harvests of adult and juvenile sockeye during all life history phases in the watershed as negligible limiting factors to population recovery (Sections 4.2.3.2.1, and 4.2.3.2.2) (see LFA Sections 6.1.2.2 and 6.1.11.2).

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

A resumption, during the initial recovery plan implementation period, of limited ceremonial and subsistence fisheries for sockeye salmon in the Ozette River has been requested. Any such ceremonial and subsistence fisheries would be implemented consistent with the need to ensure that rebuilding of the population to a recovered level would not be compromised. ESA evaluation and determination of the effects of such fisheries on population recovery would be made under the ESA 4(d) Rule limit on section 9 prohibitions applicable to listed threatened species for actions under tribal resource management plans (65 FR 42481, July 10, 2000). Initially, ceremonial and subsistence fisheries that are proposed would be limited to the removal of 30 fish or no more than **1 percent** of the estimated total returning sockeye salmon population, whichever figure represents the lowest number of fish, in a given year. Such fisheries would need to address considerations and objectives described above in Section 7.1.2 of this plan that are pertinent to implementation of a limited ceremonial and subsistence harvest designed to avoid substantial harvest impacts on the beach spawning aggregations. Proposed ceremonial and subsistence fisheries would therefore target, to the extent feasible, marked Lake Ozette tributary-origin sockeye salmon identified through in-season stock assessment data analyses as surplus to natural spawning and hatchery broodstock escapement needs in Umbrella Creek and Big River. Ceremonial and subsistence harvest of beach-origin sockeye salmon would be avoided to the extent feasible through actions such as time and area restrictions and/or exploration of selective fishery techniques.

As identified in the LFA document (Section 5.3.4.2.6), changes in lake and fisheries management have the potential to increase the abundance of certain predators known to consume sockeye salmon. ONP's recent implementation of fishing regulations requiring release of coastal cutthroat trout may have the effect of increasing the abundance of cutthroat trout in Lake Ozette, potentially to a point where juvenile sockeye salmon mortality is substantially increased from current levels. As a short-term harvest management action, this regulation change will be reexamined by ONP to determine whether protecting cutthroat trout is warranted and outweighs hazards the change may pose to the recovery of sockeye. If a determination is made by ONP, with input from other entities implementing harvest-related recovery actions in this plan, that the increased cutthroat trout population resulting from the non-retention regulation is likely to substantially impact juvenile sockeye salmon abundance levels (for example, through life cycle analysis computations showing that cutthroat predation is a significant factor impeding recovery), ONP will revise or rescind the cutthroat trout non-retention regulation. ONP may make a similar decision to allow cutthroat retention if stock status evaluations in Lake Ozette show that the abundance status of the cutthroat population is not at risk or is trending upward.

As a further measure to reduce piscivorous fish predation risks to juvenile sockeye salmon rearing in Lake Ozette, ONP and WDFW will adjust as necessary current recreational fishery regulations to promote and maximize the removal of non-native fish species. Piscivorous species that will be the focus of regulation changes, including liberalization of open fishing periods or cessation of bag limits (subject to the need to avoid sockeye bycatch), are largemouth bass and yellow perch (addresses RS#3).

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

7.1.3.2 Marine Area Fisheries (RS#4)

In continuation of the current approach, no directed harvests of sockeye salmon are allowed in the Ozette River estuary, nearshore area, or adjacent U.S. marine waters during the migration period of Lake Ozette sockeye salmon. Reviews of the current fisheries management approach for coastal marine area fisheries in Northeast Pacific waters, harvest data in Washington Catch Reporting Area 4, and estimated Lake Ozette sockeye salmon marine area migration timing and abundance estimates have resulted in categorization of interceptory marine area fishery harvests as a negligible limiting factor to recovery of the Lake Ozette sockeye salmon population (Section 4.2.3.1) (LFA Sections 5.6.1.1 and 6.1.13.1). The timing, location, and methods applied in current coastal fisheries limit the likelihood for substantial harvest impacts to Lake Ozette sockeye salmon. Continuation of current fishing regimes over the short term is expected to be sufficiently protective of sockeye salmon so as not to interfere with the population's recovery to a viable level.

7.1.4 Long-Term Actions (Subsequent 13-50 Years)

This section concerns long-term fisheries harvest management actions affecting ESU recovery, tribal fishing rights, freshwater fisheries, and marine area fisheries.

7.1.4.1 Freshwater Fisheries (RS#4)

As the Lake Ozette sockeye salmon population recovers, commercial and recreational fisheries directed at sockeye salmon may be allowed in the Lake Ozette watershed, subject to ESA approval of a fishery management plan (e.g., a Fisheries Management and Evaluation Plan [FMEP]). Among other criteria, the fishery plan would address the objectives and key considerations presented in Section 7.1.2, and describe the effects of the proposed plan. Directed commercial and recreational fisheries—for example, fisheries designed to harvest tributary-origin sockeye—may be considered prior to delisting of the population, if such fisheries will not exert harvest impacts that are likely to impede progress toward ESU recovery when measured against a “0” harvest management approach. The sockeye salmon population abundance level sufficient for allowing limited directed commercial and recreational fishery harvests of adult fish in the watershed, and the maximum allowable harvest impacts from such fisheries, will be determined through application of the considerations and criteria identified in Section 7.1.2. As noted in Section 7.1.3, as the population recovers, limited harvests of adult sockeye salmon would continue to be considered as a means to meet tribal ceremonial and subsistence fishery needs over the long term. NMFS will work with the Tribes, ONP, and WDFW within the ESA, NEPA, and U.S. v. Washington fishery management forums to evaluate specific directed commercial or recreational sockeye salmon fishery harvest plans proposed within the watershed prior to making formal decisions.

Fisheries directed at other fish species in the Lake Ozette basin will be regulated over the long term to minimize incidental harvest impacts on juvenile and adult sockeye salmon.

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

Key considerations and objectives described above in Section 7.1.2 will be addressed when considering implementation of commercial, recreational, and tribal ceremonial and subsistence fisheries that may have incidental harvest impacts on listed sockeye salmon.

To reduce piscivorous fish predation risks to juvenile sockeye salmon, recreational fisheries designed to remove and eradicate non-native fish species will continue to be promoted (RS#3). No-bag-limit fisheries directed at largemouth bass and yellow perch will be promulgated by ONP and WDFW, where and when appropriate.

7.1.4.2 Marine Area Fisheries (RS#4)

Long-term harvest actions may include resumption of sockeye salmon-directed tribal commercial, ceremonial and subsistence, and all-citizen recreational fisheries in estuarine and nearshore marine areas adjacent to, and seaward of, the mouth of the Ozette River. Although unlikely because of the fishery timing relative to adult migration, incidental catches in ocean fisheries may also increase as abundance increases. All proposed fisheries would be subject to a review of the objectives and key considerations identified above, and ESA approval involving an assessment of the fisheries and their specific effects on listed Lake Ozette sockeye salmon. Before making formal decisions, NMFS will work with the Tribes and WDFW within the ESA, NEPA, PFMC and U.S. v. Washington forums to evaluate any specific sockeye salmon-directed harvest plans proposed within marine areas where, based on a review of fisheries location and timing, Lake Ozette sockeye salmon may be present, and will also evaluate any fisheries shown to be incidentally harvesting Lake Ozette sockeye (as identified through DNA analysis or mark recoveries).

Fisheries directed at other sockeye salmon populations and fish species in U.S. marine fishing areas will continue to be regulated over the long term to minimize the risk of incidental harvest impacts to juvenile and adult sockeye salmon originating from Lake Ozette.

7.2 HABITAT-RELATED ACTIONS

The following habitat-related proposed recovery actions are voluntary and are identified as guidance and for planning purposes only. These actions are proposed for future consideration, and are not required or mandated as a result of being in the draft recovery plan. Proposed recovery actions will need to be refined during development of the Implementation Schedule (see Section 9.1), budgets will need to be developed and funding sought, permits issued from authorizing agencies, potential social and economic effects of proposed actions evaluated, and actions coordinated with Olympic National Park in order to select and implement any proposed recovery action. There is no requirement to implement these habitat-related actions, with the exception of those ongoing, programmatic actions that have been previously approved, required through other regulatory processes, and now integrated into this plan. The following habitat-

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

related projects are identified because they address habitat factors that are limiting Lake Ozette sockeye salmon and the projects are intended to improve the viability and recovery of this ESU.

Recommended habitat-related actions may be programmatic or project/site-specific.

7.2.1 Habitat-Related Programmatic Actions

“Programmatic” recovery actions are part of a policy, program or process, as opposed to being specific projects or related to specific sites. They are generally part of a regulatory or planning process. For example, programmatic actions could be part of a County’s land use and regulatory program or a watershed planning process. Comprehensive plans, critical area ordinances, shoreline management programs, and zoning could all be considered programmatic actions. Programmatic actions can include projects of a comprehensive or broadly encompassing nature e.g., riparian protection as part of a forest management plan. Watershed management plans often include projects to address specific limiting factors; for the purposes of this recovery plan, the management plans or planning processes will be considered programmatic actions, whereas the projects identified within the management plans will be categorized as projects.

This subsection describes programmatic actions related to the Washington State Forest Practices Habitat Conservation Plan (FPHCP), the WDNR State Land HCP, Clallam County Critical Areas Ordinance, Storm Water Management Plan, and Road Maintenance Plan, the Olympic National Park Management Plan, the Olympic Coast National Marine Sanctuary Management Plan, and the WDFW Hydraulic Code. No attempt has been made to list *all* of the projects or specific practices that may be part of each policy, program, or process.

7.2.1.1 Forest Practices HCP

The Washington State Forest Practices Habitat Conservation Plan (FPHCP; WDNR 2005) is a programmatic statewide plan covering 60,000 miles of streams in 9.3 million acres of non-Federal and non-tribal forestland. The FPHCP incorporates the Washington State Forest and Fish Rules, adopted by the Washington Forest Practices Board in response to the 1999 Forests and Fish Law (see Section 2.6.2.2.3). The FPHCP covers 16 listed threatened and endangered species under NMFS’ jurisdiction, including Lake Ozette sockeye. Details of the FPHCP are summarized at <http://www.nwr.noaa.gov/Salmon-Habitat/Habitat-Conservation-Plans;washington-Forest-Practices/Index.cfm>. The FPHCP contains a set of conservation measures and an administrative framework to implement and adaptively manage them. It is expected that as these practices are implemented and monitored, watershed conditions will improve. Approximately 37,000 acres (75 percent of forested watershed) of privately managed timberlands in the Lake Ozette watershed are to be managed according to the FPHCP.

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

7.2.1.1.1 Protection Measures Contained in the FPHCP

FPHCP protection measures consist of two parts: (1) a riparian conservation strategy and (2) an upland conservation strategy. The conservation objective of the riparian strategy is to protect riparian habitat function on lands covered by the FPHCP and to enable improvement of those levels once they are attained (WAC 222-30-010(2)). Riparian functions include large-wood recruitment, sediment filtration, streambank stability, shade, litterfall and nutrients, in addition to other processes important to riparian and aquatic systems.

The riparian strategy from the FPHCP consists of three separate but related sets of protection measures:

- Riparian and wetland management zones that provide large-wood recruitment, shade, and other ecological functions through tree retention.
- Limitations on equipment use in and around waters and wetlands to minimize erosion and sedimentation and maintain hydrologic flowpaths.
- Streamside land and timber acquisitions for the long-term conservation of aquatic resources.

The goal of the upland strategy is to prevent, avoid, minimize, or mitigate forest practice-related changes in erosion and hydrologic processes and the associated effects on public resources. The upland strategy in the FPHCP consists of protection measures that are implemented in upslope areas outside Riparian Management Zones (RMZs) and wetlands. These measures are intended to limit forest practice-related changes in physical watershed processes, such as erosion and hydrology that may adversely affect the quality and quantity of riparian and aquatic habitat lower in the watershed. The upland strategy includes Washington Forest Practices Rules, guidance from the Forest Practices Board Manual, and guidance issued through the WDNR Forest Practices Division related to unstable slopes and landforms; the location, design, construction, maintenance, and abandonment of forest roads; and harvest-induced changes in rain-on-snow peak flows. Further, the effectiveness and validation monitoring component of the FPHCP (as described in Section 4a-4.2 of the FPHCP) is designed to evaluate the degree to which the Washington Forest Practices Rules and guidance meet performance targets and resource objectives.

The following constitute specific protective actions that are required under the FPHCP, and that will directly benefit Lake Ozette sockeye salmon:

- Road Maintenance and Abandonment Plans

The Road Maintenance and Abandonment Plans (RMAPs) are the part of the Forests & Fish Law that most directly focuses on recovery of salmon. Forest landowners are required to submit their own RMAP to the Department of Natural Resources (DNR)

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

outlining their plans to properly abandon or stabilize existing forest roads whether they are used or not, and to improve standards on how new roads are to be built. Work must show progress over time and be prioritized by the "worst first" to give the most benefits to public resources early in the period. For example, fish barriers, stream-adjacent parallel roads, and large sediment sources would be addressed sooner than sites with less significant impact. Road maintenance is required to prevent potential or actual damage to public resources, such as disconnecting road drainage that delivers sediment to streams. RMAP strategies should meet the special needs of each watershed; each RMAP strategy is tailored to a particular geography. Adaptive management allows forest landowners to meet the special needs of each watershed while continually improving the standards of road and culvert construction.

One of the outcomes that the Forests & Fish Law seeks is to minimize the possibility of forest roads being catastrophically washed downstream as a result of heavy flooding. Therefore, culverts and bridges are being enlarged, new road techniques are being used, and old culverts and stream passages that pose a risk of failure are being re-engineered to a 100-year flood standard.

Most large forest landowners have submitted their plans to the DNR and have been practicing new methods since 2001. (Merrill & Ring began implementing RMAP's requirements in 2000 because of the pending change in regulations and the listing of Lake Ozette sockeye.) The three large landowners that make up most of the managed forest land within the Lake Ozette watershed have submitted their RMAPs and have begun implementing them. All forest landowners are required to complete their road and culvert improvements by 2016 and must report annual RMAP accomplishments to DNR while presenting a more detailed plan for each year's proposed RMAP work.

- Road Best Management Practices

Best management practices (BMPs) are the specific design techniques applied to ensure that sediment from forest roads is minimized. Application of BMPs for roads is a performance-based process; however, DNR has published a Board Manual (Board Manual Section 3, Guidelines for Forest Roads). This manual outlines BMPs associated with:

- Road Location and Design – Where you place a road is often more important than the design itself. Avoiding constructing roads near watercourses, steep or unstable slopes, wetlands, and other sensitive sites all help minimize the impact of forest roads. Road design techniques such as out-sloping help move water off the road surface and onto the forest floor.
- Road Construction and Maintenance - Proper compaction of fills and placement of vegetative material on freshly constructed road slopes also minimize erosion. Grading, maintaining drainage structures to be sure they are clear of debris, and rock surfacing are all elements of maintaining a well-drained forest road.

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

- Landings – Construction techniques, location, and drainage of landings is as important as on forest roads, especially the location of landing fills.
- Water Crossings – Designing the approach to watercourse crossings so they are perpendicular, not parallel to the stream minimizes the impact near the stream. Hydrologically disconnecting the road from the crossing so that road sediment is transferred to the forest floor, not the stream, is a critical element of crossing design. Water crossings must be installed at all channels and natural seeps and springs.
- Drainage Structures – These design features all function to remove water from the road surface and disperse it onto the forest floor. Rolling dips are slight changes in road grade that collect water and disperse it without dramatically altering the running surface of the road. Water bars are like “speed bumps” that block surface runoff and disperse it onto the forest floor. Ditch relief pipes are usually 18-inch pipes that break up the water flow in a roadside ditch and disperse it onto the forest floor.
- Road Abandonment – Removal of unnecessary or poorly designed roads is a very effective BMP to address sedimentation from roads. This is an intensive process and requires the road to be in a “maintenance free” state. Crossings and unstable fills are removed and low maintenance drainage structures are installed.

- Riparian Management Zones

Riparian Management Zones (RMZs) are the stream buffers put in place to ensure that upslope harvest activities minimize impacts on salmon. The Forest and Fish Law established these zones to increase function for salmon over time, in addition to serving as mitigation for current activities.

- Unstable Slopes

As a general rule, it is best to avoid operations on unstable slopes. In order to do that it is important to be able to recognize these features on the landscape. Both the Forest Practice Rules (WAC 222-16-050) and the Board Manual (Section 16, Guidelines for Evaluation of Potentially Unstable Slopes and Landforms) provide this guidance. In the rare situations where this is not possible, the rules require a higher level of review by the state and generally a project proponent invests in hiring a professional geologist to evaluate the proposal and provide recommendations to minimize impacts on the resources.

- Harvest unit size, green up, and reforestation requirements

There are several regulatory elements in place that limit the size and spatial distribution of clear-cut blocks. Additionally there are requirements to ensure prompt reforestation. The specific elements are outlined in WACs 222-30-025 and 222-34-010. Collectively, these regulations ensure limitations in size and timing of less hydrologically mature areas

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

over a watershed. This mitigates potential landscape-level sedimentation and peak flow effects.

- Yarding Methods

Both cable and ground-based yarding limitations reduce the potential for sediment delivery during logging operations. For cable yarding, this includes prohibiting yarding across fish-bearing waters where logs could damage stream beds and banks.

Ground-based yarding has more extensive limitations within the watercourse and RMZs. Additionally, there are prohibitions on operating on unstable and highly erosive soils. Use of ground-based equipment that would result in significant soil compaction or displacement during wet weather is also prohibited. Additional limitations and guidance are specified in WACs 222-30-060 and 222-30-070.

Any time yarding activities work over a fish-bearing stream, an additional Hydraulic Permit and review is required by the Washington Department of Fish and Wildlife. These permits provide detailed, site-specific design and activity criteria to minimize impacts to the streams.

- Road Use During Wet Weather

Road use during wet weather is highly dependent on the location and surface condition of the road. Operations on roads should be stopped when there is a risk of discharge of sediment to a stream. This is generally interpreted by DNR inspectors as well as landowners as a visual increase in turbidity in the receiving water.

7.2.1.1.2 Administrative Framework of the FPHCP

The administrative framework of the FPHCP allows for the development, implementation, and refinement of the state's Forest Practices program. This includes creation of new Forest Practices Rules and guidance, administering forest practices permitting, performing compliance monitoring, and taking enforcement action. An additional part of this administrative process is the concept of refining forest practices based on adaptive management.

The two main elements of this administrative framework that are an integral part of any successful recovery strategy are compliance monitoring/reporting on the implementation of the rules and the adaptive management process. These are both outlined in WAC 222-08-160.

- Compliance Monitoring and Reporting

Through the Forest and Fish Law, a required Compliance Monitoring Program is outlined in WAC 222-08-160. Compliance monitoring ensures that the rules in place are being

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

put into practice on the ground as they were intended. DNR is required to conduct compliance audits and submit monitoring reports to the board every two years. DNR is also required to maintain an infrastructure to support adequate compliance, monitoring, enforcement, training, education, and budget. In addition to the mandated compliance monitoring program, DNR field foresters conduct reviews and inspections before, during, and after Forest Practices activities.

- Adaptive Management

As stated in WAC 222-08-160, “The adaptive management program will be used to determine the effectiveness of forest practices rules in aiding the state’s salmon recovery effort and provide recommendations to the board on proposed changes to forest practices rules to meet timber industry viability and salmon recovery.”

The science-based adaptive management program complements the forest practices rules outlined in the FFR to protect fish and water quality in two ways: 1) by addressing near-term uncertainties with initial prescriptions and 2) ensuring that forest practices will continue to meet the ESA requirements over the long-term by improving knowledge and incorporating new information. This allows for changes to environmental protections to take place over time as we learn what is effective in promoting salmon recovery. This process is described in statute in WAC 222-12-045.

The Forests and Fish law specifies that changes to forest practices rules may occur through three avenues: 1) recommendations consistent with results from the scientifically based adaptive management process, 2) court mandates, and 3) legislative direction.

7.2.1.1.3 Additional Actions within the Scope of the FPHCP:

The following are additional actions within the scope of the Forest and Fish Law and HCP that when properly evaluated and implemented could accelerate the recovery of salmon.

- Compliance and enforcement of forest practice regulations

Consistent with the FPHCP and its incidental take permit, the state WDNR will maintain sufficient compliance and enforcement staff to enforce forest practice regulations within the Lake Ozette watershed. These activities should be carried out consistent with applicable local, state, and Federal laws and the stated objectives and intents of the FPHCP.

- Annual reports

WDNR will produce annual reports on FPHCP compliance for forest practices in the Lake Ozette watershed, including compliance with forest practices BMPs and forestry impact monitoring results, per HCP requirements. NMFS will work closely with WDNR

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

to review annual reports and address and resolve perceived non-compliance issues. WDNR is encouraged to seek involvement of representatives from the Lake Ozette Steering Committee to investigate and address compliance issues.

- Seek funding for FPHCP monitoring and adaptive management

Coordinate, seek funding for, and implement FPHCP effects monitoring programs within the Lake Ozette watershed, and adaptive management actions based on monitoring results that complement implementation of recovery plan research, monitoring and adaptive management activities. Coordinate these activities closely with FPHCP Cooperative Monitoring, Evaluation and Research Committee (CMER), recovery plan, ONP, tribal, and county research, monitoring and adaptive management actions. Identify and link FPHCP monitoring and adaptive management to this recovery plan's monitoring and adaptive management activities (Chapter 8).

7.2.1.1.4 Proposed Voluntary Actions within the Scope of the FPHCP:

The following are voluntary actions within the scope of the Forest and Fish Law and HCP that when properly evaluated and implemented could accelerate the recovery of salmon.

- Voluntary acceleration of restoration-related practices

Based on availability of funding and other resources and the results of in-watershed and /or CMER forest practice effects monitoring, timber companies may voluntarily accelerate, or, with approval, modify FPHCP practices to restore watershed processes sooner by, for example, leaving larger tributary buffers, upgrading roads, speeding road improvements, increasing rotation lengths, or other forestry management options. Special emphasis should be given to carrying out these voluntary measures in Umbrella Creek sub-watershed, an important timber production area, and one of the two lake tributaries (including Big River) where a tributary spawning sockeye population is becoming established. Sub-basins that have the greatest potential to contribute sediment to beach spawning should be prioritized above other sub-basins.

- Removal of unneeded roads, consistent with the FPHCP.

7.2.1.2 WDNR State Land HCP

The Washington Department of Natural Resources (WDNR) manages 11 percent of the land base of the Lake Ozette watershed. In 1997, the WDNR and NMFS signed a habitat conservation plan (HCP) that covers 1.4 million acres of industrial timber lands managed by the state in western Washington. The WDNR HCP is a multi-species ESA section 10 agreement that uses a combination of conservation measures that are expected to minimize and mitigate the impacts of take of listed species covered by the HCP,

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

including Lake Ozette sockeye. The HCP defines management of riparian areas and specifies buffer widths for all fish-bearing streams. Non-fish-bearing streams also have a specific buffer width, and no commercial harvest is allowed in the first 25 feet of the riparian buffer. Other components of the HCP include protections for inner gorges and mass-wasting areas, watershed analyses, and road management practices. Details of the WDNR HCP are summarized at: <http://www.nwr.noaa.gov/Salmon-Habitat/Habitat-Conservation-Plans/WA-Dept-Natural-Resources/index.cfm>.

Proposed recovery plan actions within the scope of the WDNR HCP:

- Continue WDNR annual reporting on forest practices covered by the WDNR HCP. Consider including the Ozette watershed in WDNR's statewide HCP effectiveness monitoring.
- Consistent with the WDNR HCP and its incidental take permit, WDNR will maintain sufficient compliance audit and enforcement staff to enforce forest practices regulations within the Lake Ozette watershed. WDNR is encouraged to seek involvement of representatives from the Lake Ozette Sockeye Steering Committee to regularly review implementation of the WDNR State Lands HCP and forest practice compliance with the HCP's regulations.
- WDNR is encouraged to implement lessons learned from effectiveness monitoring in other basins to promptly improve implementation of the WDNR HCP in Ozette.
- Coordinate WDNR HCP monitoring and adaptive management activities with implementation of recovery plan research, monitoring, and adaptive management activities.

7.2.1.2.1 Proposed Voluntary Actions within the Scope of the WDNR HCP:

The following are voluntary actions within the scope of the WDNR HCP that when properly evaluated and implemented could accelerate the recovery of salmon.

- Voluntary acceleration of restoration-related practices

Based on availability of funding and other resources, and the results of WDNR HCP forest practice effects monitoring in Lake Ozette watershed and/or in other basins, WDNR may voluntarily accelerate, or, with approval, modify WDNR HCP practices to restore watershed processes sooner by, for example, leaving larger tributary buffers, upgrading roads, speeding road improvements, increasing rotation lengths, or other forestry management options.

- Voluntary consideration of cumulative effects

WDNR should consider evaluating the cumulative effects of other commercial timber harvests in the watershed when they are planning sales on state lands. Special emphasis should be given to carrying out these voluntary measures in Umbrella Creek sub-

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

watershed. Sub-basins that have the greatest potential to contribute sediment to beach spawning should be prioritized above other sub-basins.

- Removal of unneeded roads, consistent with the WDNR HCP.

7.2.1.3 Clallam County Zoning and Land Use

The Lake Ozette watershed is entirely within Clallam County. Implementing and/or enforcing the county zoning and land use regulations can make an important contribution to protecting water quality and freshwater resources.

- Enforce all County rules pertaining to small landowners along Big River: specifically, zoning laws, critical areas ordinances, and development in the 100-year floodplain and/or CMZ.
- Enforce state laws restricting cattle access to rivers to protect water quality.
- Implement Clallam County critical areas ordinance and storm water management rules.
- Enforce county zoning laws limiting septic tanks that are hydrologically connected to water courses (i.e., leach field draining directly into river).
- Enforce State Water Right Laws that limit the location of water withdrawals (i.e., illegal surface water diversions).
- Accurately delineate floodplain and channel migration zones. Protect floodplains and channel migration zones from development and incompatible land use activities through application of the WDFW hydraulic code and county land use regulations.
- Work with ONP, private timber companies, WDNR, Tribes, and other interested parties to investigate various potential land conversion development scenarios and the resulting potential impact on the viability of Lake Ozette sockeye salmon. Based on this analysis, identify land use and management options that Clallam County can implement to address future potential land conversion threats to Lake Ozette sockeye. The County will implement a preferred option, based on its resources and authority, to: (1) restore natural sediment production; (2) restore hydrologic processes and natural hydrologic variability; (3) and maintain and protect the lake and tributary riparian forests.

7.2.1.4 Clallam County Road Maintenance Plan

Adhere to Regional Road Maintenance Endangered Species Act Program Guidelines as per ESA 4(d) Rule protections.

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

7.2.1.5 Olympic National Park Management Plan

The Olympic National Park (ONP) owns 15 percent of the Lake Ozette watershed, including Lake Ozette, its shoreline, and much of the land along the Ozette River. ONP's General Management Plan establishes a long-term vision for the future of the park, including its management philosophy and the framework used to make park management decisions (<http://www.nps.gov/olym/parkmgmt/planning.htm>). The General Management Plan describes desirable resource conditions and visitor experiences for the park, and provides clear direction for resource preservation, visitor use, and proposed management strategies to achieve its goals. The last park-wide management plan was completed in 1976. In 2001, ONP began a public process to update its General Management Plan, which is expected to be completed in 2008. The General Management Plan is a road map to guide how the park will be managed in the future. Not all actions can or will be implemented because of funding limitations or other restrictions.

- Implement ONP's General Management Plan within the ONP boundaries in the Lake Ozette watershed.
- Continue to implement ONP policies, regulations, site plans, and specific actions in the Lake Ozette watershed based on the General Management Plan.
- Control exotic and invasive plants using the National Park Service's Exotic Plant Management Team within the ONP's boundary in the Lake Ozette watershed.
- Continue to implement ONP's Wilderness Management policies, protections, and regulations, particularly to maintain and protect riparian habitat.
- Continue to implement ONP's Front Country Area policies and protections within the Lake Ozette watershed.
- Continue to implement ONP's Scenic Easement policy within the Lake Ozette watershed.
- Identify specific ways to cooperate with ONP to fund and implement sockeye recovery plan actions through research partnerships, management actions, and communication with the public.
- Work with Clallam County, private timber companies, WDNR, Tribes, and other interested parties to investigate various potential land conversion development scenarios and the resulting potential impact on the viability of Lake Ozette sockeye salmon. Based on this analysis, identify land use and management options that can be implemented to address future potential land conversion threats to Lake Ozette sockeye.

7.2.1.6 Olympic Coast National Marine Sanctuary Management Plan

Established in 1994 and administered by NOAA's National Marine Sanctuary Program, the Olympic Coast National Marine Sanctuary's Management Plan describes objectives for resource protection, research, and education programs: <http://www.ocnms.nos.noaa.gov/>. In 2007, the Sanctuary initiated a process to review and update its management plan. Healthy estuarine and nearshore habitat is an important

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

component of sockeye life history. Therefore, continued implementation of the Olympic Coast National Marine Sanctuary Management Plan is important to protect nearshore habitat for sockeye salmon recovery.

Proposed recovery plan actions within the scope of the Olympic Coast National Marine Sanctuary Management Plan:

- Continue to implement the Olympic Coast National Marine Sanctuary's Management Plan, particularly as it relates to nearshore habitat management and research activities.
- Identify nearshore habitat data and research needs for sockeye recovery that may be addressed in cooperation with the Olympic Marine Sanctuary research programs.
- Seek funding to carry out cooperative research and management actions identified in Chapter 8, Research, Monitoring, and Adaptive Management, with the Sanctuary, NMFS Northwest Fisheries Science Center, and other interested parties or institutions.
- Share information and data collected by the Marine Sanctuary with parties implementing the Lake Ozette Sockeye Recovery Plan.
- Cooperate and seek funding for public education and outreach materials and activities to promote public awareness about sockeye recovery.
- Implement the Coast Guard's Northwest Area Contingency Plan in response to any oil spill within the Sanctuary.

7.2.1.7 Washington State Department of Fish and Wildlife Hydraulic Code

Washington Department of Fish and Wildlife (WDFW) is responsible for preserving, protecting, and perpetuating all fish and shellfish resources in the state. In 1949 the state Legislature adopted a state law known as the "Hydraulic Code" to help WDFW carry out this mission. The Code requires individuals, organizations, or government agencies that want to carry out construction projects that will use, divert, obstruct, or change the bed or flow of state waters to do so with a permit issued by WDFW (<http://apps.leg.wa.gov/RCW/default.aspx?cite=77.55>). A sample of activities that may be conducted in the Lake Ozette watershed that need a hydraulic code permit include stream bank construction; construction of piers or docks³; culvert installation; gravel removal; and log, log jam, or debris removal.

- Continue to implement and enforce the WDFW hydraulic code, with particular attention to gravel mining, fish passage projects, and culvert replacement projects.
- As per WAC 220-11-010, each application for a Hydraulic Project Approval (HPA) shall be reviewed on an individual basis. Therefore, require a site visit to inspect proposed job site for every HPA application to determine site-specific

³ Construction of piers and/or docks within ONP (e.g., Lake Ozette) falls under the exclusive jurisdiction of ONP. Activities within ONP must comply with ONP permitting processes.

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

- issues and technical provisions necessary for the protection of fish life and fish habitat.
- Encourage WDFW fisheries enforcement to prioritize habitat issues and strictly enforce WDFW hydraulic code.
 - Use the Region 6 HPA Administrative Audit and Hydraulic Permit Compliance, Implementation, and Effectiveness Pilot Study as a template for how to improve the HPA permitting process in the Lake Ozette watershed.

7.2.1.8 Washington State Department of Ecology

Washington Department of Ecology (DOE) is responsible for protecting, preserving, and enhancing Washington's environment, as well as promoting wise management of air, land and water resources. DOE's water quality program manages point source and non-point source pollution prevention and cleanup programs, stormwater management, and financial assistance for jurisdictions to improve and protect water quality. The Federal Clean Water Act (CWA) requires DOE to assess statewide water quality and to identify water bodies that fail to meet water quality standards in its Water Quality Assessment Report. Assessment Reports include the CWA 303(d) list of impaired waters of the state and the CWA 305(b) statewide assessment of water quality.

- Advocate further involvement from WDOE in assessing baseline water quality conditions in Lake Ozette watershed.
- Encourage WDOE to prioritize the Lake Ozette watershed for immediate 303(d) assessment and advocate for watershed level studies (e.g., for TMDL).
- Enforce State Water Right Laws that limit exempt wells to less than 5000 gallons per day.

7.2.2 Habitat Protection and Restoration-Enhancement Projects

The habitat protection, restoration, and enhancement projects described below include both broad-scale conceptual projects and site-specific projects. Collectively, the actions described below address a portion of the recovery strategies presented in Chapter 6 (other recovery strategies are addressed in other portions of Chapter 7). Where recovery strategies are directly linked to the actions below, a notation within parentheses is included within text linking the recovery strategy to the action.

7.2.2.1 Broad-Scale Sediment Reduction Projects

The following actions may be carried out as part of the voluntary actions under the FPHCP or WDNR HCP, or by other landowners not covered by these HCPs.

- Quantitatively assess sediment production impacts from logging (gully creation, debris flows, landslides), road building, LWD removal, and other land use

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

- activities in Priority Subbasins I, II, and III. Develop program to reduce land use-related sediment inputs.
- Implement rigorous sediment reduction and retention program designed to reduce coarse and fine sediment delivery to the Ozette River (see Sediment Processes).
 - Use the results of subbasin-scale sediment budgets (see broad-scale actions) to define the relative contribution of different sediment sources and target specific sites for restoration activities.
 - Where interest, willing landowners, and funding exist, purchase land from willing sellers in Priority Subbasins I, II, and/or III and manage land to recover watershed processes and ecosystem function for sockeye salmon recovery.
 - Develop a voluntary comprehensive “green” forestry program at the landscape scale that promotes ecosystem function and watershed process recovery. Research programs and identify potential voluntary forestry program options to achieve sockeye recovery goals.
 - Reconnect floodplains in Priority I and II Subbasins by reintroducing LWD to all tributaries to improve floodplain connectivity and sediment deposition/storage.
 - Plant or under-plant conifer riparian forests in fields and disturbed hardwood zones to increase bank rooting strength, increase hydrologic roughness, and aid in sediment storage/deposition (see Section 7.2.2.4.2).
 - Eradicate non-native plants (i.e., knotweed) in the riparian zone and replace with native species more effective at protecting soil and banks (see Section 7.2.2.4.2).

7.2.2.2 Hydrologic Restoration Projects

- Quantitatively assess hydrologic impacts from land use and large wood removal activities and develop a distributed hydrologic model calibrated for each tributary in conjunction with Ozette River hydraulic model to prioritize actions needed to improve natural hydrologic functions where needed (RS#8).
 - Based on modeling results, remove and/or disconnect hydrologically connected road systems via road decommissioning (full removal), abundant road cross-drain installation, and adequate culvert sizes at tributary crossings to ensure passage of LWD, sediment and water at the 100-year flood.
 - Agree on any proposed large wood placement actions designed to restore natural hydraulic conditions and maintain the natural range of lake level variability (see Sections 7.2.2.3 and 7.2.2.3.1) when producing the Implementation Schedule (see Section 9.1). Decisions regarding large wood placement actions will balance the biological needs of sockeye with considerations of social and economic effects on residents in the Ozette watershed. All actions will be considered in coordination with Olympic National Park.
 - Based on modeling results, restore or improve permanent vegetative hydrologic maturity (>25 or 40 years old) throughout watershed.

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

7.2.2.3 Large Woody Debris (LWD) Placement Projects

Large woody debris may be root wads or trees fallen into or across the channel. It is beneficial in the following ways:

- In smaller rivers and streams, LWD plays a key role in shaping the channel.
- It creates pools and waterfalls, providing salmon with protection from predators.
- It helps sediment settle out.
- It provides organic matter to feed the small invertebrates that salmon feed on.
- Streams with adequate LWD tend to have greater resistance to floods because the root wads and trees, along with the meandering channel they help to create, absorb more of the force of the floodwater.

It is understood, however, that LWD projects need to be carefully evaluated and thought through to make sure that benefits accrue and that potential damage or future problems are foreseen, prevented, or mitigated.

The following projects are proposed because they address limiting factors, respond to recommendations in research studies (i.e., Herrera 2005), and provide scientifically based actions to improve sockeye viability. These actions are recommended for consideration when developing the Implementation Schedule (see Chapter 9). Actions should be selected after careful consideration of both the biological needs of sockeye salmon and the social and economic needs of residents in the Ozette watershed, in coordination with Olympic National Park. During the implementation phase of the recovery plan, all proposed actions will be further defined, options analyzed, costs identified or refined, permitting needs identified, and decisions made in coordination with relevant permitting agencies and the public.

7.2.2.3.1 Broad-Scale LWD Placement Projects

Throughout the last century, and particularly in the last 60 or 70 years, LWD was removed from the Ozette River and tributaries in the belief that its removal would help the fish or that it would reduce flooding. However, the research evidence now indicates that LWD removal, in combination with other factors, has affected water quality (Hypothesis 2), Ozette River streamflow (Hypothesis 3), and Ozette River habitat conditions such as pool depth, pool volume, and cover (Hypothesis 4). It has also contributed to lower average lake levels and resulted in increased vegetation along the lake shore (Hypothesis 6). Historically, LWD was also removed from portions of the lake shoreline. This removal affected the shoreline hydraulics, resulting in reduced localized turbulence around wood. Shoreline wood functions to cleanse gravel locally and scour colonizing vegetation through turbulence. Without wood, vegetation can more effectively colonize bare soil and trap fine sediment, reducing substrate size and habitat suitability.

Adding large wood to rivers, streams, or shoreline can help to recover natural processes in the short term; however, to restore long-term watershed health, these measures should

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

be accompanied by strategies to allow trees to mature in the riparian area and, in the long term, to fall naturally. With that proviso, the following broad-scale actions are recommended:

- Place LWD structures in selected sections of the lower Ozette River to enhance habitat complexity, help prevent/hinder harbor seal migration into the lake, and provide cover for migrating sockeye salmon to help reduce predation.
- As may be recommended by modeling results (Section 7.2.2.2), add large wood to some parts of the upper 1.3 miles of Ozette River to restore natural hydrologic conditions and maintain natural range of variability of lake levels in order to improve beach spawning habitat.
- Reconnect floodplains by reintroducing large wood in all tributaries to improve floodplain connectivity, water retention, and peak flow attenuation.
- Add LWD accumulations in the mainstem of Umbrella Creek to re-activate its floodplain where disconnected and store suitably sized spawning gravels where absent (see Section 7.2.2.3.2).

1. Lower Ozette River

Placement of LWD in the Lower Ozette River relates to Hypothesis 1: Predation by marine mammals in the Lower Ozette River is a limiting factor for Lake Ozette sockeye.

- Placing LWD structures in the lower Ozette River would help prevent or hinder harbor seal migration into the lake.
- LWD would also provide cover for migrating salmon and help to reduce predation.

2. Upper 1.3 miles of Ozette River

Adding LWD in the upper 1.3 miles of Ozette River would help to restore natural flow patterns and maintain a natural range of lake levels in order to improve beach spawning habitat. This should be considered only after implementing the following recommended preliminary studies (#3 below).

3. Preliminary studies

Before starting any large wood placement project in the Ozette River directed at restoration of hydrologic conditions, implement the following proposed actions⁴:

- **Identify current flood hazards and potential flood risks around the lake.** Determine risk for flooding and options to address landowner concerns about lake levels and their property. Many of these concerns were discussed during the November 2007 NOAA/landowner meeting at Port Angeles. A summary of this

⁴ Note: the following bulleted actions only apply to large wood placement in the upper 1.3 miles of the Ozette River, where LWD placement would affect lake levels.

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

- meeting is included in Appendix C. Use this information to evaluate proposed recovery actions when developing the Implementation Schedule (Section 9.1).
- **Refine hydrologic model.** Improve the hydraulic model for design of instream structures and evaluating potential flood hazards around the lake. Better floodplain definition may be needed, especially in cross-sections in the upper reach. Although the model calibration was deemed suitable for purposes of this phase II study (Herrera 2005), it should be refined for the final design and for detailed flood prediction purposes.
 - **Determine the effect of increased lake levels on property and infrastructure.** Perform a topographic survey of flood-prone areas around Lake Ozette and the Ozette River, such as the ONP ranger station facilities and individual residences along the lake. Reprocessing the LiDAR data should greatly assist in this analysis. Additional surveys should be tied into the control established by CTS Engineers in October 2003. The results of the topographic survey will be compared with simulated lake elevations and durations to estimate the degree of potential flood risks at flood-prone locations.
 - **Identify a range of options for large wood placement** based on the refined hydrologic model and flood hazard analysis, together with the costs and benefits associated with each option, and ways to minimize unintended impacts of large wood placement.
 - **Identify potential projects** to be evaluated for the Implementation Schedule based on balancing the biological needs of sockeye with the social and economic effects on local residents. Potential projects should consider implementing these recommendations when developing projects:
 - **Establish reference spawning areas.** Survey actual spawning locations and elevation zones; beach slope; substrate types; vegetation types, elevation zones, and conditions; and ordinary high water mark. This information will be used to further analyze the existing results from the hydraulic modeling to make more detailed site-specific estimates of impacts on the existing spawning habitat that are associated with changes in lake levels and to determine design criteria and goals for future enhancement and restoration efforts.
 - **Evaluate and select restoration sites.** Evaluate the existing, historically active, and potential spawning area locations to develop a prioritized list of spawning areas (existing and potential) to be targeted during restoration. This assessment will also define the favorable hydraulic regime in these target locations. Survey potential spawning area locations and elevation zones; beach slope; substrate types; groundwater/hyporheic conditions; vegetation types, elevation zones, and conditions; and ordinary high water mark.
 - **Develop shoreline vegetation plan.** Assess passive versus proactive plan for removal of shoreline vegetation that encroaches on lake shore, focusing on substrate cohesion and impacts on spawning. Experiments in vegetation removal would be done to better understand the difference between sediment mobility with and without vegetation. A timeline for beach recovery would be developed for either scenario.

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

- **Analyze the social and economic effects** of each potential project and refine these options during development of the Implementation Schedule (Section 9.1).

4. Umbrella Creek

Fish habitat and LWD conditions in Umbrella Creek were intensively monitored and measured in 1999 and 2000. Researchers found that there are areas where there is not very much LWD, the stream channel is unstable, and there is little suitable spawning gravel. The plan recommends considering reintroducing LWD to several channel segments with the intent to stabilize the channel and restore spawning gravels. The following section details these recommendations.

7.2.2.3.2 Site-Specific LWD Placement Projects

Habitat and LWD conditions were intensively monitored and measured; the results are presented in detail in Haggerty and Ritchie 2004. Figure 7.1 depicts LWD conditions at the watershed scale. Within Umbrella Creek, several channel segments have been identified where LWD conditions are poor and suitable spawning substrate sizes are absent due to degraded channel conditions. Within these wood-starved reaches, LWD should be reintroduced with the intent to stabilize the channel and store suitably sized spawning gravels. Sites where this should be attempted or considered are included as thick red line segments in Figure 7.2.

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

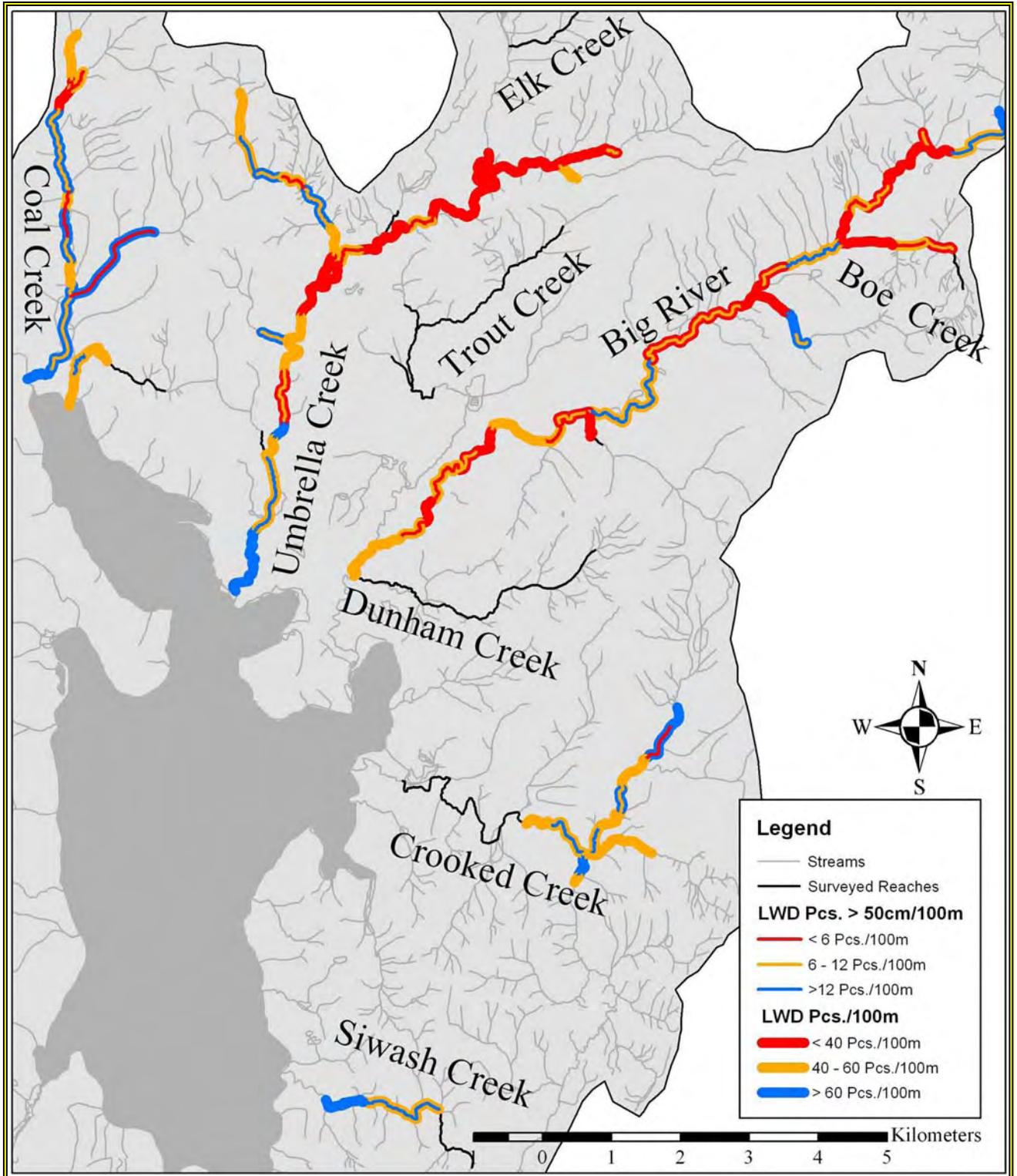


Figure 7.1. Overview of LWD conditions measured in 1999 and 2000 in major tributaries to Lake Ozette (source: Haggerty and Ritchie 2004).

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

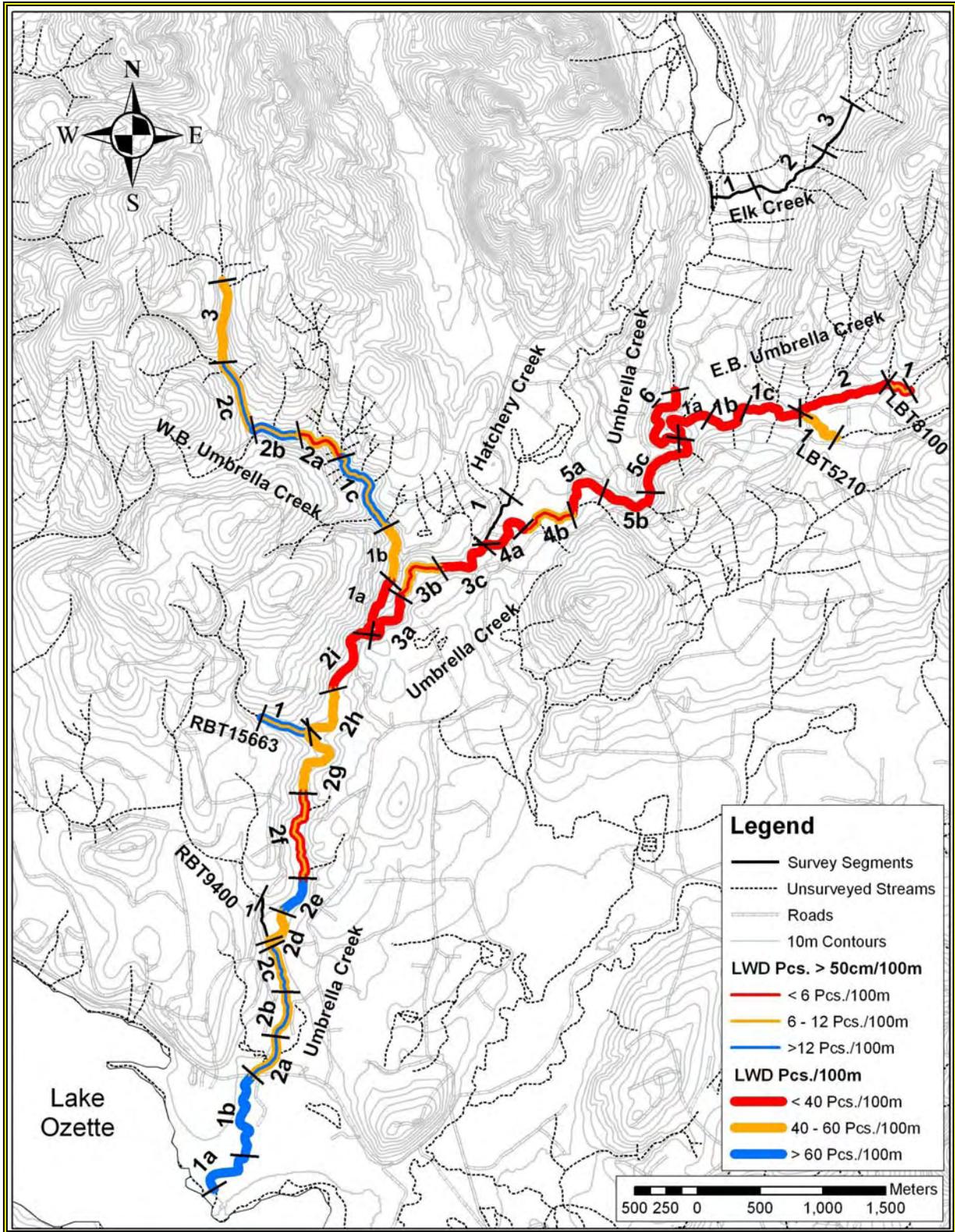


Figure 7.2. LWD conditions measured in 1999 and 2000 in Umbrella Creek, thick red lines depict sites where LWD reintroduction should be considered (source: Haggerty and Ritchie 2004).

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

7.2.2.4 Riparian and Floodplain Restoration Projects

The approach used in this plan for riparian and floodplain processes and condition recovery is to implement the recovery strategies presented in Sections 6.2.6, and 6.4.4 by taking the actions described below.

7.2.2.4.1 Broad-Scale Riparian and Floodplain Restoration Actions

- Conduct a high resolution, detailed survey of the lake shoreline and riparian zone documenting non-native plant species. Develop program to eliminate non-native, invasive plant species (RS#21). These activities should be conducted in cooperation with ONP.
- Plant or under-plant conifer riparian forests in fields and disturbed hardwood zones (RS#15, 29).
- Within Lake Ozette tributaries, eradicate non-native vegetation (RS#21, RS#30).
- Reconnect floodplains by reintroducing LWD to all tributaries where LWD is deficient and floodplain connectivity is impaired in order to improve floodplain connectivity, sediment storage, water retention, and peak flow attenuation (RS#32).
- Relocate the county road where the road affects floodplain connectivity or reduces functionality of riparian processes (RS#31).

7.2.2.4.2 Site-Specific Riparian and Floodplain Restoration Actions

Site-Specific Riparian-Floodplain Action #1 (RS#15)

Plant native conifer tree species along the right bank of the Ozette River as depicted in Figure 7.3. Where feasible, establish a minimum 200-foot-wide riparian forest managed to mature sufficiently to provide longterm LWD recruitment. Maintain planting until trees are free to grow. Remove or relocate infrastructure within 200 feet of river's bankfull edge, where feasible (addresses RS#15). Total length of the treatment reach is approximately 2,800 ft. Total area of the location proposed for treatment is approximately 11.1 acres.

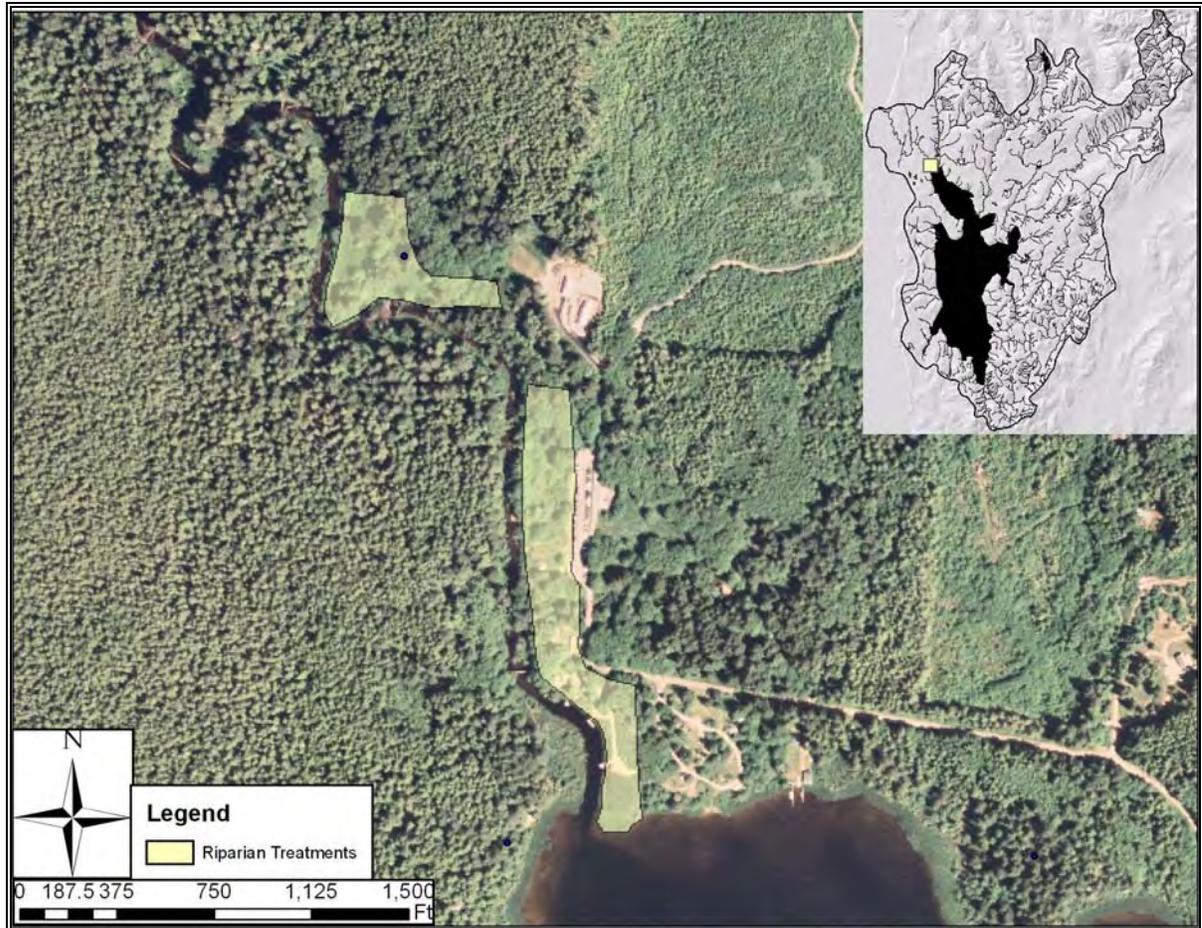


Figure 7.3. Riparian treatment areas adjacent to upper Ozette River.

Site-Specific Riparian-Floodplain Action #2 (RS#31)

The LFA identifies numerous riparian and floodplain impacts within the Big River watershed (e.g., riparian road density $>17\text{mi}/\text{mi}^2$ in channel segment 1). Riparian-Floodplain Action #2 addresses riparian-floodplain infrastructure in segment 1 and sub-segments 2a-2h (2.8 river miles total). Within 200 feet of the bankfull edge of Big River from segment 1 to 2h (as classified in the LFA and Haggerty and Ritchie 2004), there are approximately 9,800 feet of riparian-floodplain road and 900 feet of riprap. Riparian forest conditions are variable and include mature conifer and alder, as well as young alder. However, most of the riparian forest is dominated by either young red alder or strips of mature red alder.

- Identify riparian-floodplain infrastructure impairing the riparian floodplain function in this reach of Big River (Figure 7-4).
- Relocate a portion of Hoko-Ozette Road affecting floodplain. The road is elevated above the floodplain and bisects the flood path of both Big River and Trout Creek, limiting floodplain function. Figure 7.4 depicts a conceptual route for realignment of the Hoko-Ozette Road out of the immediate riparian-floodplain of

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

the Big River. In addition to relocation, the road should be constructed so that it doesn't hinder flood water movement between Big River and Trout Creek.

- Other road segments colored purple in Figure 7-4 should be considered for removal and replanted with the appropriate mix of conifer and alder trees. The Swan Bay Road and bridge also function to disconnect flood waters from the floodplain; this issue may be resolved by reconstructing the road in a manner that allows for free passage of flood waters across the floodplain.
- The Hoko-Ozette Road segment located just upstream of the map shown in Figure 7.4, at the confluence with Solberg Creek, should also be considered for a realignment outside of the Big River riparian area.

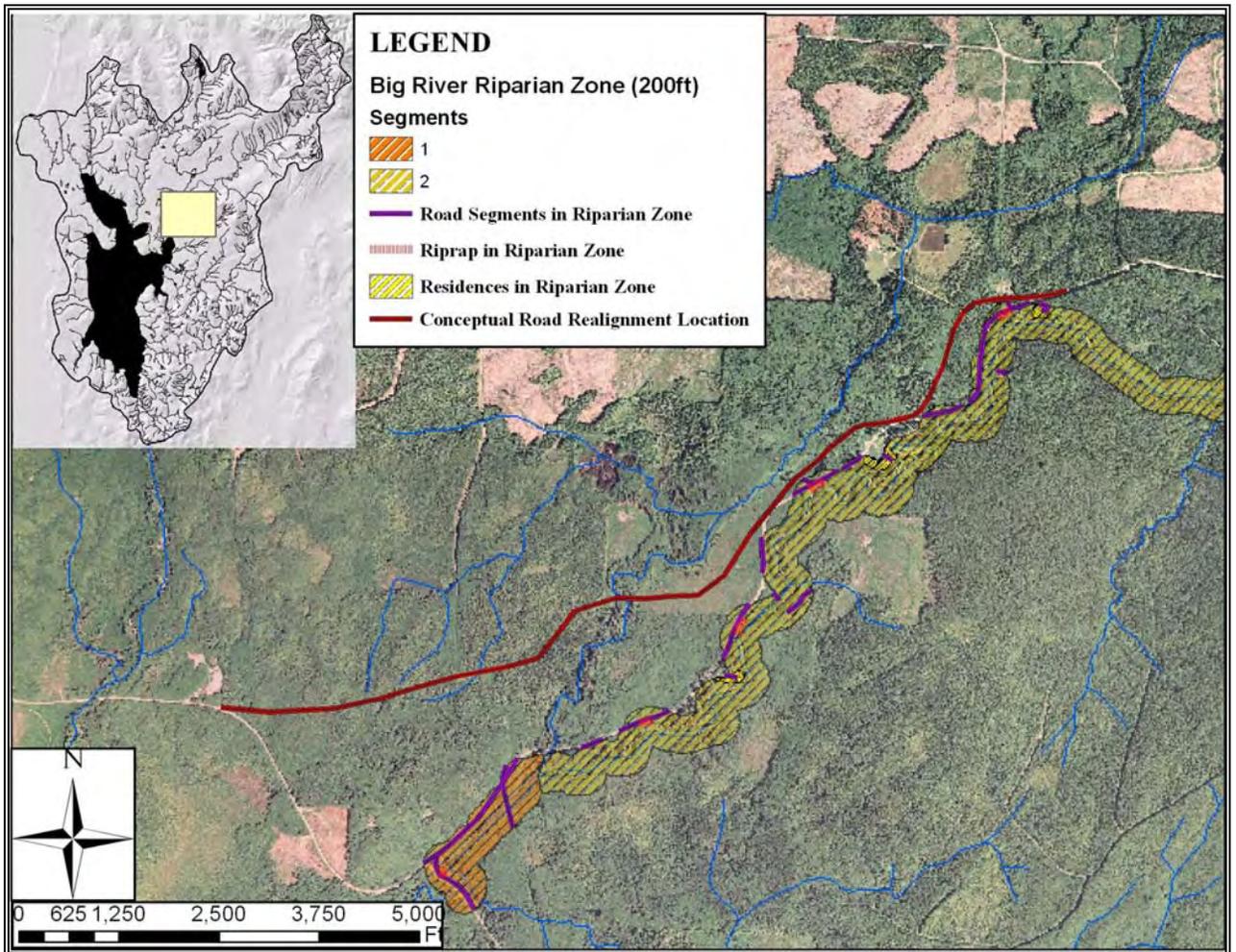


Figure 7.4. Map depicting Big River channel segments, roads, riprap, and residences within 200 feet of bankfull edge and the conceptual location of Hoko-Ozette Road realignment.

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

Site-Specific Riparian-Floodplain Action #3 (RS#31)

Plant the appropriate mix of native conifer and deciduous tree species in the pastures depicted in Figure 7.5. Establish a 200-foot-wide riparian forest where feasible; this may require property acquisition or a conservation easement to compensate the landowner. Maintain plantings until trees are free to grow (RS#29). If cattle are going to graze in the remaining pasture, then a fence should be installed to prevent their access to the river. Remove or relocate unneeded infrastructure within 200 feet of river's bankfull edge (addresses RS#31). Total length of riparian planting treatment is approximately 1,800 feet (right bank) (RB) and 2,600 feet (left bank) (LB). Total area of treatment is approximately 9.1 acres. If downstream infrastructure is relocated and floodplain processes restored, then this stream reach should receive a LWD treatment aimed at reconnecting the channel and floodplain. LWD piece counts in habitat segment 3f were among the lowest measured in Big River.

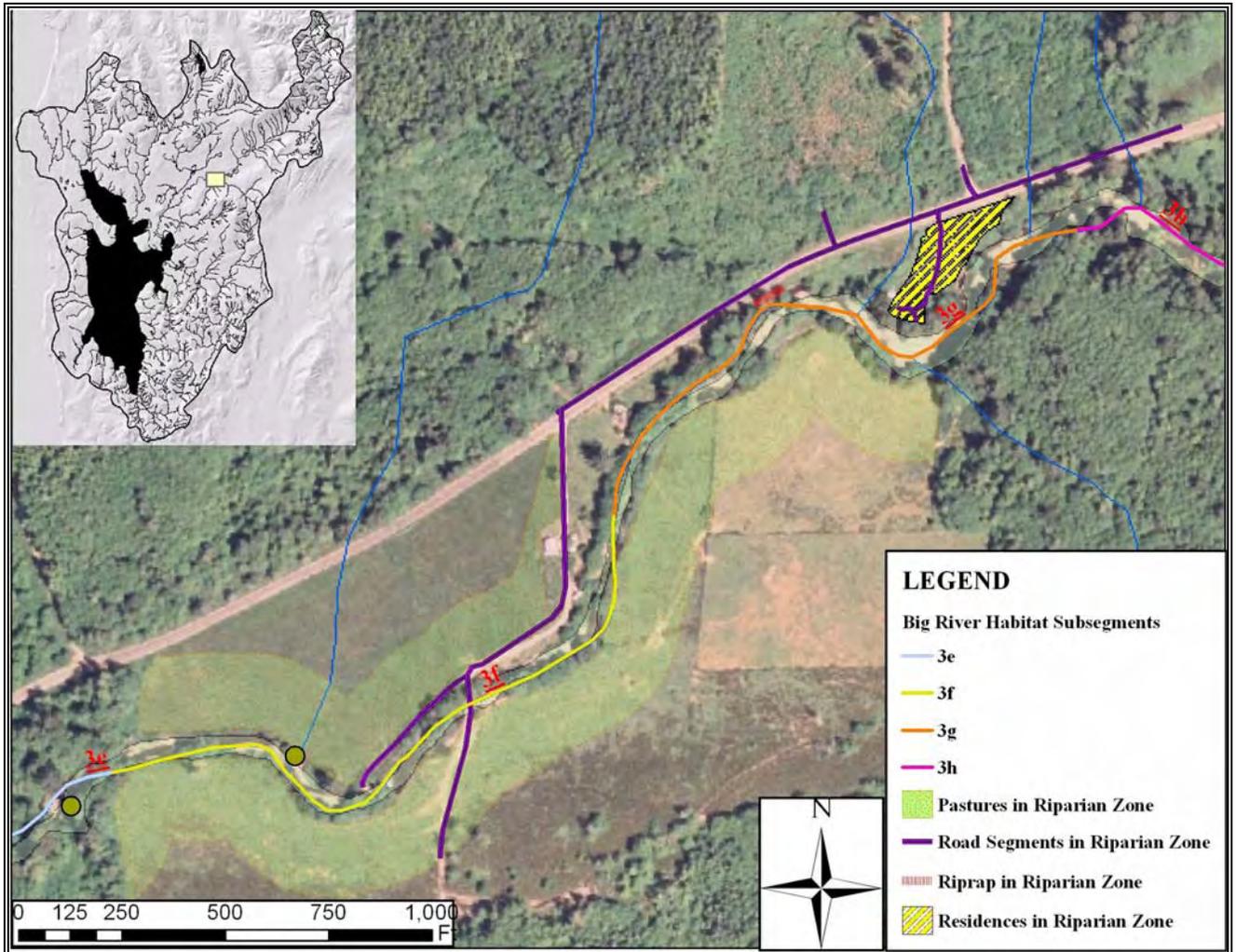


Figure 7.5. Map depicting Big River habitat segments 3f and 3g with pastures, roads, riprap, and residences within 200 feet of the bankfull edge.

Site-Specific Riparian-Floodplain Action #4 (RS#31)

Plant the appropriate mix of native conifer and deciduous tree species in the pastures depicted in Figure 7.6. Establish a 200-foot-wide riparian forest where feasible; this may require property acquisition and/or conservation easements to compensate the landowners. Maintain plantings until trees are free to grow (RS#29). If cattle are going to graze in the remaining pastures, then a fence should be installed to prevent their access to the river. Remove or relocate unneeded infrastructure within 200 feet of river's bankfull edge (addresses RS#31). Total length of riparian planting treatment is approximately 3,500 ft (RB) and 2,500 ft (LB). Total area of treatment is approximately 21.7 acres. If downstream infrastructure is relocated and floodplain processes restored, then this stream reach should receive a LWD treatment aimed at protecting banks from excessive erosion. Several homes are located along this stream reach; therefore, restoring floodplain connectivity using LWD introductions is not likely feasible. LWD piece counts in habitat segment 3i were among the lowest measured in Big River.

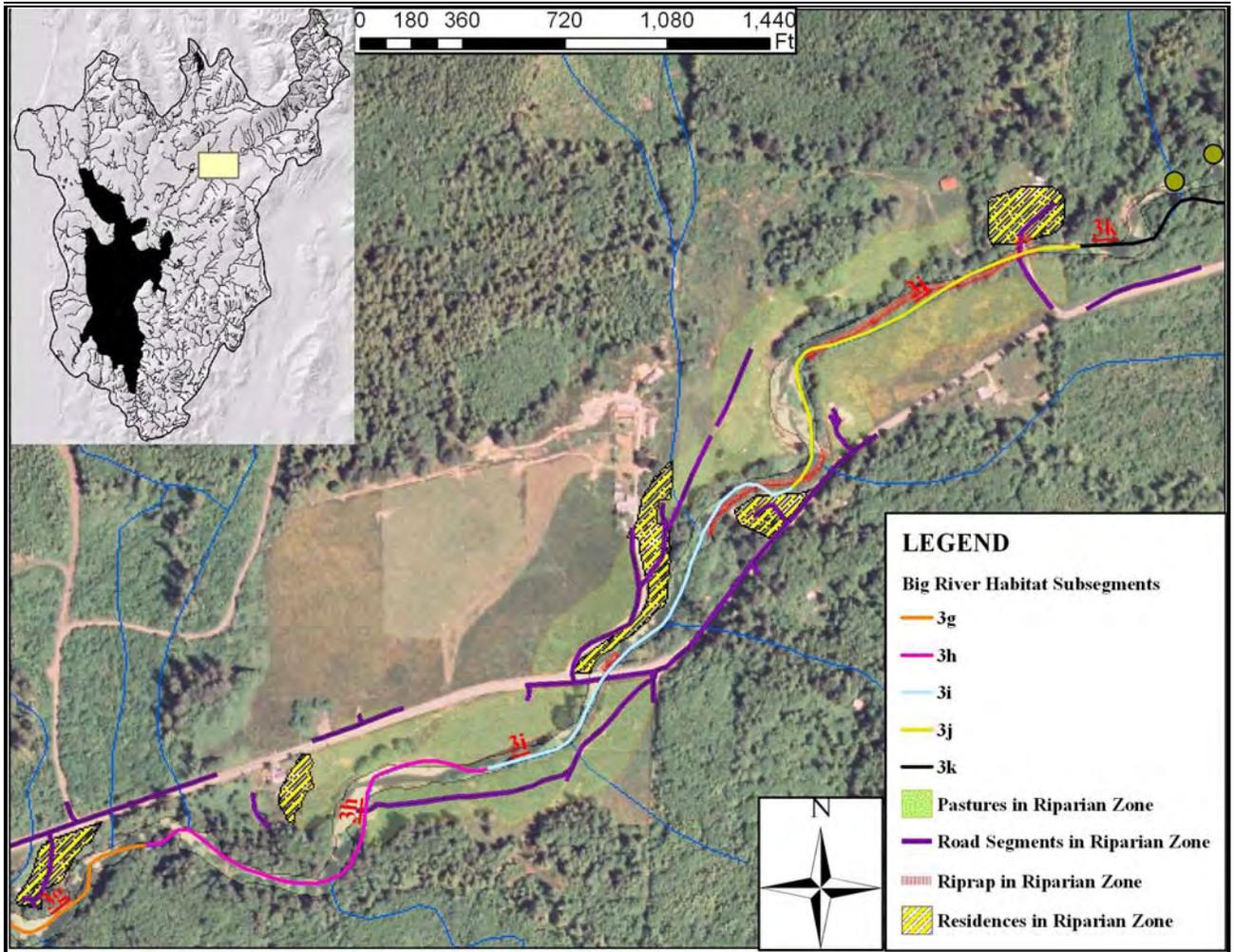


Figure 7.6. Map depicting Big River habitat segments 3h through 3j with pastures, roads, riprap, and residences within 200 feet of the bankfull edge.

Site-Specific Riparian-Floodplain Action #5 (RS#31)

Plant the appropriate mix of native conifer and deciduous tree species in the pasture depicted in Figure 7.7. Establish a 200-foot-wide riparian forest where feasible; this may require property acquisition and/or conservation easements to compensate the landowners. Maintain plantings until trees are free to grow (RS#29), and manage for long-term natural LWD recruitment. If cattle are going to graze in the remaining pasture, then a fence should be installed to prevent their access to the river. Remove or relocate unneeded infrastructure within 200 feet of rivers bankfull edge (addresses RS#31). Total length of riparian planting treatment is approximately 1,850 ft (LB). Total area of treatment is approximately 7.1 acres. If downstream infrastructure is relocated and floodplain processes restored, then this stream reach should receive a LWD treatment aimed at protecting banks from excessive erosion. A few homes are located along this stream reach (habitat segment 4a,); therefore, restoring floodplain connectivity using LWD introductions is not likely feasible. LWD piece counts in habitat segment 4a were the lowest measured in Big River.

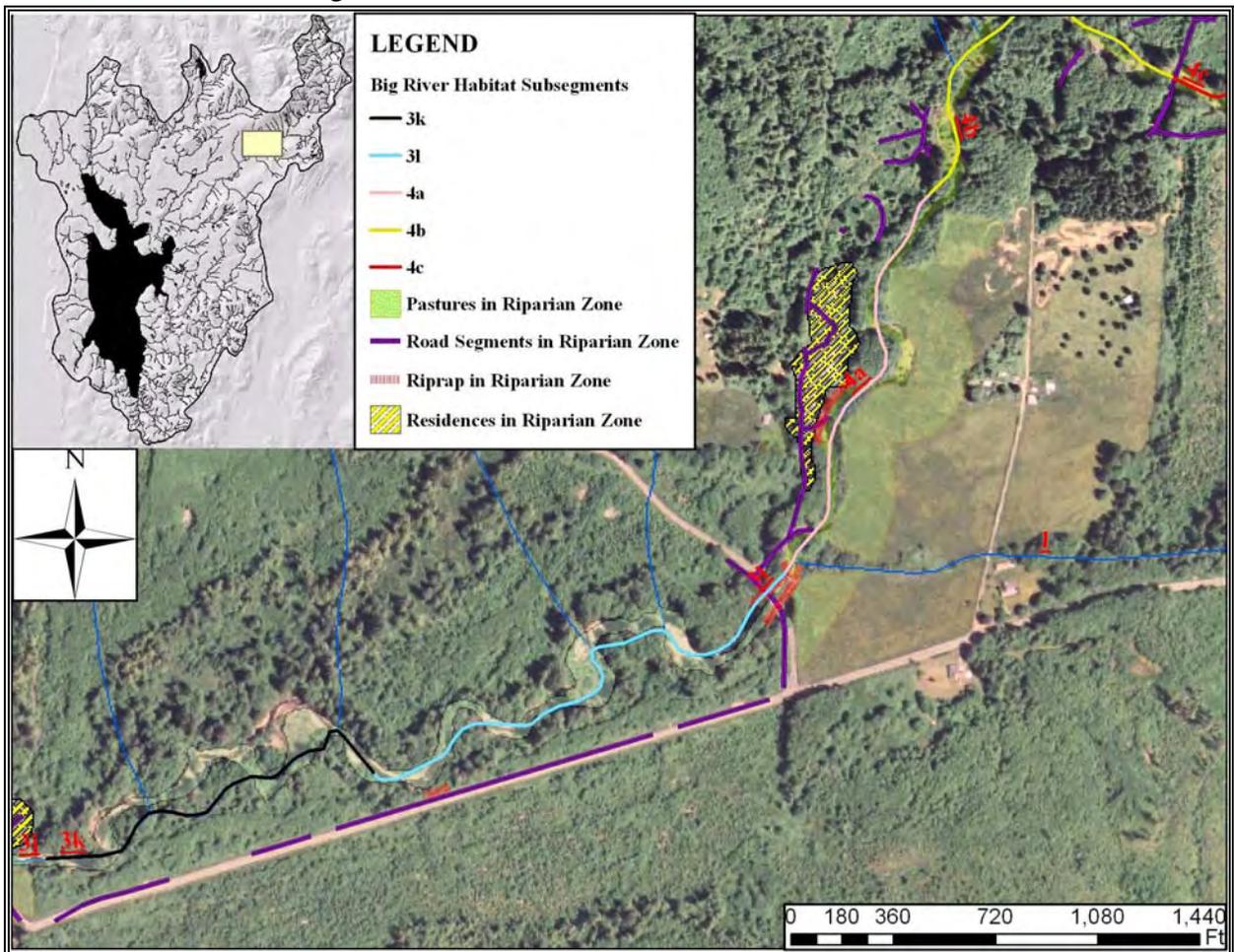


Figure 7.7. Map depicting Big River habitat segments 3k, 3l, 4a, 4b, and 4c with pastures, roads, riprap, and residences within 200 feet of the bankfull edge.

Site-Specific Riparian-Floodplain Action #6 (RS#30): Invasive Plant Species Eradication

Beginning in 2004, Clallam County began to control knotweed on the DNR and Barber properties on the Big River (around segment 2h in Figure 7.8). This was followed by a cooperative knotweed control project in partnership with the Makah Tribe in 2005 and 2006. During these two years, two treatments of knotweed control were conducted on the entire stretch on the Hoko-Ozette Road, Big River, and Boe Creek. It is estimated that it will take at least 3-4 more years to completely eradicate knotweed from the Big River system. Figure 7.8 depicts known knotweed sites along the Big River from surveys conducted in 2006. There are several other species of noxious weeds present in this watershed (Himalayan blackberry, tansy ragwort, reed canary grass, morning glory) and these weeds should be opportunistically controlled when encountered. Continued efforts by the Makah Tribal, Clallam County, and ONP noxious weed control programs should focus on eradicating noxious weeds and reestablishing native riparian forests with the help of private landowners and others.

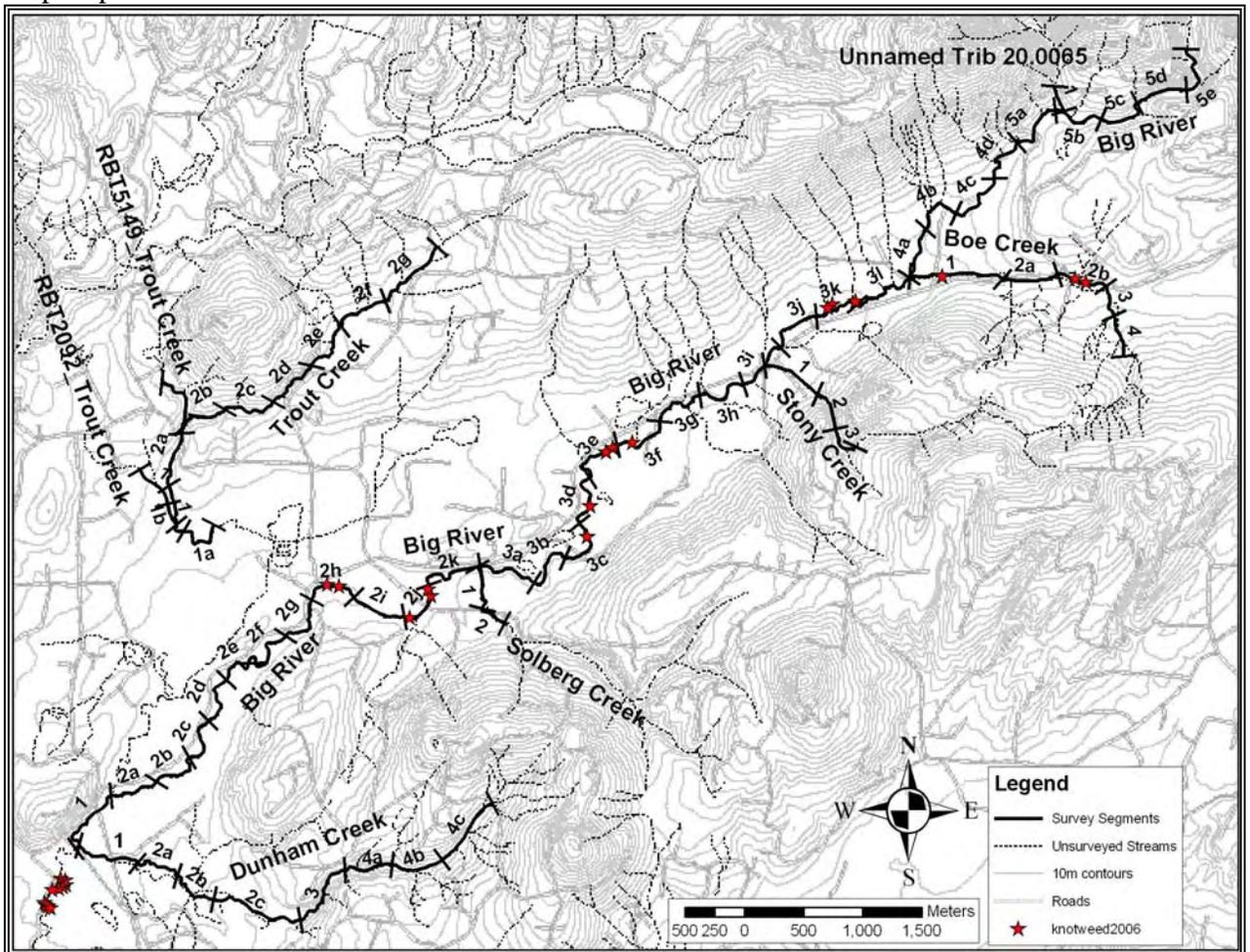


Figure 7.8. Big River habitat segments and 2006 mapped knotweed locations (knotweed source data provided by Makah Forestry).

7.2.2.5 *Spawning Habitat Restoration and Enhancement Projects*

- Develop comprehensive program to restore beach spawning habitat at Umbrella Beach (in addition to Umbrella Creek recovery efforts). Upon habitat recovery implement an experimental sockeye re-introduction program (see Section 7.3.1.5).
- Identify other potential sockeye beach spawning habitats and attempt re-introducing sockeye salmon in conjunction with habitat and watershed process rehabilitation efforts as described in Sections 7.3.1.5 and 7.3.2.1.4. Habitat enhancement projects may include the placement of downed trees on spawning beaches to promote gravel storage and sorting, mobilization and transport of fine sediment, and increased hyporheic flow, as well as mechanical improvements of beach spawning areas (see Section 7.3.2.1.3).
- Within sockeye spawning tributaries such as Umbrella Creek, implement LWD placement concepts described in Section 7.2.2.3.
- Develop a shoreline habitat restoration plan, including vegetation removal, gravel cleaning, and beach restoration actions at selected shoreline project sites. The plan should include flood protection measures for areas that were identified as flood-prone. Involve volunteers to carry out actions as part of the public education and outreach actions (see Section 7.6).

7.2.2.6 *Conservation Easements and Land Acquisition*

Land acquisition from willing sellers and establishment of conservation easements are two useful conservation and habitat management tools that could be applied to improve sockeye salmon habitat. Community land trusts or other private or local governmental organizations could acquire land from willing sellers within the most important subbasins within the watershed and manage these systems to protect and/or restore ecosystem functions.

- Where interest, funding, and willing sellers exist, purchase land within Ozette watershed and restore and actively manage for old-growth unroaded conditions. The priority for such subbasin conservation is as follows.
 - Umbrella Creek
 - Big River
 - Tier II subbasins
 - Tier III subbasins
- If acquisition does not occur, develop conservation easements with willing landowners to promote ecosystem function and watershed process recovery with management objectives focused on aquatic ecosystem restoration.

7.3 HATCHERY SUPPLEMENTATION ACTIONS

The following proposed actions need to be coordinated with NMFS, ONP, or other relevant agencies to receive necessary permits and meet applicable standards.

7.3.1 Short-Term Actions

The short-term approach applied in this plan regarding the use of artificial propagation (i.e., hatcheries) for recovery purposes incorporates all actions and requirements specified in the Makah Tribe's 2000 Lake Ozette Sockeye Salmon Hatchery and Genetic Management Plan (HGMP) (MFM 2000), and in the NMFS 2003 ESA 4(d) Limit 6 approval for the hatchery plan (NMFS 2003). The HGMP, as approved by NMFS, applies supplementation methods based on the best available science to establish natural, self-sustaining sockeye salmon aggregations in two major Lake Ozette tributaries (Umbrella Creek and Big River), using the indigenous Lake Ozette stock as broodstock. These supplementation and sockeye salmon aggregation establishment actions are summarized in Section 2.5 of this plan. The approved HGMP also includes extensive research, monitoring, and evaluation actions designed to track the effects of the plan on Lake Ozette sockeye salmon and to identify stock status, life history, and behavioral information critical for use in recovery planning. Research, monitoring, and evaluation actions conducted under the HGMP and proposed for application over the short-term in this plan, are summarized as management actions in Chapter 8. The results from these research, monitoring, and evaluation actions will be applied to adjust the HGMP. The adaptive nature of the HGMP (as specified in the ESA approved plan [NMFS 2003]) will be applied to ensure that the hatchery and research approaches are consistent with recovery needs and criteria identified in this plan.

In the short term, implementation of the hatchery actions specified in the HGMP should assist in meeting ESU recovery goals identified in this plan. HGMP goals of establishing self-sustaining tributary spawning aggregations and avoiding hatchery intervention for the beach spawning aggregations are likely to benefit population abundance, spatial distribution, and diversity parameters for Lake Ozette sockeye salmon (NMFS 2003; NMFS 2004), and should assist in meeting VSP criteria developed by the PSTRT (Rawson et al. 2008) to define a viable sockeye ESU.

In its 2003 ESA 4(d) Rule Limit 6 determination for the HGMP, NMFS found that the sockeye salmon supplementation strategy focusing on establishment of self-sustaining tributary spawning aggregations and risk reduction measures applied through the program were adequately protective of the listed sockeye salmon ESU, that they were likely to benefit prospects for recovery of the ESU, and that they would not appreciably reduce the likelihood of its survival and recovery (NMFS 2003). In a subsequent evaluation of the effects of the HGMP on listed sockeye population viability, NMFS concluded that the plan benefited three of four VSP attributes (McElhany et al. 2003) for the listed ESU (NMFS 2004). NMFS found that the abundance of naturally spawning sockeye salmon in

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

the ESU was increased by the tributary hatchery program, as evidenced by the establishment of adult returns in Umbrella Creek. The HGMP actions were determined unlikely to contribute to the abundance of natural-origin fish produced in beach-spawning areas, but naturally spawning hatchery-origin sockeye were leading to the production of natural-origin adult fish in Umbrella Creek. The hatchery plan was also unlikely to benefit or affect natural beach-spawning sockeye salmon productivity, but naturally spawning hatchery fish in Umbrella Creek appeared to be enhancing overall productivity in the ESU boundaries. Fry releases through the program in Umbrella Creek had returned adult spawners above replacement levels, as evidenced by establishment of adult returns in Umbrella Creek that are sufficient in most recent years to meet broodstock collection needs and seed natural habitat.

ESU spatial structure has been enhanced through reintroduction of spawners in tributaries that have been vacant for decades (NMFS 2003). NMFS concluded that genetic diversity of the beach-spawning population was being safeguarded from hatchery effects coincident with operation of the hatchery programs through application of appropriate hatchery protocols. NMFS judged that ESU diversity had benefited from the creation by the hatchery program of genetic reserves through establishment of tributary spawning aggregations originally derived from the beach-spawning population. However, given the intent to terminate the tributary hatchery programs after 12 years (see Section 2.5), NMFS determined that the viability of natural populations and extinction risk to the ESU will soon depend entirely on performance of natural-origin populations in their available habitat. Based on this evaluation of population viability effects, and considering application of criteria specified in NMFS' Hatchery Listing Policy (70 FR 37204, June 28, 2005), the hatchery-origin sockeye salmon produced through the HGMP were included as part of the Lake Ozette sockeye salmon ESU, and listed, with the natural beach spawning population, as "threatened" under the Federal ESA through NMFS' updated species status review in 2005 (70 FR 37160, June 28, 2005).

For these reasons, the ESA-approved actions specified in the HGMP, including all risk-reduction measures, are adopted in this plan as the appropriate short-term artificial propagation measures for application in the recovery of the Lake Ozette sockeye salmon ESU. Implementation of the approved HGMP through this recovery plan, in concert with actions addressing the major limiting factors to recovery, is expected to benefit achievement of the recovery goals identified in this plan for the listed ESU.

The focus of short-term recovery actions involving hatcheries will be on the continuation of on-going programs in the Umbrella Creek (Umbrella Creek Hatchery) and Big River (Big River Remote Streamside Incubators) (RSIs) watersheds, with the goal of establishing naturally spawning, self-sustaining tributary aggregations. Therefore, through 2012, the recovery-directed hatchery program will include the following actions, summarized here and fully described in the Lake Ozette sockeye salmon HGMP (MFM 2000). The NMFS ESA authorization document for the supplementation plan also describes the hatchery programs, highlighting operational measures that will be applied to reduce hatchery-related hazards to listed sockeye salmon population viability (NMFS 2003).

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

7.3.1.1 Sockeye Salmon Broodstock Selection and Collection Actions

Adult sockeye salmon returning to Umbrella Creek will continue to be the brood source for the tributary hatchery programs. Prior to 2004, sockeye salmon were collected from Lake Ozette spawning beaches for artificial propagation. Progeny of these fish were planted in Lake Ozette and in several tributaries, and were the source broodstock for present tributary returns. Under the approved HGMP, the tributary hatchery program relies only on adult sockeye salmon returns to Umbrella Creek to sustain the program. The lake spawning sockeye salmon population will not be used under the short-term recovery approach as broodstock for supplementation and reintroduction. However, a small number of adult sockeye salmon may be collected from Lake Ozette each year for research purposes only.

Sockeye salmon used as broodstock for the tributary hatchery program will continue to be trapped in Umbrella Creek as returning adults originating from past hatchery releases or from naturally spawning hatchery-origin returns. Up to 200 adult sockeye salmon adults (plus 10 percent or 20 fish if needed to account for inadvertent pre-spawning mortality) may be trapped and retained in lower Umbrella Creek each year using a weir. Weir collections may be augmented by seining of gravid fish upstream of the weir if necessary to meet annual broodstock requirements. Broodstock will be collected in Umbrella Creek from October through December, encompassing the spawner entry period. Sockeye salmon broodstock will be collected as the fish arrive at the trap location, proportional to the timing, weekly abundance, and duration of the total return to the creek. Collection protocols allow for the random selection of broodstock that is representative of the total tributary return, without bias towards origin (first generation hatchery or natural origin adults), return timing, fish size, or fish age. Fish will be transferred for holding through spawning at Umbrella Creek Hatchery in circular tanks. Alternatively, sockeye adults may be spawned on-site at the point of capture, with gametes transported for incubation at iso-incubation facilities, as specified in the HGMP.

7.3.1.2 Sockeye Salmon Broodstock Spawning Actions

Broodstock spawning procedures will continue to be conducted in accordance with NMFS guidelines for artificial propagation under the ESA (Hard et al. 1992), and with co-manager fish health guidelines designed to reduce disease transfer and amplification risks (NWIFC and WDFW 1998). A partial factorial mating procedure using a four female by four male spawning matrix is applied through the program. Adult sockeye salmon spawned in each factorial mating are randomly selected from the pool of eligible ripe adults on each spawning date. This mating design was chosen to minimize the effects of inadvertent or advertent selection on the genetic diversity of the population. Specifically, this mating design lowers the risk of effective population size reduction, increases the probability of unique genetic combinations in the brood return spawned, and provides for back-up fertilization in the event of infertility of males spawned. Spawning will be

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

accomplished at Umbrella Creek Hatchery, or potentially in Umbrella Creek, adjacent to the Umbrella Creek weir or seining locations. Gametes will be collected and stored in oxygenated plastic bags for transport to iso-incubation facilities at Makah NFH.

Approximately 305,000 unfertilized eggs will be collected from tributary-origin sockeye each year for incubation and the production of eyed eggs or fry for out-planting the following spring or summer into Umbrella Creek or Big River.

7.3.1.3 Juvenile Sockeye Salmon Rearing and Release Actions

HGMP protocols for incubation call for the use of iso-incubation quarantine units at Makah NFH or Educket Creek Hatchery. By iso-incubating all sockeye eggs at these locations (using individual incubators for each egg group), the eggs are provided enhanced protection from catastrophic loss and fish disease. Backup water supply systems, alarm systems, and on-site staffing at the hatcheries decrease the likelihood for egg mortality from power loss, flow loss, or flooding. Isolated incubation practices will continue to be applied (low egg incubation densities, sequestered and disinfected water supplies and discharges) to reduce the risk of fish pathogen amplification in the propagated sockeye salmon population (particularly IHN virus, which is endemic to Lake Ozette sockeye salmon). Eggs at both sites are incubated on pathogen-free water in bucket-style incubators through the eyed stage. All eggs are otolith marked using standard thermal marking procedures during incubation. Differentiating otolith marks are applied to various release groups (different release locations, rearing and release strategies, or life stages at release) to allow for assessment of origin and survival rates during smolt emigration and upon adult return. When reaching the eyed life stage, eggs destined for the production of unfed fry and fingerling sockeye salmon releases will be transported to the Umbrella Creek Hatchery, Umbrella Creek RSI, and Big River RSI for the short period from eyed egg incubation until hatching. Eggs and fry will be propagated at low densities using gravity-fed water from tributaries to Umbrella Creek and Big River. Eggs will be incubated to hatch in Nopad-type incubators. Upon swim-up (mid-April to late May), the fry will be ponded into rearing troughs and reared on an artificial diet, potentially supplemented with live feed as a natural rearing strategy. At the RSI sites, fry will be reared in 3-foot-deep troughs.

At Umbrella Creek Hatchery, fry will be retained in the troughs until successfully started on feed. The fry will then be transferred into 10-foot-diameter circular fiberglass tanks for approximately 60 days of rearing. Fed fry from all rearing locations will be reared to a final target average individual fish size of one gram. A proportion of the mass otolith-marked fry produced at Umbrella Creek Hatchery will also be marked with an adipose fin clip to allow for visual identification of the fish during smolt emigration and upon adult return. The proportion of sockeye salmon receiving an adipose fin clip each year will be sufficient to allow for statistically significant evaluations of adult fish straying to beach spawning locations.

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

Up to 80,000 fed fry will be released each year into Umbrella Creek (at the hatchery site and/or at the RSI site located upstream of the hatchery) between late-March and late-June at dusk. Sockeye salmon eggs from Makah NFH or Educket Hatchery will also be transferred to RSIs in the Umbrella Creek and Big River watersheds.

Up to 140,000 otolith-marked eyed eggs will be transferred for incubation and fry release each year into Big River, assuming average survival rates for adult tributary-origin sockeye spawned for the Big River program. Resultant fry will be allowed to volitionally emigrate from the RSIs into plastic raceways from mid-March to late April. Half of the annual Big River RSI sockeye fry production will be released from the raceways into the Big River as otolith-marked, unfed fry (average individual size of approximately 0.15 gram, or 3,000 fish per pound [fpp]) or “early” fed fry (average size of approximately 0.5 gram, or 900 fpp). These fry would not be additionally marked with an adipose fin clip, because their small size will preclude application of such a mark. Unfed and early fed fry are produced through the program for comparison of unfed fry, early fed fry, and later fed fry (one gram fingerling, or 453 fpp) survival rates to adult return. The remaining half of the annual hatchery production will be reared for 45 to 60 days on an artificial diet, partially supplemented with natural food, for release in the early summer as fingerlings (average individual size of one gram). A proportion of the fingerlings produced at the Big River site will receive an adipose fin clip mark to augment the otolith mark. The proportion marked with a fin clip will be sufficient to allow for evaluation of adult contribution and stray rates to beach spawning areas. The production of fingerlings at the Big River site will follow protocols applied for fed fry at Umbrella Creek Hatchery. A representative sample of adult sockeye salmon returning to the Big River will be examined for otoliths and fin clips to compare hatchery-origin unfed fry, early fed fry, and fingerling survival rates and to identify contribution rates for natural-origin sockeye salmon.

7.3.1.4 Hatchery-Origin Adult Sockeye Salmon Disposition Actions

The short-term hatchery approach under this plan will carry forth plans for the disposition of adult sockeye salmon specified in the Lake Ozette sockeye salmon HGMP. The effective number of sockeye salmon broodstock collected from Umbrella Creek each year will continue to be limited to 200 adults (plus 10 percent or 20 fish if needed to account for pre-spawning mortality). Up to 10 additional adult sockeye salmon may also be collected from the lake spawning areas for use in research. The potential for possession of surplus adults and eggs or juvenile fish through the program will be low. Remaining adult hatchery-origin sockeye salmon will be allowed to spawn naturally in the Lake Ozette tributaries. Carcasses of spawners collected from Umbrella Creek and the lake will be returned to the stream or lake, respectively, after spawning. Return of carcasses to the tributary and lake will provide ecosystem-wide benefits through nutrient enrichment. The caudal fin will be removed from carcasses returned to the natural environment to distinguish fish used for broodstock from carcasses of naturally spawned fish during spawner abundance surveys. No adult sockeye will be retained through other monitoring and evaluation and research activities planned in the HGMP. Adult sockeye

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

trapped in the Ozette River for sockeye salmon migration and spawning behavior evaluation purposes will be released after biological sampling and tagging are completed. The majority of these fish will spawn naturally in the Lake Ozette Basin.

7.3.1.5 Beach Spawning Aggregation Supplementation Research

Under the approved HGMP carried forth in this recovery plan, artificial propagation of sockeye salmon is confined to two Lake Ozette tributaries, and supplementation of beach areas is avoided. The approach in the short term is to allow the beach spawning populations to recover without hatchery intervention. This approach assumes that other recovery actions in the watershed will result in improved beach incubation conditions, and acknowledges the need to obtain better information regarding beach spawning population abundance levels and spawning locations. NMFS approved research to determine egg survival rates on Lake Ozette sockeye salmon spawning beaches (NMFS 2003) as a means to identify the degree to which incubation survival conditions were a limiting factor for ESU recovery. NMFS also authorized the annual removal of up to 10 adult fish from beach spawning areas for use as broodstock supplying eggs used in beach survival research.

As identified in the LFA document, spawning and incubation conditions in known, extant beach spawning areas are impaired. Although recovery actions now underway and planned in the watershed are expected to substantially improve processes affecting beach conditions for sockeye salmon, it is uncertain whether the beach spawning aggregation survival and productivity will improve naturally and without human intervention. In particular, deleterious water quality and fine sediment levels in known spawning areas may continue to limit survival of beach spawning sockeye salmon. For example, high fine sediment levels accumulated on the beaches over time may not be alleviated because of the low numbers of sockeye spawners available for cleaning gravels through the act of spawning each year. Several potential alternative methods for improving sockeye beach spawning habitat conditions, survival, and productivity through artificial means are described below in the long-term action section (Section 7.3.2).

To prepare for the implementation of potential long-term actions to bolster survival and productivity of beach spawning fish, investigations of beach spawning sockeye supplementation will be implemented as short-term actions. The primary objective of this research will be to expand the number of effective tools available for recovering viable beach spawning sockeye aggregations on known spawning beaches by perfecting beach supplementation techniques. Completion of this research will allow for the potential use of beach supplementation as a future action on a larger scale and perhaps at known beach spawning sockeye locations, if beach spawner survival and productivity cannot be improved naturally. Specific, initial actions would involve collection of the following kinds of improved data:

- beach spawning aggregation abundances at known and newly discovered sites
- precise beach locations where sockeye salmon spawn in Lake Ozette
- beach conditions available to sockeye in identified spawning locations

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

- egg and fry survival rates in beach redds
- factors affecting sockeye egg and fry survival at the specific locations
- identification of suitable new locations in Lake Ozette, where habitat conditions for spawning and incubation may support introduced beach spawning aggregations

An additional short-term research action will be identification of a suitable pilot location where beach supplementation could be tested. The basic concept would be to seed artificial redds with eyed sockeye salmon eggs on a suitable, unoccupied beach removed from known, extant beach spawning aggregations. Habitat conditions at the beach would be fully documented prior to planting, with substrate conditions, beach gradient, and beach upwelling features noted. Mass, differentially otolith-marked eggs from Umbrella Creek Hatchery tributary-origin sockeye adults would be used as the brood source to avoid mining the extant beach spawning aggregations. Egg survival and fry emergence from the seeded beach would be monitored to estimate fry survival and abundance. Resultant adult sockeye returns to the beach would be enumerated and sampled for marks post-spawning. Changes in beach condition from pre-spawning conditions, including the degree of coarsening of spawning substrate where redds were constructed, would be documented.

A potential location for a pilot beach supplementation project is Umbrella Beach, near the mouth of Umbrella Creek. This site was historically used by beach spawning Lake Ozette sockeye but it is not used at present. Watershed processes and habitat conditions in the Umbrella Creek watershed are being restored and enhanced to properly functioning conditions through the FPHCP (Section 7.2.1.1), the WDNR state lands HCP (Section 7.2.1.2), and other recovery plan actions (see Sections 7.2.2.1 through 7.2.2.6), so beach supplementation at the site would be integrated with planned habitat recovery strategies and actions. Umbrella Beach is at a distance from the two known beach spawning areas on the southern end of Lake Ozette, and the risk of research program adult fish straying would be further reduced by the location of the beach at the mouth of Umbrella Creek. If they were to stray, adult fish would more likely home to and enter Umbrella Creek, where they originated, and adjacent to where they were released as eyed-eggs.

7.3.2 Long-Term Actions

As described in Section 2.9, the proposed tributary hatchery program is expected to last 12 years, or three sockeye salmon generations, per release site. This limit in duration is intended to address the concern that repeated enhancement of the same population segment would result in a decrease in effective population size of the target population (WDFW and PNPTT 2000; Kapuscinski and Miller 1993). It also limits the exposure of natural-origin sockeye salmon to potentially deleterious selective effects of hatchery conditions to a few generations, minimizing the likelihood for divergence between hatchery and natural-origin fish within the supplemented stock. The completion of the initial 12-year period may be used to define the end of the short-term phase of the use of hatchery methods in Lake Ozette sockeye salmon recovery.

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

Longer term hatchery approaches may include several actions that are more fully described below. Options include termination or continuation of sockeye salmon tributary program production after the 12-year operational period, depending on the status of the programs in meeting criteria summarized in Section 2.9 for escapement and establishment of spawning aggregations. The successful establishment of self-sustaining natural spawning aggregations in Umbrella Creek and Big River may decrease the need for further artificial propagation in the watershed. It would also be important to consider whether or not commensurate improvements in the status of the core naturally spawning beach populations had occurred. If there are no improvements in the viability status of the beach spawning sockeye aggregations, the long-term approach may include implementation of enhancement approaches specifically designed to preserve and bolster beach spawner abundance and productivity. Potential methods include: mechanical improvement of spawning gravels in known beach spawning areas, creation of new beach-spawning sites with suitable spawning and incubation conditions, and (following on research described above in Section 7.3.1.5) the use of hatchery supplementation methods to increase the survival and production of eggs and fry at spawning beaches.

A decision on the appropriate long-term use of artificial propagation for the recovery of Lake Ozette sockeye salmon will need to consider many factors, including the following:

- Changes in the viability status of beach and tributary spawning aggregations in response to the implementation of short-term recovery actions, as measured by comparison of ESU abundance, diversity, spatial structure, and productivity with population viability parameters developed by the PSTRT and the co-managers, and adopted by NMFS as ESU delisting criteria;
- Observed or likely changes in the status of habitat-sustaining natural spawning aggregations in response to habitat-related protection and restoration actions applied over the short term through this recovery plan; and
- Results of research, monitoring, and evaluation designed to identify the effects of short-term artificial propagation, habitat improvement, and other resource management actions implemented through the recovery plan.

The following section describes potential long-term options for the use of hatchery supplementation and other associated enhancement methods to recover the Lake Ozette sockeye salmon ESU to a viable level.

7.3.2.1 Potential Long-Term Enhancement Actions

7.3.2.1.1 Termination or Continuation of Tributary Supplementation Programs

After 12 years of operation of the currently approved tributary hatchery programs (post 2012 for Umbrella Creek and post 2014 for Big River), and depending on the status of tributary sockeye salmon escapement, tributary population sustainability, and habitat in the tributaries, a decision would be made to either terminate or continue the

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

supplementation programs on Umbrella Creek and Big River. Termination of the programs would lead to full reliance on natural production for the recovery of viable sockeye salmon aggregations in the tributaries. The benefits of program termination could include a reduced risk of hatchery-related hazards, such as genetic diversity reduction, for the tributary spawning aggregations. The risks of the approach include the potential loss of the aggregations, in the event that habitat conditions in the tributaries have not been improved to levels that will support self-sustaining sockeye salmon production. A decision to continue specific components of the HGMP beyond 12 years would be based on a review of the program to determine whether its goals and performance standards had been met, or were expected to be achieved if not yet fully accomplished.

Similarly, if aspects of the program were not meeting goals or standards, but alternative measures were identified that, if implemented, would be likely to achieve goals and standards providing a net benefit to the ESU, program elements would be changed and continued upon evaluation and reassessment before or after the 12-year evaluation. The overall goals and objectives for the supplementation programs will be reevaluated over the short-term duration of the programs to incorporate new findings. Tributary escapement goals and population abundance thresholds developed by the PSTRT and the co-managers, and applied as NMFS' recovery criteria in this plan, will be used as standards for determining whether program continuation is appropriate. The ability to meet minimum escapement and spawner distribution goals for the tributaries for each brood year will be considered in determining program continuance or termination.

7.3.2.1.2 Natural Colonization of Beaches

The long-term approach could include the decision to continue to forego use of enhancement, in particular, supplementation, as a means to recover healthy Lake Ozette sockeye salmon aggregations on the spawning beaches. Such a decision would be a continuation of the short-term approach, which is to confine the use of enhancement activities to the two major northern tributaries, where natural spawning aggregations are being established. The benefits of foregoing enhancement of the beach spawning aggregations include a reduced risk of hatchery-related hazards to the core spawning aggregations, including effects of broodstock removal on the remaining naturally spawning aggregations, and the potential for a reduction in their genetic diversity and natural spawning fitness as a consequence of taking the fish into hatchery propagation. Risks of foregoing supplementation include the continuation of spawner returns based on natural production that are low and/or downward trending in abundance, if the beach spawning populations do not respond to other recovery actions taken in the watershed. Decisions regarding whether to maintain the beach spawning aggregations without hatchery intervention over the long term will be based on an assessment of the status of the aggregations, ensuring that they are maintaining above the critical abundance level and showing improvement in return levels year-to-year.

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

7.3.2.1.3 Mechanical Improvement of Beach Spawning Areas

One primary limiting factor affecting sockeye salmon egg incubation on the beaches is the reduction of spawning habitat quality and quantity from historical levels (Limiting Factors Analysis, Section 6.1.5.1) (Haggerty et al. 2007). As noted in Section 5.4.2.1.1.2 of the LFA, the small beach spawning aggregations that have persisted during the last 30 years may have been reduced to levels incapable of sufficiently cleaning spawning gravels of fine sediment and maintaining vegetation-free spawning gravels. In the absence of sufficient numbers of mass spawning sockeye, it might be effective to clean spawning gravels manually to increase the quantity and quality of beach spawning habitat. The objective would be to mimic the effects of mass spawning sockeye by manually or mechanically coarsening beach spawning substrate, reducing the percentage of fine materials (e.g., silt and sand). The percentage of “fines” (sediment particles less than 0.85 mm in diameter) in beach spawning area samples has been shown to be at levels that are detrimental to egg survival. The gravel could be cleaned during the summer months, when sockeye salmon are not using the beaches for staging, spawning, or incubation. A reduction in fines may be effective in improving spawning success and incubation survival rates, relative to current natural conditions. This type of enhancement is relatively unobtrusive ecologically, with very low risks of ecological, genetic, or demographic hazards to the beach sockeye salmon aggregations.

7.3.2.1.4 Creation of New Beach Spawning Locations and Stock Introduction

A potential long-term enhancement action would be to create new beach spawning locations in Lake Ozette, followed by natural colonization by sockeye or seeding of the new locations using hatchery methods. This action would respond to reduced spawning habitat quality and quantity as a primary limiting factor affecting sockeye salmon egg incubation on the beaches (LFA Section 6.1.5.1). Beach spawning by sockeye salmon is currently limited to two known beaches along the lake where habitat conditions are apparently suitable for spawning and incubation. Other beach areas are known to have been used historically by sockeye (e.g., Umbrella Creek delta). Beaches historically used by sockeye could be mechanically rehabilitated, if likely past causes of their degradation as spawning habitat were under control. New locations in Lake Ozette, where habitat conditions for spawning and incubation are identified as suitable, could be seeded with sockeye salmon eggs procured from Olsen’s Beach or Allen’s Bay spawners to initiate adult returns in subsequent years.

7.3.2.1.5 Supplementation of Beach Spawning Aggregations

As described in the Lake Ozette sockeye salmon HGMP (MFM 2000), a potential application of artificial propagation in the future could include supplementation of beach spawning sockeye salmon aggregations. Specifically, the HGMP states that the tributary-

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

directed hatchery program and associated research actions are also designed to provide information on whether supplementation can potentially be used in the future to rebuild beach spawning aggregations, and to expand spawning in Lake Ozette to currently unused beaches. This potential use of hatchery methods is consistent with the long-term goal of the HGMP, which is to increase sockeye abundance to levels that will “meet future estimated escapement goals and culminate in sustainable fisheries.” However, under the approach approved by NMFS, the method applied in the HGMP to pursue these goals over the short term is the establishment of tributary-spawning sockeye salmon aggregations.

NMFS approved the HGMP under the ESA based on isolating the tributary supplementation program from the core beach spawning aggregations (NMFS 2003). A precautionary approach to supplementation that reduced the likelihood for unintended adverse genetic and ecological effects on the beach spawning aggregations was proposed, improved based on agency review, and implemented. The approved hatchery program relies on broodstock removed from Lake Ozette tributary sockeye salmon returns. The listed beach spawning population is not used as broodstock. Sufficient sockeye adults, both first-generation hatchery sockeye and natural-origin sockeye, return to Umbrella Creek to sustain the tributary hatchery programs. Adult sockeye salmon returns to the tributaries result directly from hatchery juvenile sockeye salmon releases, or from natural spawning by hatchery-origin adult sockeye salmon. Broodstock from the core, listed beach-spawning population is proposed to be collected only in low numbers and only for research purposes. studies of limiting factors, genetic composition, and life history using methods described in the HGMP

Under the HGMP, future determinations regarding whether sockeye broodstock are collected from Lake Ozette beaches to supplement or reintroduce lake aggregations would be made pending results of limiting factors evaluations and research. Only when it has been determined that hatchery supplementation is likely to aid recovery of the beach spawning sockeye aggregations, and that a successful method of supplementation is available, will the lake aggregations be considered for use in beach aggregation supplementation and/or reintroduction measures.

Although NMFS does not believe that supplementation of the extant beach spawning sockeye aggregations is warranted in the short term, hatchery intervention may be considered if those aggregations do not respond to other recovery actions, remaining at critically low abundance levels, and/or continuing to trend downward in population size year to year. Potential supplementation methods could include collection of broodstock staging on the beaches for holding, spawning, and artificial propagation of progeny at facilities used for the tributary supplementation program. Eyed eggs or fry could be returned to the beaches (e.g., for incubation in Jordan-style incubators anchored to spawning gravels) to complete development, egress, and imprint. This approach would circumvent potential limiting factors affecting beach spawner success and egg and fry incubation and survival in the natural environment (LFA Section 6.1.5.1). The approach may increase the abundance of fry emigrating from the beaches into pelagic zones in Lake Ozette, thereby increasing the likelihood that more beach-origin smolts will survive

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

to emigrate and return as adults. If a determination is made that supplementation of the beach spawning aggregations is warranted, specifics regarding the approach, including annual broodstock removal and fry production objectives, would need to be provided in an HGMP. Broodstock removal and fry production objectives would be limited by spawning habitat capacity and the need to maintain a proportion of the donor/recipient spawning aggregation in a natural condition. These limitations would be of lesser concern if the aggregations were at imminent threat of extirpation because of small population size.

7.4 PREDATION-RELATED RECOVERY ACTIONS

In addition to the piscivorous fish predation actions identified in Section 7.1.4.1, Freshwater Fisheries (RS #4); the following recovery actions are proposed to address predation-related impacts:

- Create an incentive program, as appropriate within NPS regulations, to encourage or require lethal take of largemouth bass and other non-native fish species, with a goal of reducing or eliminating non-native fish species.
- Create fishing regulations that will limit take of native species while maximizing the removal of non-native species.
- Develop a management plan for northern pikeminnow, based on field assessments of the species' impact on sockeye salmon survival and productivity. Control the abundance of this species if reduction in the number of pikeminnow in Lake Ozette is determined to be necessary to meet sockeye population viability criteria.
- Work with NMFS and other appropriate agencies to study impacts of marine mammals and river otters on sockeye salmon, particularly on beach spawning grounds. Based on this information, develop a NMFS-sanctioned plan to address these impacts through a variety of predator control measures being tested and used in the NMFS Northwest Region.
- Working in coordination with NMFS, ONP, and other agencies, analyze the impacts of seals and sea lions on sockeye salmon and identify options to minimize these impacts, including reinstating ceremonial and subsistence hunting of seals and sea lions in Tribal Usual and Accustomed hunting and fishing areas.
- Modify sockeye adult enumeration techniques at the Ozette River weir to reduce any predation mortality on adult and juvenile sockeye.
- Implement research and monitoring actions proposed in Chapter 8 to analyze fishing regulations, predator-prey interactions, and predation at all life stages for beach spawners.

7.5 RESEARCH, MONITORING AND ADAPTIVE MANAGEMENT ACTIONS

Research, monitoring, and adaptive management actions will be carried out based on the research, monitoring, and adaptive management plan that will be developed in 2008 after the Lake Ozette Sockeye Recovery Plan is adopted by NMFS. (See Chapter 8.)

7.6 PUBLIC EDUCATION AND OUTREACH ACTIONS

Recovery of Lake Ozette sockeye depends on the collective actions of citizens in the region. Recovery actions will need to be implemented by diverse organizations, Tribes, Olympic National Park, individuals, private companies, and governmental entities, all striving for the common goal of sockeye recovery. The goal of public education and outreach is to engage the public as an active partner in implementing and sustaining recovery efforts. This goal will be achieved by building public awareness, understanding, and support, and by providing opportunities for participation in all aspects of recovery implementation. This effort will also involve sharing information between scientists and the public as recovery projects and monitoring actions are carried out.

- Develop and implement an education and outreach program directed at fishers and the general public regarding the negative impacts of non-native fish and plants on native species, habitat, and the Lake Ozette ecosystem.
- In cooperation with co-sponsors, produce a 3-5 page summary brochure or handout describing the key parts of the Lake Ozette Sockeye Recovery Plan and highlighting the recovery actions that can be carried out by the public and landowners. Distribute the brochure to the public in cooperation with Olympic National Park, soil and water conservation districts, Clallam County, public libraries, schools, local businesses and Chambers of Commerce, and other organizations.
- Develop a clearinghouse of information about recovery plan implementation to keep partners and the public informed about progress on recovery actions. This may be web based, in coordination with an annual “Sockeye Summit” to brief the public on status, progress, and achievements of recovery plan implementation.
- In cooperation with Clallam County, local Soil Water and Conservation Districts, and the Natural Resource Conservation Service, work with landowners in the watershed to provide information regarding the need to implement recovery actions and help identify appropriate recovery actions on landowner property.
- Produce educational materials that can be used in the local schools, community colleges, and community centers to educate children about needed recovery actions.

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

- Develop cooperative educational and outreach programs with existing organizations and nonprofit groups to include information about sockeye recovery in their materials.
- Develop exhibit materials that can be used at fairs, festivals, or other venues to communicate the recovery actions needed to protect and restore sockeye salmon.
- Work with Olympic National Park staff to develop materials, posters, and display boards to educate the public visiting Lake Ozette about the need to recover sockeye salmon and the recovery actions being carried out within the Park.
- Seek funding to carry out the proposed education and outreach actions. Develop a clearinghouse of information on funding sources. Support local entities, landowners, and Tribes to seek funding for recovery actions.
- Identify which entities and individuals will carry out the education and outreach actions.
- Develop public education information that can be posted on the NMFS, Olympic National Park, Olympic Coast National Marine Sanctuary, and Clallam County's NOPLS web sites. Identify other opportunities for web postings of recovery information.
- Carry out briefings and presentations to civic, business, trade, environmental, and conservation organizations.
- Lead seasonal tours of the watershed so the public can observe spawning sockeye salmon and visit recovery project restoration sites.

7.7 RECOVERY STRATEGY AND ACTION INTEGRATION

The PSTRT's 2003 guidance for recovery planning emphasizes the importance of an integrated strategy that describes the types of habitat, harvest, and hatcheries measures that will lead to recovery. Such a strategy provides a set of specific, integrated actions for habitat, harvest, and hatcheries that are hypothesized to result in achieving the salmon population targets. The Lake Ozette Sockeye Salmon Recovery Plan is based on that concept, recognizing that habitat conditions and aquatic ecosystem function are a result of the interaction between watershed controls, watershed processes, land use, and human management regimes. Because this recovery plan is organized around population segments, clearly stated hypotheses, and biological processes associated with the entire ecosystem, including habitat, hatcheries, and harvest, it is inherently an integrated plan.

Recovery goals, strategies, and actions are linked to specific hypotheses about the factors limiting the Lake Ozette sockeye ESU. Flow charts were developed that depict the hierarchical strategy for prioritizing protection, restoration, and enhancement activities to address factors affecting each population segment (e.g., all population segments, beach spawners, and tributary spawners). Factors typically affecting salmonid VSP parameters, such as habitat, hatchery, and harvest management (the "H" factors), are addressed and evaluated within the context of the biological processes that create the survival conditions (the habitat) for the fish.

PROPOSED RECOVERY PLAN FOR LAKE OZETTE SOCKEYE SALMON

Appendix D is in the process of development. The appendix will include a table integrating all of the strategies and actions into one format that will show the relative priority of actions across all H factors, based upon the recovery strategy hierarchy (Figure 6.4), subbasin prioritization, and limiting factors.