

# WRIA 1 SALMON RECOVERY BOARD

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## 2008-2010 WRIA 1 SALMON RECOVERY 3-YEAR IMPLEMENTATION PLAN

### *WRIA 1 Watershed Recovery Strategy*

The ultimate goal for salmon recovery in WRIA 1 is to recover self-sustaining salmonid runs to harvestable levels through the restoration of healthy rivers and natural stream, river, estuarine, and nearshore marine processes, careful use of hatcheries, and responsible harvest, and with the active participation and support of local landowners, businesses, and the larger community. In the near-term (10-year time frame), however, the objectives are to: (1) focus and prioritize salmon recovery efforts to maximize benefit to the two Nooksack early chinook populations; (2) address late-timed Chinook through adaptive management, focusing in the near-term on identifying hatchery- versus naturally-produced population components; (3) facilitate recovery of WRIA 1 bull trout by implementing actions with mutual benefit to both early chinook and bull trout and by removing fish passage barriers in presumed bull trout spawning and rearing habitats in the upper Nooksack River watershed; and (4) address other salmonid populations by (a) protecting and restoring WRIA 1 salmonid habitats and habitat-forming processes through regulatory and incentive-based programs; and (b) encouraging and supporting voluntary actions that benefit other WRIA 1 salmonid populations without diverting attention from early chinook recovery. Planning targets for the priority Nooksack early chinook populations are presented in Table 1. Focusing efforts on early chinook is consistent with regional salmon recovery – current abundance and productivity for the two populations is very low and recovery of both populations is critical to delisting and recovery of Puget Sound Chinook.

**Table 1.** Planning targets for Nooksack Early Chinook.

Population	Adult Return <sup>1</sup>	Spawners (Natural Origin) <sup>2</sup>	Productivity <sup>3</sup>	Diversity Index <sup>4</sup>
North Fork early chinook	10,600	3,400	3.1	97%
South Fork early chinook	7,600	2,300	3.3	98%

<sup>1</sup> Ocean Recruits at MSY

<sup>2</sup> Spawners at MSY

<sup>3</sup> Productivity at MSY

<sup>4</sup> Diversity Index refers to the percentage of estimated potential life history trajectories that are sustainable.

### *10-Year Action Plan*

The *WRIA 1 Salmonid Recovery Plan* identified 8 actions to be implemented over the next 10 years that would address the near-term priorities presented above:

1. Establish a South Fork gene bank/supplementation program

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2. Restore anadromous fish passage at early chinook barriers (Middle Fork diversion dam and Canyon Creek)
3. Habitat restoration in the Forks, mainstem Nooksack River, and major early chinook tributaries
4. Habitat protection and restoration in estuarine and nearshore areas
5. Integrate salmon recovery needs into floodplain management planning
6. Integrate salmon recovery needs into local Critical Areas Ordinance and Shoreline Management Program updates
7. Establish new instream flows and begin implementation of instream flow management programs
8. Restore functioning riparian and water quality conditions and reconnect isolated habitats in lower mainstem tributaries and independent tributaries in WRIA 1

Expected results of the 10-Year Action Plan were modeled through EDT and are presented in Table 2. The results represent the long-term benefits of actions implemented in the 10-year time frame, rather than the expected population status after 10 years.

**Table 2.** Estimated benefits of 10-year plan on Nooksack early chinook populations.

Note: Benefits are projected over the long term and assume no net degradation from land use.

<b>Population</b>	<b>Adult Return</b>	<b>Spawners (Natural Origin)</b>	<b>Productivity</b>	<b>Diversity Index</b>
North Fork early chinook	3,400	1,600	2.2	89%
South Fork early chinook	1,900	860	3.3	87%

*WRIA 1 Salmon Recovery 3-Year Implementation Plan*

Overview of 3-Year Implementation Plan

The WRIA 1 3-year implementation plan establishes an ambitious pace for and constitutes substantial progress towards implementation of the 10-year action plan. To help ensure the pace progresses, annual salmon recovery work plans are prepared to further identify tasks necessary to implementing the actions.

It is important to recognize the actions identified in the *2008-2010 WRIA 1 Salmon Recovery 3-Year Implementation Plan* are based on our current scientific knowledge as it pertains to salmon recovery. Our ability to implement these actions will depend on the community's willingness to act and support these actions. Public outreach associated with implementation of the *WRIA 1 Salmonid Recovery Plan* is included in the *2008 WRIA 1 Salmon Recovery Work Plan*. In addition, and in many cases, a salmon recovery project may be part of a larger project having multiple objectives, such as a flood hazard reduction or bridge replacement project. Ultimately our success will depend on our ability to engage the community in a way that supports salmon recovery while addressing other community needs.

An overview of the key actions of the 3-year plan, organized by 10-year action, is presented below.

1. South Fork chinook supplementation program, designed to conserve the South Fork early chinook population until habitat conditions improve.
2. Restoration of passage at the two identified early chinook barriers, Middle Fork diversion dam and Canyon Creek.
3. Habitat protection and restoration of early chinook freshwater habitats.
  - a. South Fork. The lower South Fork (RM 0 – 13) is one of the primary focus areas for restoration efforts since it is the most important reach to restore for the SF population and because reach assessments and restoration planning have been completed. The upper South Fork is also important although conditions are less degraded; reach assessment and restoration planning is currently underway. Projects in the South Fork address the following limiting factors: (1) habitat diversity by placing wood jams to provide wood cover and increase habitat unit diversity and complex edge habitat, and by restoring floodplain forest; (2) key habitat quantity by increasing quantity of deep pools and reconnecting sloughs; (3) temperature by creating thermal refugia, i.e. deep, complex, pools in areas of cool groundwater influence expected to promote thermal stratification, and restoring tributary riparian areas and wetlands; (4) sediment load by reconnecting forested floodplain areas that can promote fine sediment deposition, or assessing or treating forest roads; and (5) channel stability (impact of which was underestimated in EDT) by removal/setback of levees and/or hardening and a study of the feasibility of construction of a chinook spawning channel.
  - b. North Fork. The lower North Fork (RM 36.5 to 57) is another primary focus of restoration, since it is the most important reach to restore for the NF/MF population and because reach assessment and restoration planning is underway. Projects in the North Fork (including Canyon Creek, see category 2 above) address the following limiting factors: (1) channel stability, through log jam placement throughout the active channel, including at heads of side channels with upland or groundwater sources of flow; and (2) key habitat quantity, through log jam placement that forms pools, side channels and complex edge habitat. Sediment load will be addressed through ongoing forest road management through Forest and Fish and USFS; this action is not described in the detailed descriptions or spreadsheet.
  - c. Middle Fork. Reach assessment and restoration planning is proposed for the lower Middle Fork (RM 0-5) to develop strategic projects in the reach. A project is also proposed to mediate flow (ensure low flows, moderate high flows) into a spring-fed side channel that supports increasing numbers of early chinook spawners.
  - d. Mainstem Nooksack. Reach assessment and restoration planning is proposed for the mainstem Nooksack. Additionally, limited small-scale restoration projects (piling jams) and larger projects that address both flood and salmon concerns (see also action #5) are proposed; these address limiting factors of habitat diversity (complex cover) and key habitat quantity (deep pools, backwaters, edge habitat).
  - e. Acquire priority areas for protection of function and/or to facilitate restoration.

4. Estuarine and nearshore marine areas. Proposed actions for estuarine and nearshore areas include the following:
  - a. Assessment of Nooksack chinook distribution in and use of nearshore, including study of circulation in Bellingham Bay that would affect juvenile chinook distribution and migratory pathways.
  - b. Restoration of floodplain connectivity upstream of the Nooksack delta (not described further).
  - c. Restoration of connectivity (upstream and downstream) and estuarine habitat quantity and quality on the Lummi delta.
  - d. Restoration of non-natal estuary habitat (Squalicum Creek).
  - e. Improvement of connectivity along urbanized shoreline habitat benches constructed in association with redevelopment of inner Bellingham Bay (not described further).
  - f. Protection of existing function through Shoreline Master Program updates and implementation for Whatcom County and cities of Bellingham and Blaine.
5. Integration of salmon recovery and floodplain management. Salmon Recovery Board members have agreed that integration should be pursued deliberately but carefully to build community vesting and to avoid polarizing stakeholders and landowners. The following steps are proposed for the next 3 years:
  - a. Implementation of pilot levee setback projects with mutual benefit for flood management and salmon recovery; lessons learned will be applied to future projects.
  - b. Implement measures to ensure flood and transportation projects maximize benefit to salmon to the extent possible. The County has recently completed a Comprehensive Water Resources Integration Project to integrate and prioritize all County water resources projects and programs using a suite of criteria, including benefit to salmon.
  - c. Mainstem Nooksack Reach Assessment. As part of this project, salmon recovery staff will work with County River and Flood staff to assess conditions, identify projects, evaluate project feasibility, and conduct education and outreach of affected landowners and stakeholders.
  - d. Consultation with salmon recovery staff for flood projects (ongoing, but not described further).
6. Critical Areas Ordinance (CAO)/Shoreline Management Program (SMP) Updates. The updated Whatcom County CAO and SMP are expected to serve as models for other local government CAO/SMP updates in the 3-year time frame:
  - a. SMPs will be updated for cities of Ferndale, Lynden, Everson, Nooksack and Blaine, as well as Blaine CAO.
  - b. In addition to regulatory protection, a program for fee simple or conservation easement acquisition is also proposed, although the primary objective is to acquire lands to facilitate important restoration projects.
7. Instream flows. The goal of the WRIA 1 Watershed Management Project as it relates to salmon recovery is to ensure adequate instream flow levels for spawning, rearing, and migration of all WRIA 1 salmonids. Priority species and life stages were selected in each

- geographic area that generally represent the most flow-limited in that area. The technical teams have identified flows that are optimal for priority WRIA 1 fish species and life stages subject to current hydrologic model constraints and fish habitat model limitations. These technical recommendations, along with other technical, policy, and legal considerations, including beneficial out-of-stream water needs and existing and future hydrologic constraints, will be used to negotiate a flow regime that is acceptable to the parties and is then adopted. The following actions are proposed for the 3-year time frame:
- a. Instream flow negotiations. Instream flows are being negotiated for the pilot watersheds (Middle Fork Nooksack, Bertrand Creek), with other watersheds to be negotiated subsequently.
  - b. Projects are proposed to be implemented in the Bertrand Creek watershed to restore instream flows and improve habitat conditions.
8. Other WRIA 1 salmonid habitats. The primary emphasis for other WRIA 1 salmonid habitats is protection of existing function through implementation of Shoreline Master Programs, Critical Areas Ordinances, and stormwater management programs. Limited activities are also proposed to restore processes and reconnect isolated habitats in Nooksack River tributaries and the independent tributaries to the Fraser River and Strait of Georgia:
- a. Fish passage barrier removal program to address high priority fish passage barriers.
  - b. Riparian restoration program to support ongoing voluntary riparian restoration (e.g. Tenmile Creek partnership, Bertrand Watershed Improvement District) along lower mainstem and independent tributaries.
9. Other programmatic actions.
- a. Adaptive management for Nooksack early chinook. Generic population and habitat monitoring programs are described herein. Monitoring will follow the adaptive management plan, expected to be developed by the end of 2008.
  - b. Salmon recovery implementation oversight and coordination..
  - c. Population monitoring for other WRIA 1 salmonids that are ESA-listed (bull trout), proposed for listing (steelhead), or species of concern (coho).

### Process for Updating and Prioritizing 2008-2010 WRIA 1 Salmon Recovery 3-Year Implementation Plan

The *2007-2009 WRIA 1 3-Year Implementation Plan* was distributed to WRIA 1 Salmon Recovery Board technical staff, salmon recovery partners, and project sponsors with a request for project additions and updates. The request was focused on addressing chinook recovery projects in preparation for the 2008 SRFB funding cycle. Project updates, additions, and deletions were incorporated into the draft *2008-2010 WRIA 1 Salmon Recovery 3-Year Implementation Plan*. Actions in the draft 3-year implementation plan were reviewed by the WRIA 1 Salmon Recovery Staff Team, and projects with direct benefit to chinook identified and rated high, medium, and low (see “2008 Chinook” attribute). The rating was based on magnitude of benefit and project readiness, considered in the context of staging projects for 2008 funding. The costs reflected, however, represent the total project cost as estimated by the likely project sponsors.

As reflected in the update process described above, our 3-Year Implementation Plan focuses largely on projects; program activities are included but are not necessarily complete and comprehensive. Since initial development of the WRIA 1 3-Year Implementation Program in 2006, the WRIA 1 Salmon Recovery Board has begun developing Annual Work Plans to guide and monitor implementation of salmon recovery efforts. These annual work plans focus on programs rather than projects, and, as such, more accurately represent near-term programmatic activities, albeit for a shorter time frame than the broader 3-Year Implementation Program. For this reason, we have included the *2008 WRIA 1 Salmon Recovery Program Work Plan* with this submission.

The WRIA 1 Steering Committee reviewed the draft 2008-2010 WRIA 1 Salmon Recovery 3-Year Implementation Plan and recommended its approval to the WRIA 1 Salmon Recovery Board, which is the Lead Entity for WRIA 1.

A follow-up workshop will be conducted in late spring 2008 to further develop the *2008-2010 WRIA 1 Salmon Recovery 3-Year Implementation Program* to include all programs and projects that have direct and indirect benefits to all species of salmon. This effort will also address the Puget Sound Partnership goals that have recently been added to the Puget Sound Partnership's 3-Year Implementation Program format.

#### Summary of Changes to the *2008-2010 WRIA 1 Salmon Recovery 3-Year Implementation Plan*

- Projects that were not initiated in 2007 were shifted to a projected 2008 start date.
- Projects were removed that were considered infeasible to initiate or complete within the projected timeframe. These projects include:
  - Perpetual CREP, i.e. acquiring conservation easements on riparian areas leased and restored through the Conservation Reserve Enhancement Program, to extend protection from 15 years to perpetuity.
  - Bertrand Creek Levee Setback – Setback completed (LWD placement and monitoring remain)
  - Cliffside Beach Wood Debris Removal – Feasibility completed
  - Acquisition of 90 acres upland and 40 acres tideland at Lily Point – Project completed
  - Bertrand Creek Well and Surface Storage System – Funding received from other sources
  - South Fork Forests Forever: Purchase of Development Rights from Sierra Pacific Industries (>2,500 ac along 7 3/4 mi of SF) – Project not currently feasible.
- Projects with completed design, permitting and construction phases have been removed from the 2008-2010 WRIA 1 Project List even though these projects may still have associated monitoring underway.
- The projects identified as having a direct benefit to chinook recovery were identified and rated high, medium, or low based on magnitude of benefit and readiness to proceed. These projects are identified on the *2008-2010 WRIA 1 Salmon Recovery 3-Year Implementation Plan* spreadsheet in a column labeled “2008 Chinook Recovery Projects”.
- Projects were added that were considered feasible to implement or initiate within the projected timeframe. These projects include:

- Fobes Creek Island Side Channel Project
  - Cavanaugh Creek Island Project
  - Larson's Floodplain Refuge Project
  - Integration of Salmon Habitat Reach Assessment & Projects with Flood Management
  - Chuckanut Village Marsh Restoration
  - Bay Road Culvert Replacement (California Creek)
  - Goodwin Road Culvert Replacement (Dale Creek)
- Project costs were updated as appropriate to reflect new information such as revised project cost estimates, funding obtained, and engineering and/or design work completed.
  - Project names were reviewed for consistency between the 3-year plan spreadsheet and the project narrative document.

## **2008- SCRP I ONSI SALMON RECOVERY 3-YEAR PROJECT PLAN**

### **ACTION DESCRIPTIONS**

**The following descriptions are arranged by geographic area and align with the accompanying spreadsheet, which provides details on funding for 2008-2010.**

#### **South Fork Nooksack**

##### **South Fork Acme-Confluence Reach: Active Channel Logjams**

Objective: restore deep pools with complex cover, promote development of temperature refuges

These projects include construction of stable log jams in the main channel in areas of known cool water influence (groundwater recharge or tributary inputs). The objectives of the projects are to increase habitat diversity, quantity of deep pools with cover, and availability of temperature refuges. Phase 1 (Kalsbeek Reach, RM 6.5) was constructed in 2007; Phase 2 (Todd Creek Reach, RM 3.8) and Phase 3 (Van Zandt Reach, RM 1.2) are funded and scheduled for construction in 2008 and 2009, respectively. Additional potential locations include: (1) near Standard Creek confluence; and (2) near confluence of Hardscrabble Creek. Conservatively estimate cost of \$150,000 per structure, \$100,000 per location for design and permitting, and \$10,000 per location for monitoring. Phases 4 and 5 (approximately 4 log jams each) are estimated to cost \$710,000 each for design/permitting, construction, and monitoring, with construction scheduled for 2010 and 2011, respectively. Total estimated Phase 4 and 5 3-year cost: \$800,000.

Benefit: Increase in number of log jams engaged with low flow channel, main channel pools, temperature refuges during summer low flow (2°C difference from thalweg)

Cost: Estimated unmet funding needs from 2008-2010 for phase 4 and 5 is \$800,000.

##### **South Fork Acme-Confluence Reach: HMZ Reconnection**

Objective: Reconnect disconnected floodplain to reduce mainstem velocities and restore channel migration processes that create habitat diversity, reduce fine sediments by promoting overbank deposition of sediments

This project includes removal or setback of bank hardening that blocks HMZ to restore habitat-forming channel migration processes. The objectives of the project are to encourage greater interaction between the river and the HMZ in order to increase the availability of off-channel habitat, reduce mainstem velocities, and encourage floodplain deposition of fine sediment. Locations, HMZ area made accessible, and length of bank hardening removed/setback include: (1) Caron Creek area, up to 57 acres of HMZ reconnected, up to 625 feet of bank hardening removed/setback; (2) Standard Creek area, up to 39 acres of HMZ reconnected, up to 560 feet of bank hardening removed/setback; (3) River Farm area, up to 40 acres of HMZ reconnected, up to 340 feet of bank hardening removed/setback; and (4) McCarty Creek area, up to 40 acres of HMZ reconnected some secondary channel development. Projects are contingent on landowner

willingness to proceed with project or sell conservation easement (see Acquisition of Priority Habitats action). Estimate \$100/foot for removal and \$300/foot for setback.

Benefit: up to 176 acres HMZ reconnected; up to 1525 feet of bank hardening removed or set back

Cost: Estimated 3-year project cost is \$120,000 and total estimated cost of \$417,000.

### **Lower South Fork Tributary Riparian Restoration**

Objective: Restore riparian shading to provide temperature refuges in low-gradient floodplain tributaries for juvenile salmonids, including chinook, rearing in the South Fork mainstem

This project involves riparian planting in unforested or poorly stocked riparian areas of low-gradient tributaries (100 foot buffer widths) within ½ mile of the lower South Fork (downstream of Saxon Rd bridge). The planting will be 500 trees per acre and include layout, 3-year maintenance and beaver protection. Estimate 70 acres in the Acme-Confluence reach and 53 acres in the Acme-Saxon reach that have not already been restored, at \$4,400/acre, or \$541,200. Projects are contingent on landowner willingness to proceed with project.

Benefit: restore 123 acres of riparian buffer along lower South Fork tributaries to increase shading and wood recruitment to tributaries and the South Fork downstream of the tributary confluence.

Cost: Estimated 3-year project cost is \$541,200 (\$180,400 per year).

### **Lower South Fork HMZ Riparian Restoration**

Objective: Increase wood recruitment potential, ultimately to improve habitat diversity (i.e. cover, habitat unit diversity) and key habitat quantity (deep meander bend pools) in the lower South Fork

This project involves riparian planting in unforested areas in and within 260 feet of the accessible Historic Migration Zone (1880-present) of the South Fork in this reach. In this context, “accessible” refers to areas open to channel migration, i.e. not isolated from the active channel by bank hardening. The planting will be 500 trees per acre and include layout, 3-year maintenance and beaver protection. Estimate 161 acres in the Acme-Confluence reach and 62 acres in the Acme-Saxon reach that have not already been restored at \$4,400/acre, or \$981,200. Project is contingent on willingness of landowners of properties likely to be affected by the project.

Benefit: Restore approximately 223 acres of riparian forest within the South Fork HMZ to increase wood recruitment potential and shading of the South Fork. This action will have longer-term benefits to channel stability, habitat diversity and water temperature in the South Fork.

Cost: Estimate for 3-year project is \$981,200 (\$327,067 per year)

### **Lower South Fork Wetland Water Storage Improvement**

Objective: Restore temperature and baseflow maintenance function of lower South Fork floodplain wetlands, to address low flow and high temperature in the lower South Fork

This project encompasses actions that promote water storage in historical and potential wetlands of the lower South Fork to restore temperature and baseflow maintenance functions to the mainstem South Fork. Activities to promote water storage include, plugging, backfilling, and/or re-meandering drainage ditches and re-creating micro-impoundments similar to beaver dams. An estimated 5500m of straight ditchline and 1900m of stream length in the historically important Black Slough wetland complex could be improved (approximately 1/3 of its length), plus additional ditchline and stream length in other wetlands in the lower South Fork valley. Estimated cost of water storage improvement is \$70/m, for a total \$518,000. Project is contingent upon landowner willingness to proceed.

Benefit: promote water storage along 7.4 km of ditchline and/or stream length to restore an estimated 180 acres of wetland, with associated improvements in wetland functions, such as flood storage, increased summer baseflow, and decreased summer temperature in the lower South Fork Nooksack River.

Cost: Estimated cost for 3-year project is \$518,000 (Phase 1 implementation \$259,000; Phase 2 implementation \$259,000)

### **Acme-Saxon Reach Active Channel Logjams: Nessel's Reach Restoration**

Objective: Increase habitat diversity (by increasing the persistence and function of existing wood) in a cooler water section of the South Fork. This group of projects includes stabilization of log jams in the active channel of the South Fork between Hutchinson Creek and Saxon Creek. Projects are contingent on landowner willingness to proceed with project. Projects include:

Cost: Estimated 3-year cost is \$280,000.

### **Acme-Saxon Reach Active Channel Logjams/Saxon Reach Restoration**

Objective: Increase habitat diversity (number and persistence of pools, complex cover) in a cooler water section of the South Fork. This group of projects includes stabilization of log jams in the active channel of the South Fork between Acme and Saxon Road bridge. Projects are contingent on landowner willingness to proceed with project. Projects include:

- Saxon Reach Restoration Project will include the stabilization/augmentation of existing log jams. The goal of the project is to stabilize the split flow downstream of the bridge and create holding habitat in a cooler section of the reach. The project includes augmenting existing wood accumulations to encourage the stability of the mid-channel island. It is estimated that the project will require landowner participation in setting project objectives and allowable scope of the project. It is likely that the project will need to meet flood protection objectives in the reach, possibly including fish friendly bank protection. It is expected that the project would cost \$750,000 to design, permit and construct.

Benefit: 5 log jams, 5 pools with complex cover, 5 cooler water areas local to the logjams during summer low flow (2°C difference from thalweg)

Cost: Estimated 3-year cost is \$830,000.

### **Skookum Reach Restoration**

Objective: Remove channel constrictions, add LWD structure to the river channel, provide access to thermal refugia.

The Skookum Reach project will consist of removing bank protection, installing active channel logjams near the mouth of Skookum Creek relocating Saxon Road from the river bank to upland areas owned by Whatcom Land Trust and Lummi Nation and restoring riparian buffer stands along the South Fork channel. An additional benefit of the project would be providing better road access control to Skookum Creek, Skookum Hatchery and the South Fork Weir.

Benefit: removal of 1800 feet of bank protection, installing 2 active channel logjams, re-locating ½ mile of Saxon Road to upland areas and restoring 11.8 acres of riparian buffer stand.

Cost: Estimated 3 year cost \$1,250,000

### **Upper South Fork 30 Mile Reach Restoration**

Objective: Slow channel incision, increase habitat diversity, and buffer South Fork from large landslides

The 30 Mile Reach Restoration Project includes the removal of a bridge, associated fill and riprap, removal of a blocking culvert on the southern access road, and the installation of several instream structures designed to slow channel incision in the reach and buffer the channel from several large stream-adjacent landslides. Project will be completed in 2007. Ongoing costs will be limited to monitoring.

Benefit: removal of bridge and associated 400 feet of riprap, reconnect 5 acres of HMZ, buffer ~18,000 square yards of actively eroding landslides from the active channel.

Cost: Estimated 3 year cost \$350,000

### **Upper South Fork Orphan Road Assessment**

Objective: Identify areas potentially in need of corrective action to reduce erosion and prevent slope failures

The orphan road assessment will use the coming LiDAR (Fall 2006) that will include coverage of the state managed and private timberlands of Whatcom County to identify forest road grades that are not currently covered under forest practice road management rules. Once the extent of these existing roads is determined, the assessment will include field surveys to determine if and where drainage improvement and fill removal is necessary to reduce erosion and prevent slope failures. Orphan Road Abandonment projects resulting from the assessment will be contingent on landowner willingness to proceed with projects. Based on the costs of previous road assessment work, it is estimated that the assessment would cost \$120,000. Orphan road surveys conducted as a part of the upper SF assessment results will give us an indication of the extent that these roads are a problem.

Benefit: assessment of orphaned roads, with prescriptions for drainage improvement and pullback of landings and sidecast for several road miles. These projects will reduce sediment input into the South Fork and its tributaries.

Cost: Estimated 3-year cost \$120,000

### **South Fork Orphan Road Abandonment**

Objective: Treat areas in need of corrective action to reduce erosion and prevent slope failures

The work will interrupt a historic pattern of chronic mass wasting events triggered by roadbed failures that have been delivering significant amounts of sediment into the south fork of the Nooksack River. Project will treat orphan roads in Seattle City Light South Fork property along the 200 Road corridor. During summer 2007, Lummi Natural Resources will remove drainage structures, install cross drains, waterbars and tank-trap barriers on three orphan road spurs held in conservation status by City of Seattle's City Light Division. The orphan spurs will have drainage structures removed by heavy equipment, and with hand labor. Triple tank traps will be installed at the junctions of the roads with active roads to prevent future offroad vehicle use.

Benefit: The project will remove drainage structures, install cross drains, waterbars and tank-trap barriers on three road spurs totaling over 1 mile of orphan road. The work will interrupt a historic pattern of chronic mass wasting events triggered by roadbed failures that have been delivering significant amounts of sediment into the south fork of the Nooksack River

Cost: Estimated 3-year cost \$ 30,000

The project is fully funded through partnerships with City of Seattle and U.S. Fish and Wildlife

### **Fobes Creek Island Side Channel Project**

Objective: To stabilize existing wood debris in the active channel of the South Fork Nooksack to increase habitat functions and improve floodplain connectivity, provide high quality habitat in a known thermal refuge area, increase wood recruitment potential and shading through riparian enhancement.

The Fobes Reach project area and scope has been expanded to include the reach between Larson's Bridge (RM 20.5) and the top of Dye's Canyon (RM 18). The project will be constructed in several phases and likely use a variety of stabilization techniques to improve the function of wood in the channel. The design will build on the Larson's Bridge Project that lies in the reach.

The Fobes Creek Island project proposes to stabilize forested islands in the South Fork that are located between RM 18-20.5. The reach is one of the few areas where the South Fork Nooksack has historically migrated across its floodplain, resulting in many relict channels. Most of these channels maintain connection during periods of high flow, which is critical for reducing scour in the main channel during floods. The reach contains abundant small pieces of wood that can be stabilized to increase the function of woody debris in the channel. The reach is heavily used for holding, spawning, and rearing by Threatened spring chinook and other species. The Fobes Creek Island Project seeks to improve the persistence of instream wood and maintain high flow connectivity with existing side channels, while improving habitat in the cool water refuge at the

confluence of Fobes Creek. The project includes riparian treatment to increase the conifer content on the forested islands in the reach and the placement of large woody debris to improve habitat quality in the Fobes thermal refuge area. Instream wood will be stabilized throughout the channel to provide flow impedance and slow flow in the channel. This is the highest ranked project area in the Upper South Fork Nooksack River Habitat Assessment.

Benefit: The project is expected to improve habitat diversity in a demonstrated thermal refuge area at the confluence of tributary creeks, increase instream cover, pool frequency and planform diversity by increasing the function of wood in the channel. The increase in wood is designed to approach historic conditions and is expected to lead to an increase in floodplain connectivity and an associated reduction in mainstem bed scour. Associated riparian treatments should increase shading and wood recruitment to the channel.

Cost: Estimated project cost is \$1,520,000 with \$375,000 anticipated 2008-2010

### **Cavanaugh Creek Island Side Channel Project**

Objective: To improve the low flow connectivity of a side-channel and increase habitat diversity in a demonstrated thermal refuge area through creating logjams, and increase shading and wood recruitment potential with riparian planting.

The Cavanaugh Island project is located in the South Fork between RM 16.6-17.0. The project reach includes the greatest length of side channel habitat in the South Fork watershed. The channel is separated from the main channel by an 11-acre island that is forested with deciduous trees and occasional young conifers. During the low flow period, the side channel is dry, but it receives enough water from the mainstem during high discharge events to maintain a 30-foot wide unvegetated, gravel-dominated bed. The project seeks to improve habitat diversity in the Cavanaugh Creek reach by maintaining year-round flow in the side channel. Flow will be encouraged into the channel by using pilings to create two wood accumulations to draw the thalweg of the main channel toward the head of the island. Riparian restoration on the island will increase the stability of the island, and large wood will be placed in the side channel to impede flow and provide instream cover for rearing juveniles. The project also includes placing three wood structures in the thermal refuge areas associated with Cavanaugh Creek, located at the downstream end of the side channel. These structures will improve habitat quality in known cool water influence areas, including the plumes of two cooler water tributaries and a groundwater seep that enters the channel from terrace bordering the western side of the channel. This is the fourth highest ranked project in the Upper South Fork Nooksack River Habitat Assessment and the second highest ranked project not currently funded.

Benefit: The project is expected to improve habitat diversity in a demonstrated thermal refuge area at the confluence of Cavanaugh Creek, increase instream cover, pool frequency and planform diversity by increasing the function of wood in the channel and increase the connectivity of a side-channel. Associated riparian treatments should increase shading and wood recruitment to the channel.

Cost: Estimated 3 year cost \$350,000

### **Larson's Floodplain Refuge Side Channel Project**

Objective: Improve connectivity with cool water side-channel. Increase habitat diversity in an area with abundant groundwater seeps from an adjacent terrace.

This site is a series of groundwater-fed floodplain channels located just above the Larson's Bridge at RM 20.9. A relict South Fork channel, dating from the 1940s, runs through the forested floodplain and mixes with the main channel. Flow in the relict channel are low in the summer; however, temperatures (7-DAM) recorded in this channel averaged 12.5°C between July and October 2005. The best water quality conditions of all stations sampled were observed at this site. Temperatures recorded in the coldwater plume also maintained low values, providing an instream refuge for fish in the area during warm periods. This is the sixth highest ranked project in the Upper South Fork Nooksack River Habitat Assessment and the third highest ranked project not currently funded.

Benefit: Increase habitat diversity in cooler water section of the river and increase connectivity of a floodplain channel.

Cost: Estimated 3-year cost \$600,000.

### **USFS Road Network Monitoring and Maintenance**

Objective: reduce sediment production from sites with known deficiencies

The SF/MF Watershed Analysis found that, regarding reduction of sediment production from roads, most roads have been improved, but several sites have known deficiencies and need correcting. Specific findings include the need to: (1) monitor the road network; (2) correct remaining drainage and stability problems on USFS Road 12 between Mileposts (MP) 7 and 9; and (3) Road 1260 will require periodic maintenance from MP 0.8 to 2.2, including brushing and ditch line cleaning due to raveling cut banks.

Benefit: reduced sediment delivery, stream pirating associated with USFS roads in upper South Fork

Cost: Estimated 3-year project cost \$90,000

### **Years 3 and 4 of Skookum Chinook Supplementation**

Objective: To increase the natural spawning population of the South Fork Nooksack River Early Chinook population, currently at risk of extinction, while minimizing the effects of hatchery intervention on the genetic integrity of the stock. (Target release of 200,000 sub-yearlings by year 4 of the program)

This activity will continue the program funded by the Pacific Salmon Commission Southern Endowment Fund that will expire in 2008 without additional funding. The requested support will cover the expenses of hatchery staff and operations essential to the supplementation program and hatchery improvements required to ensure safe and effective achievement of program goals.

Brood Stock selected from adults diverted into the hatchery by a weir across the South Fork and identified to stock by microsatellite DNA analysis. Protocols have been developed to minimize risk from disease and the nature of operations in an isolated location. Hatchery production will be Coded Wire Tagged under the Pacific Salmon Commission Indicator Stock Program to

evaluated survival and contribution to fisheries. The sub-yearlings will be released volitionally in mid-May.

Benefit: established South Fork early chinook program and, ultimately, improved abundance of South Fork early chinook

Cost: Estimated 3-year project cost \$510,054

### **South Fork Captive Brood Supplementation Program run at Kendall Hatchery**

Objective: To increase the abundance of the South Fork Nooksack River Early Chinook population, currently at risk of extinction, through raising a portion of the offspring from each mated pair without release to the wild, and transferring ripening adults back to Skookum Hatchery. (Target of approximately 250 juveniles per year with the program running for approximately 8 years.)

Offspring from Skookum Hatchery South Fork broodstock that meet the desired microsatellite DNA stock assignment will have a small portion of each family group transferred as eyed eggs or fry to WDFW's Kendall Hatchery, where they will be raised until maturing adults. Ripening adults will be transferred back to Skookum Hatchery to be spawned, with offspring reared and released as described in the Skookum Chinook Supplementation. Very recent microsatellite DNA analysis indicates approximately 20-30% of recently sampled wild adults were assigned to the South Fork spring chinook baseline.

Benefit: Increased short-term abundance of this population, which will transition to a traditional hatchery population rebuilding program upon completion and while degraded habitat conditions are addressed such that natural population productivity increases.

Cost: One time capitol improvements of \$944,000 to improve water supply and for tanks, and while required to run this program for its duration, this is not required for the first year. Additionally, annual costs are \$13,000, \$19,000, \$38,000, and \$51,000 for years 1-4 respectively, and \$51,000 annually for years 5-8.

### **South Fork Captive Brood Supplementation Program run at NOAA Fisheries Manchester Research Station**

Objective: To increase the abundance of the South Fork Nooksack River Early Chinook population, currently at risk of extinction, through raising a portion of the offspring from each mated pair to adulthood without release to the wild, and transferring ripening adults back to Skookum Hatchery. (Target of approximately 250 juveniles per year with the program running for approximately 8 years.)

Offspring from Skookum Hatchery South Fork spawned broodstock that meet the desired microsatellite DNA stock assignment will have a small portion of each family group transferred as smolts (approximately 3 months old) to NOAA Fisheries Manchester Facility (Port Orchard, WA), where they will be raised until maturing adults. Ripening adults will be transferred back to Skookum Hatchery to be spawned with offspring released as described in the Skookum Chinook Supplementation. Very recent microsatellite DNA analysis indicates approximately 20-30% of recently sampled wild adults were assigned to the South Fork spring chinook baseline.

Benefit: Increased short-term abundance of this population, which will transition to a traditional hatchery population rebuilding program upon completion and while degraded habitat conditions are addressed such that natural population productivity increases.

Cost: \$250,000 per year and facility needs no improvements.

### **Skookum Creek Hatchery Water Supply**

Objective: To insure a steady supply of water and provide the redundancy appropriate to the rearing of native early chinook at the Skookum Creek Hatchery.

Skookum Creek Hatchery utilizes two sources of water for its operations, Skookum Creek and wells on the hatchery property. Well water is required for the incubation and early rearing because its temperature is well above that in the creek water and promotes accelerated growth during winter months. Water from the creek is required for the final grow out to release for purposes of improved growth as the season progresses and to ensure imprinting to the hatchery entrance upon their return. The current water supply requires an additional measure of redundancy to ensure the safety of the chinook supplementation program while meeting the other objectives of the hatchery. Additional water will be required when the chinook program reaches its full production. The intake in Skookum Creek must be modified to reduce the impact of sediment loads and changes in bed elevation on the intake, minimize the transport of sediment into the hatchery, to meet appropriate screening criteria and provide for improved passage in the creek for bull trout and native chinook. The production of the existing wells has deteriorated in recent years and rehabilitation of the existing wells and location of new wells is necessary to ensure the margin of safety required for safe and effective implementation of the chinook supplementation program as well as meeting other hatchery objectives. Project is contingent on landowner willingness to proceed.

Benefit: stable water supply sufficient to support Skookum hatchery operations

Cost: Estimated 3-year project cost \$700,000

### **Skookum Cr Riparian Forest Conservation Easement**

Objective: Protect riparian forests and the functions they provide to Skookum Creek.

This project will protect through acquisition of either easement or fee purchase of 300-600 acres of riparian forest along Skookum creek, from the mouth upstream 5 miles. This reach has been identified in the WRIA #1 Salmon Recovery Plan as "Protection Category A". Protection of the riparian forests along this reach will address the limiting factors of low habitat diversity by protecting maturing riparian forests and allowing them to reach an older age and be recruited into Skookum Creek to serve as large woody debris and thereby increase diversity of habitat within the Skookum Creek channel. For larger landowners, some selective timber harvest is allowed even within the 200 shoreline buffer along Type 1 fish bearing streams, and further timber harvest is allowed within even smaller buffers along smaller streams. These buffer sizes and partial harvest restrictions are not at all sufficient to provide the size and volume of native trees that have historically provided large woody debris to WRIA#1 streams and rivers. Furthermore, a recent study by DNR of the recently approved Forest and Fish rules found that only 60% of logging operations followed the forest practice rules. This result raises concern for the impact of forest practice regulations on endangered salmon habitat and points out once again the need to simply

acquire critical habitat for species recovery rather than relying on the ability of individual landowners to understand and follow the complex set of forest practice rules and on an understaffed DNR Forest Practices Division to enforce the rules. Project scope has been prepared and is ready to proceed pending funding. Estimated cost is \$1,400,000.

### **South Fork Spawning Channel Feasibility and Design**

Objective: To determine conclusively the feasibility of constructing a chinook spawning channel in the South Fork Nooksack River with a capacity for 100 spawning pairs.

Preliminary studies of chinook redds in the South Fork have documented many problems with the ultimate survival of the spawn from those adults that return to the river. The supplementation program at the Skookum Creek hatchery is one approach to ensuring a higher productivity from returning adults, but still entails a level of risk that could be further reduced if it were possible to create an area protected from the erosional and sedimentation risks existing in the currently degraded channel conditions found in the South Fork. An additional benefit would be the ability to regulate the entry into the channel of non-native chinook later in the season. The objective would be to duplicate the success of the spawning channels for pink and sockeye salmon which allow for natural mate selection and controlled water quality and quantity as well as controlled sediment levels and yield high potential egg deposition to fry production. Similar success has not been encountered in the few spawning channels established to replace lost chinook spawning areas. This project would be staged in a series of phases that would progress as information supported continuation of the work. Phase 1: Analysis of critical chinook spawning habitat data, evaluation and critique of attempts to create controlled chinook spawning areas, and specification of requirements for a successful chinook spawning channel. Phase 2: Identification of locations within the South Fork meeting the specification of requirements for a successful chinook spawning channel, development of preliminary design options for the most likely locations, evaluate options with objective ranking criteria, prepare preliminary design and specifications for a channel at the highest ranking site and prepare initial cost estimates and construction schedule for a spawning channel. Landowner willingness will ultimately be required to evaluate sites and proceed with project.

Benefit: Protected spawning habitat for 100 pairs of native early chinook under natural conditions eventually resulting in 100,000 to 150,000 fry from naturally mated parents and reared under natural conditions.

Cost: Estimated 3 year project cost for Phases 1 and 2 is \$250,000

### **Lower South Fork Flood/Salmon Coordination (Below Hutchinson Creek)**

Objective: Increase habitat diversity, reducing poaching impact

This project seeks to develop coordinated salmon habitat and flood management projects for the South Fork in a location near Acme.

This project includes working with Whatcom County Public Works and Parks Departments to address the right bank erosion at the Acme Farm and the failing rock revetment at the Roos property (Dozer Hole). Accomplishing these objectives may include attempting to split flow on the left bank floodplain upstream adjacent to the Roos property to enhance floodplain connections and side channel formation and maintenance to enhance rearing opportunities.

**Benefit:** The project will improve habitat diversity in the reach through increasing side channel areas, increasing the number of pools in the reach, and providing improved cover to existing pools. It is expected that the project could lead to 3600 feet of secondary channel through relict floodplain channels. The project will also improve woody cover on a riprap pool that is currently subject to poaching of Threatened species.

**Cost:** The project will cost an estimated \$300,000.

### **Acme Early Chinook Restoration**

**Objective:** Increase habitat diversity, improve floodplain connectivity, reduce flood hazard to Acme.

This project seeks to develop coordinated salmon habitat and flood management projects for the South Fork in a location near Acme.

Habitat objectives of this project include improving South Fork floodplain connections and fine sediment storage at the former RV Park, improving habitat diversity and complexity, and maintaining connectivity for juvenile salmonids accessing the slough in Riverview Park and Landingstrip Creek. Reducing flood risk for the community of Acme is a primary flood management goal of this project. It should be noted that existing infrastructure currently limits floodplain functions in this area and that changes to infrastructure extend considerably beyond the 3-year planning horizon for this exercise. Planning and design costs are estimated at ~\$86,400. Construction costs are to be determined and are estimated at ~\$840,000.

**Benefit:** Improved complex pool habitat and thermal refugia; improved floodplain connectivity on one or both banks of the South Fork; community springboard for reach-scale discussions of salmon recovery and flood hazard management.

**Cost:** Estimated 3 year project cost \$926,400.

### **Acme to Confluence Restoration Acquisitions (2-5 parcels key for future restoration)**

**Objective:** Acquire properties in the Acme to Confluence reach of the South Fork that are necessary to implement planned priority restoration projects.

This project will acquire fee simply interest in 2-5 properties where habitat restoration projects are planned. This project address the limiting factors of habitat diversity, temperature and sediment load by acquiring key restoration properties and keeping them in conservation status perpetually in order to fully control and restore key salmon habitat structures. Possible sites include the Todd Creek confluence, the junction of Caron Creek and Tawes Creek, property near Standard Creek confluence and the confluence of Hardscrabble Creek. These sites have been discussed in the *South Fork Nooksack River Acme-Confluence Reach Restoration Planning: Analysis of Existing Information and Preliminary Restoration Strategies* as possible locations of large, instream woody log jams. Other sites include wetland and potential properties that will support the *Lower South Fork Wetland Water Storage Improvement* project. Acquisition of these sites will provide willing landowner support for construction, monitoring and maintenance of the restoration projects.

Cost: Estimated cost of the project is \$2,000,000. Preliminary design of acquisition sites is underway with initial consultation with Nooksack Natural Resources and Lummi Natural Resources. Estimated date for completion is 6/2010.

### **Lower South Fork Joint Transportation/Restoration Planning**

Objective: Develop habitat restoration projects in conjunction with possible replacement or relocation of existing transportation infrastructure.

Whatcom County is currently planning to replace Potter Road Bridge and improve drainage on Potter Road east and west of the bridge to increase public safety and access during flood events and to improve flood routing and salmon habitat functions. A second planning area lies between the State Route 9 (SR9) Acme Bridge (RM8.5) and the Burlington Northern Sante Fe Railroad (BNSF) Bridge (RM7.7). SR9 near the BNSF Bridge is considered a chronic maintenance problem by WSDOT (1999 Highway Concerns Review). Whatcom County is currently developing a hydraulic model for the South Fork Nooksack River which will help determine the extent to which the two bridges (BNSF and SR9) might be contributing to flooding concerns. This restoration planning project would complement the transportation planning process to optimize benefits for transportation and fish. Desired restoration elements include: (1) construction of instream logjams in an area of cool water influence to increase quantity of thermally-stratified deep pools with cover; and (2) construction of logjams along the margins of the HMZ to encourage greater connectivity with these surfaces, to increase the availability of off-channel habitat, reduce mainstem velocities and encourage floodplain deposition of fine sediment. The project will be implemented in two phases by area, with an estimated planning cost of \$100,000 for each area. Projects are likely to require landowner willingness to proceed with implementation.

Benefit: Two restoration plans coordinated with transportation plans

Cost: Estimated 3-year project cost \$200,000

### **Bell Creek Road Crossing (Upper South Fork)**

Objective: Allow bedload transport and migration

The Road 12 crossing of Bell Creek in the upper South Fork watershed is a partial bedload barrier and a complete fish barrier which fragments an isolated population of genetically identified, native Dolly Varden. This project involves replacing a culvert with a bridge. Because this road currently provides access to the SnowTel site and may not be maintained, the bridge will be designed to be easily removed if necessary. The project objective is to allow for bedload transport and migration of resident Dolly Varden. Likely sponsors for the project are Whatcom County or the U.S.D.A. Forest Service. This project is estimated to cost \$95,000. All permitting and NEPA compliance has been completed.

Benefits: restored fish passage at 1 resident fish barrier

Costs: Estimated 3 year project cost \$95,000

## **Middle Fork Nooksack**

### **Middle Fork Reach Assessment and Restoration Planning**

Objective: Develop comprehensive restoration plan for Lower Middle Fork to address Nooksack chinook limiting factors

This project will assess limiting habitat conditions and plan restoration projects in the lower Middle Fork Nooksack River from the confluence with the North Fork upstream to the gaging station upstream of the Mosquito Lake Road bridge (RM 0-5.5). Objectives include: (1) synthesis of existing information and collection of new data to characterize limiting habitat conditions and habitat-forming processes; (2) identify and prioritize project concepts that address limiting habitat conditions. Similar efforts have been completed and/or are underway for 3 reaches that comprise the anadromous extent of the South Fork Nooksack (RM 0-8, 8-14.3, 14.3-31) and for much of the anadromous extent of the North Fork Nooksack (RM 36.5 – 57). Restoration of the lower Middle Fork is expected to benefit early chinook spawning and rearing success.

Benefit: comprehensive plan for restoration of lower Middle Fork that addresses limiting factors for early chinook and other species.

Cost: Estimated 3-year cost is \$160,842

### **Middle Fork Diversion Dam**

Objective: To restore anadromous fish passage at Middle Fork diversion dam

Restoration of anadromous fish passage at the diversion dam on the Middle Fork Nooksack River at RM 7.2 will restore access to at least 10.2 miles of Middle Fork and 6.9 miles of tributary habitat. The 90% feasibility study for a new intake structure and partial dam removal has been completed, and a Charrette/Value Engineering Study completed. This revised the cost estimate for this option to \$22,300,000. The fish ladder design option to restoring passage is complete through 90% feasibility, and it is anticipated to also go through a Charrette/Value Engineering Study to review the design and associated costs. Permits are being obtained, and construction could occur in 2008, pending funding availability. The project is expected to improve the abundance, productivity, spatial structure and diversity of NF/MF Nooksack early chinook.

Benefit: Restored passage at MF diversion dam to 17.1 miles of potential chinook habitat

Cost: Estimated 3 year project cost \$22,300,000 for the revised intake and partial dam removal option and approximately \$12,000,000 to \$16,000,000 for the ladder option.

### **Middle Fork Diversion Dam: Lake Whatcom Kokanee Program**

Objective: To develop alternative kokanee production facilities to the Lake Whatcom program

The Lake Whatcom Hatchery is the primary source of kokanee (non-anadromous *Oncorhynchus nerka*) for Washington State, used to stock 36 lakes and reservoirs and supporting recreational fisheries valued at over \$20 million yearly. While the risk of virus transfer to Lake Whatcom

through the pipeline from the Middle Fork is low, the Lake Whatcom Hatchery will lose its pathogen-free water certification once anadromous fish use upstream of the diversion dam is restored. Loss of pathogen-free status will necessitate testing of all adults from which eggs or offspring are intended to be transferred out of the local fish or egg health management zone, a level of testing which is considered to be infeasible. The Legislature funded WDFW to initiate a feasibility study to identify sites that could be used to replace the Lake Whatcom kokanee egg supply, and the recommended option was for multiple brood lakes plus construction of additional hatchery capacity. WDFW supports the restored anadromous use to the Middle Fork above the diversion, with the understanding that kokanee brood facilities to replace Lake Whatcom production needs to be funded and constructed as close as possible to restoring passage to avoid or minimize the duration of kokanee hatchery production reductions. The WRIA 1 Salmon Recovery Board supports the WDFW efforts to obtain funding from the state legislature, although acquiring the funding is not a prerequisite to restoring passage.

Benefit: N/A

Cost: Estimated 3 year project cost \$6,164,000

### **Middle Fork Side Channel Reach Assessment and Project Design**

Objective: The objective of the Middle Fork Reach project is to complete an reach assessment of a 1.5 mile section of river between the Mosquito Lake Rd Bridge ( RM 5.0) and the confluence of 01. 0349 leading to the design of in-stream actions which will maintain conditions which split river flow between the 5000' side channel reach and the main stem reach..

The MF side channel is a mile long, spring and river fed channel. Wood was placed in the channel in 2004 and 2005 to trap and sort sediments and improve cover, channel complexity and spawning habitat. During the winter of 2007, a sediment plug raised the bed of the MF reach downstream of Mosquito Lake Road crossing leading to a partial avulsion of approximately half the river flow into the MF side channel. The additional flow into the side channel working in combination with placed and newly transported wood has created good chinook spawning conditions. Flood flows are currently moderated by the split flow conditions providing some level of protection to the spawning habitat. Left to it own processes, the river will likely complete the avulsion into the side channel, abandon the mile of main stem channel and lose the high flow buffer provided by the current split flow conditions.

Benefit. The project, when complete will secure 5000' of protected spawning and early life stage rearing habitat for MF/NF spring chinook, pink, and coho salmon and steelhead trout

Cost: Assessment and design \$60,000

### **Upper Middle Fork Spawner Surveys**

Restoring passage to the Middle Fork is anticipated to result in natural colonization by steelhead, coho, and anadromous bull trout, and by early chinook returns from the ongoing off-station Kendall Hatchery releases that have occurred above the existing dam. Effective spawn survey coverage of this habitat is needed to monitor habitat recolonization, North/Middle Fork chinook population size, including natural and hatchery origin abundances, and to collect coded wire tags essential for use in estimating harvest rates for this Pacific Salmon Treaty Indicator Stock. With

passage scheduled in 2007, surveys should begin in 2007. Due to the stream sizes and remoteness, spawn surveys will primarily be conducted in two person crews.

Benefit: improved escapement estimate for Nooksack early chinook; improved understanding of species use to reconnected habitat

Costs: Estimated 3 year project cost is \$150,000

## **North Fork Nooksack**

### **Lower Canyon Creek Design and Restoration**

Objectives: to improve adult passage and restore processes that create habitat diversity and complexity for early chinook and pink salmon, bull trout, and other salmonids

Restoration objectives that factor in geomorphic, habitat, alluvial fan flood risk, and public outreach goals have been defined in the completed assessment. Phase 1 project design and sequencing has been defined with proposed options for Phase 2 design and implementation. Habitat priorities include providing long-term passage at a recognized barrier to upstream spawning areas for early chinook, pinks, bull trout, steelhead, and other salmonids and providing improved in-stream habitat structure and diversity while habitat forming processes recover in both the stream and adjacent riparian areas.

Benefit: restore passage to 4.1 miles of chinook habitat; increased pool quantity, spawning gravel availability, backwater habitat, cover availability, channel stability (i.e. less redd scour, channel shifting, improved riparian retention) in 0.9 miles of early chinook tributary habitat.

Cost: Estimated 3 year project cost \$2,096,385

### **Lower North Fork Reach Stable Side Channel Restoration**

Objective: wood placement to improve channel stability, promote and protect forested island formation, and protect side channels for early Chinook spawning

This suite of projects seeks to protect and restore stable, off-channel spawning and rearing habitat to improve egg-to-emergence and juvenile rearing survival. The project concepts have been developed through an ecological assessment of the lower North Fork (Nooksack Tribe, in progress) that identifies lack of wood and loss of forested islands, in addition to higher and more frequent peak flows, as the most important factors in the channel instability that has been observed there. Preliminary strategies proposed include:

- (1) Install stable logs and log structures at the upstream extents and lateral margins of existing or incipient channel islands, to encourage island growth, maturity, and stability. Design structures to collect and trap additional wood;
- (2) Fortify entrances to back channels with stable wood structures that scour a narrow flow aperture, ensuring low-flow inundation but preventing major avulsion into the off-channel habitat;
- (3) Construct new or augment existing wood accumulations to promote formation of new forested channel islands by encouraging fine sediment deposition and tree seedling establishment and growth to maturity;

- (4) Add wood structures to braids and younger back channels to provide instream cover and promote habitat diversity.

Preliminary project concepts, costs, and phasing have been proposed. Projects are contingent on landowner willingness to proceed. Phase 1 (Lone Tree) is scheduled for construction in 2008. Cost estimates for subsequent phases vary by site and treatment and are likely to change as site plans develop. Additional potential locations and costs estimates include: (1)

Wildcat/MacDonald Slough, \$300,000; (2) Warnick Reach, \$800,000; (3) Hatchery Reach Island Enhancement, \$1,200,000; (4) The Glen, \$1,500,000; (5) Maple Creek Mainstem, \$450,000; and (6) Kenny Slough, \$50,000.

Benefit: increased stability, low flow connectivity of side channels; increased key habitat quantity (complex edge, backwater habitat) in side channels

Costs: Estimated unmet funding needs from 2008-2010 is \$640,000.

### **Lower North Fork Reach Tributary Restoration**

Objective: improve habitat conditions in lower tributary reaches and at mainstem-tributary junctions

This suite of projects seeks to restore tributary spawning and rearing habitats that can provide refugia from mainstem floods by: (1) placing logjams on mainstem floodplains to encourage side channel development in association with tributary junctions; (2) placing wood in tributary reaches to improve habitat complexity and diversity; and (3) restoring historic channel configuration in reaches that have been straightened and simplified. Preliminary concepts and costs have been developed for three sites: (1) Boulder Creek confluence, \$190,000; (2) Gallop Creek, \$200,000; (3) Bell Creek/Spruce Roost, \$95,000.

Costs: Estimated 3 year project cost estimate \$485,000.

### **Lower North Fork Floodplain Riparian Restoration**

Objective: Increase wood recruitment potential to improve channel stability and habitat diversity in the lower North Fork floodplain and increase shading to moderate temperatures in side channels

This project involves riparian planting in unforested or understocked areas in and within 260 feet of the North Fork floodplain in this reach. Rough preliminary estimate of \$100,000. Project is contingent on willingness of landowners of properties likely to be affected by the project.

Cost: Estimate for 3-year project is \$100,000

### **Lower North Fork Tributary Riparian Restoration**

Objective: Increase wood recruitment potential to improve channel stability and habitat diversity in the lower North Fork floodplain and increase shading to moderate temperatures in side channels

This project involves riparian planting in unforested or understocked areas along tributaries to the lower North Fork. Rough preliminary estimate of \$100,000. Projects contingent on willingness of landowners of properties likely to be affected by the project.

Cost: Estimate for 3-year project is \$100,000

### **North Fork Restoration Acquisitions**

Objective: Acquire properties on the North Fork Nooksack that have been identified as necessary to implement planned priority restoration projects.

This project will purchase fee simple interest in 2-5 properties where fishery biologists and unpublished analysis have identified key habitat restoration project sites. This project address the limiting factors of channel stability, habitat diversity and sediment transport by acquiring key sites and keeping them in conservation status perpetually in order to fully control and restore planned salmon habitat structures. Possible sites include Boulder Creek confluence, Gallop Creek, and additional lands near Bell Creek and Big Spruce Roost/The Glen, Warnick Reach, Hatchery Reach Island Enhancement Kenny Slough and the Lone Tree Island reach. These sites are possible locations of large, instream woody log jams and riparian forest restoration. Acquisition of these sites will provide perpetual and willing landowner support for construction, planting, monitoring and maintenance.

Cost: Estimated cost of the project is \$2,000,000. Preliminary design of acquisition sites is underway with initial consultation with Nooksack Natural Resources and Lummi Natural Resources. Estimated date for completion is 10/2010.

### **Mainstem Nooksack River**

#### **Invasive Weed Control**

Objective: to inventory and control invasive weed infestations to foster recovery of natural riparian plant species and riparian functions in priority chinook recovery areas which are currently limiting.

This project will inventory and control invasive weed infestations that dramatically alter riparian species composition and jeopardize long-term riparian functions such as shading and large woody debris recruitment. The focus is on the Knotweed family in riparian areas of the Nooksack River and its forks. Specific targets include Japanese knotweed (*Polygonum cuspidatum*), Giant (*P. sachalinense*) and Himalayan (*P. polystachyum*). Existing inventories will be completed. Areas along the active channel and isolated populations where knotweed is established and is most likely transported to form new colonies downstream will be prioritized for treatment. Projects are likely to be contingent on landowner willingness.

Benefit: decreased occurrence, rate of spread of knotweed

Cost: Estimated 3 year project cost \$315,000.

#### **Mainstem Reach Assessment and Restoration Planning**

Objective: Develop a comprehensive restoration plan for Mainstem Nooksack River to coordinate with flood management planning

The purpose of this project is to assess limiting habitat conditions (habitat diversity, quantity of key habitat like pools and off-channel habitat) and plan restoration projects in the Mainstem Nooksack River from the upper extent of the estuary to the Forks confluence (RM 36.5).

Objectives include: (1) synthesis of existing information and collection of new data to characterize limiting habitat conditions and habitat-forming processes; (2) identify and prioritize project concepts that address limiting habitat conditions; (3) work with County River and Flood to evaluate project feasibility; and (4) conduct education and outreach to affected landowners.

Similar efforts have been completed and/or are underway for 3 reaches that comprise the anadromous extent of the South Fork Nooksack (RM 0-8, 8-14.3, 14.3-31) and for much of the anadromous extent of the North Fork Nooksack (RM 36.5 – 57). Restoration of lower Nooksack River habitats is expected to benefit early chinook oversummer and overwinter rearing.

Benefit: comprehensive plan for restoration of Mainstem Nooksack that addresses limiting factors for early chinook, including identification of several projects that are feasible under current floodplain management context

Cost: Estimated 3 year project cost \$300,000

### **Integration of Salmon Habitat Reach Assessment & Projects with Flood Management**

Objective: to inventory current habitat conditions and identify habitat restoration and protection needs and priorities in order to reduce conflicts with flood management actions and optimize restoration opportunities.

This project will build on existing geomorphic, hydraulic, and habitat data for key reaches of WRIA 1 where flood management needs are most pressing and where conflicts with restoration objectives are most likely. Existing habitat restoration assessments will be used where available. Reconnaissance level assessments will be prepared in priority reaches, such as between Everson and Deming, pending availability of more detailed reach assessments. Products will be prepared in consultation with the salmon co-managers and Whatcom County River and Flood.

Benefit: better coordination of restoration and flood management objectives

Cost: \$30,000 for initial reconnaissance phase in Reach 4 (Everson to South Fork confluence).

### **Sande Bar Levee and ‘Clay Bank’**

Objective: to reduce a fine sediment input that degrades water quality (i.e. turbidity) in the Nooksack River mainstem and estuary to modify a channel confining structure that alters floodplain connectivity, and to improve in-stream habitat complexity.

The project scope is to analyze alternatives and risks, prepare feasibility designs and costs, prepare final design, implement, and monitor a project(s) to reduce or eliminate toe erosion at the ‘Clay Bank’ in the mainstem Nooksack River. Failure of the ~200’ tall slope introduces large volumes of fine-grained sediment to the river chronically impairing water and habitat quality. Historic catastrophic slope failures have also temporarily blocked and diverted the river onto the floodplain to the north. A ‘hook’ in the right bank levee directs flow toward the slide, exacerbating slope failure. A combination of instream structures, levee setback, acquisition or

easements on key properties, and design of a controlled overflow path are among the options to be considered to reduce long-term habitat impacts and need for more extensive and confining flood infrastructure. Projects are likely to be contingent on landowner willingness to proceed.

Benefit: improved habitat diversity (wood cover), backwater and complex edge habitat, reduced velocities during flood flows; decreased turbidity, fine sediment downstream of slide

Cost: Estimated 3 year project cost \$2,950,000

### **Piling Jam, 4 Sites**

Objective: Demonstrate an economical and effective method to improve channel roughness, cover and quiet water refuge particularly applicable to the single thread reaches of the main stem of the Nooksack and beneficial to salmonid stocks.

Install log piling arrays (similar to structures installed in early 1900's to protect river banks) to collect and hold wood debris, roughening the channel margins, creating fish cover and backwater habitat. Targeted species and life stage include both adult and juvenile stages of all salmonid species of the Nooksack River but in particular those species with extended freshwater adult holding and juvenile rearing stages. Projects are likely to be contingent on landowner willingness to proceed.

Benefit: increased cover and backwater habitat along 400-1200 feet of mainstem edge habitat

Cost: Estimated 3 year project cost \$100,000

## **Estuary and Adjacent Waters**

### **Modeling of Currents in Bellingham Bay**

Objective: Configure COHERENS hydrodynamic software to model physical processes in Bellingham Bay under different conditions of tide, creek and river discharge and wind, and collect data allowing calibration and validation of the computer model to provide a basis for identifying potential estuarine habitat limiting factors.

There has been much speculation on the nature of the currents in Bellingham Bay that may be a factor in the distribution of salmonids migrating from the Nooksack River through the passages to the open ocean. The COHERENS model will allow provide knowledge and information about water circulation, stratification, and distribution under typical, unusual and hypothetical conditions. This information will facilitate the sampling of chinook in the estuarine area of the Nooksack River to identify potential limiting factors associated with near shore and upland anthropogenic influences.

Benefit: increased understanding of current patterns that may affect juvenile chinook distribution in Bellingham Bay

Costs: Estimated 3 year project cost \$216,000

### **Chinook Habitat Use Assessment in Bellingham Bay and Adjacent Areas**

Objective: To identify habitat factors associated with the distribution and abundance of early Chinook in the areas adjacent to the mouths of the Nooksack River and identify anthropogenic impacts on ecosystem processes that may affect the productivity of the early Chinook runs to the Nooksack river.

Building on information generated from beach seine and open water salmonid surveys, implement a two year program to identify the habitats most frequented by Chinook leaving the Nooksack river. The project would regularly sample on shore and off shore habitats from Chuckanut Bay to Point Whitehorn, estimate the origin of hatchery and natural Chinook encountered and characterize the habitats sampled. The programs would provide a test of current hypotheses concerning the importance of near shore habitats on chinook use and abundance. The three year program will involve two years of sampling and sufficient time for analysis of results and communication of the results.

Benefits: increased understanding of distribution and abundance of chinook in Bellingham Bay and adjacent areas

Costs: Estimated 3 year project cost \$250,000

### **Complete WRIA 1 Nearshore Habitat Prioritization with Salmon Overlay**

Objective: To work with other groups, such as the Marine Resources Committee, to integrate the results of existing nearshore restoration plans and project lists into order to identify data gaps, to provide a way to prioritize projects across a range of nearshore habitat areas, and to design project priorities with respect to salmon recovery.

The goal of this project is to better integrate ecological restoration projects in both the freshwater and marine environments of WRIA 1 and across multiple programs with potentially differing objectives. The project will entail the review of existing nearshore restoration planning documents, proposed projects, and criteria for project prioritization. This information will be used to develop criteria (salmon overlay) to be used to identify and prioritize those projects which have a distinct salmon recovery benefit within the context of a larger nearshore ecosystem function.

Benefit: A strategy to better help plan and collaborate on projects within the nearshore will be generated and will allow for prioritization within nearshore projects and to help gauge the relative benefit with respect to freshwater salmon recovery projects.

Cost: \$75,000

### **Smuggler's Slough Acquisition and Reconnection**

Objective: Restore access to historic estuarine habitat, improve water quality, restore tidal and saltwater influence to evaluate improved utilization and productivity of chinook.

The goal of this project is to reconnect Smuggler's Slough to the Nooksack River and Lummi Bay. The project includes acquisition and restoration of wetland areas adjacent to the channel that will likely be affected by reconnecting the slough. The reconnection will include removal or

alteration of tide gates at multiple locations in the estuary, as well as improving channel connectivity under roads and in ditches. The project will also remove portions of the Lummi Bay seawall to allow tidal inundation and salt marsh habitat in the area between the southern distributary channel of the Lummi River and setback levees formed by Kwina and Hillaire Roads. Riparian planting of the channels will follow design. Fresh water wetlands restoration will be accomplished in later project phases. It is estimated that the initial project will cost \$2,100,000 over four years with the first phase of property acquisition and design to take place in 2007 at a cost of \$300,000. The planning of the project will require landowner participation in setting project objectives and allowable scope of work.

Benefit: 250 acres of wetland acquired and 500 acres of flood plain wetland restored, restored passage to 6-8 miles of tidal slough and Lummi Bay

Cost: 3-year project cost estimate is \$3,000,000

### **Squalicum Creek Estuary Restoration**

Objective: Restore estuarine marsh and intertidal mudflat in the Squalicum Creek delta.

Project elements include: (1) Removal of a derelict pier and associated creosote pilings, as well as over 200 additional creosote pilings; (2) restore 0.4 acres of estuarine fringe marsh; (3) restore 0.4 acres of riparian buffer; and (4) use clean dredge spoils to increase the area of shallow water intertidal habitat. Such habitat restoration is expected to benefit Nooksack early chinook fry and parr migrant life stages by restoring rearing habitat for physiological transition and feeding and refuge in a nonnatal estuary within 5 miles of the Nooksack River delta. Funding is needed for estuarine and riparian buffer restoration; removal of derelict structure and pilings will likely occur as mitigation for redevelopment in the area.

Benefit: restore 0.4 acres of estuarine fringe marsh, 0.4 acres riparian, increased shallow intertidal area associated with Squalicum Creek estuary

Cost: Estimated 3 year project cost \$875,000

### **Chuckanut Village Marsh Restoration**

Objective: Perform the preliminary design and permitting necessary to result in the restoration of the Chuckanut Village Marsh.

Tasks for this project include conducting a wetland assessment, developing a culvert removal memorandum, and completing submittal-ready permit applications. The wetland assessment will first be performed to characterize the wetland, determine the type and category, and evaluate functions. Information gathered from this task will inform the remaining two tasks of culvert removal memorandum and permit applications.

Benefit: The restoration opportunities at this site include enhancing the hydrologic connectivity and the tidal prism of the backshore wetland and recovering lost backshore habitat.

Cost: \$20,000 for preliminary design work with implementation funding needs to be identified.

## **Lower Nooksack Tributaries**

### **Instream Flow Enhancement Project(s)**

Strategies for achieving an adequate water supply for varied uses are part of the instream flow negotiations described in the Overview document. The strategy for meeting all water demands includes defining and installing facilities intended to augment instream flows at critical low flow periods. Identified projects include:

- Bertrand Creek wetlands enhancement to increase water storage and infiltration to increase discharge to and augmentation of baseflow to Bertrand Creek. Additional projects will be identified that are intended to support the specific water demand needs, instream flow needs and hydrology of the subject watershed as the negotiations proceed. Estimated 3-year cost: \$55,000

Benefit: increased instream flow in Bertrand Creek

Cost: Estimated 3 year combined project cost \$55,000

### **Main Stem Nooksack- Fish Trap Creek**

- Relocate Double Ditch and Benson watercourses between Main and Badger to new corridor to improve habitat and reduce flooding associated with these streams. Project involves purchasing a 5,000' by 200' foot easement between the Benson and Double Ditch Roads, constructing a new channel and restoring the riparian corridor. Estimated three year cost \$1,000,000 which includes the purchase of a 22 acre easement and construction of channel.
- Improve stream crossing on Fish Trap and Double Ditch Creeks. Project involves replacing two undersized crossing, one on Fish Trap at main and a second on Double ditch at 17<sup>th</sup> Street to improve fish passage and flow conveyance. The Double Ditch project will be constructed in the summer of 2007 while design and engineering work of the Fish Trap project will begin in 2008 with construction planned for 2010. Total three year cost is estimated to be \$2,000,000.
- Improve habitat, storage, and drainage along the Border to Badger reach of Fish Trap Creek. Project involves completing hydrologic analysis of channel, design and engineering, in channel work and riparian restoration along a three mile reach of the creek to improve fish habitat and drainage. Total three year cost \$850,000 of which \$300,000 is in hand.
- Establish Instream flows for the Fish Trap basin. It is envisioned the Fish Trap basin will be the site of the next pilot in stream flow effort given the basin shares many of the same issues with the Bertrand. Work is underway to form a watershed improvement district to effectively deal with instream flow, flood and drainage issues. No estimate has been made for the three year cost...
- Levee set back along lower Fish Trap Creek. Project involves setting an existing levee back along 2 miles of lower Fish Trap Creek. Project actions include acquiring approximately a 40 acre easement to provide the footprint to accommodate a 200 foot levee setback along the two mile reach of Fish Trap Creek, design and engineering,

relocation of the levee, and in channel habitat improvement. Costs during the three year period are estimated to be \$300,000 for acquisition and engineering.

### **Schneider, Whiskey, Cougar, Creeks Ditch Flood Gate Improvements**

Objective: Improve fish access to 20an estimated 10 miles,000 feet of flood plain tributary channel, associated wetlands, and ponds.

Modify existing flood gates to improve flow connectivity and fish passage between river and floodplain habitats on the Schneider, Whiskey, and Cougar Creek systems. . The proposed action is to complete an assessment of options, design and engineering, and construct preferred option. The targeted species and life stage are juvenile chinook expected to use the transition flood plain habitats between the Nooksack River and Schneider Ditch; adult and juvenile coho, steelhead, and cutthroat expected to use the entire Schneider ditch drainage. An added benefit to this project is the community outreach and good will that can be gained. Projects are likely to be contingent on landowner willingness to proceed.

Benefit: restored passage to floodplain habitats through range of flows

Cost: Estimated 3 year project cost \$150,000

### **Other Geographic Areas and Programs**

#### **Update Small Cities SMP/CAO**

Note: The spreadsheet that accompanies this program description document includes a separate entry for the Sumas plan update due to the different priority tier assigned for efforts in this watershed. The project description below and estimated 3-year cost is inclusive of all planning updates.

The Whatcom County and City of Bellingham Critical Areas Ordinances were adopted in 2005, and the Whatcom County and Bellingham Shoreline Master Program updates are scheduled for completion/adoption by the end of 2006. Salmon recovery staff are participating on the Technical Advisory Committee for both updates to ensure salmonid habitat is protected to the maximum extent possible. Small cities are in the progress of updating their CAO and SMPs. The updated Whatcom County CAO and SMP are expected to serve as models for those updates. The following updates (with associated funding needs) are planned for the 3-year time frame:

- Update Ferndale SMP (90% complete, 6-9 months of work remaining, need additional \$30,000) Category Memo Overview: 6a
- Update Lynden SMP (scheduled for 2008, need \$60,000) Category Memo Overview: 6a
- Update Blaine CAO (may occur in 2008, need \$18,000) Category Memo Overview: 6a, 4f
- Update Blaine SMP (in progress, need \$15,000) Category Memo Overview: 6a, 4f
- Update Everson SMP (planned, estimated need \$60,000) Category Memo Overview: 6a
- Update Nooksack SMP (planned, estimated need \$60,000) Category Memo Overview: 6a
- Update Sumas SMP (planned, estimated need \$60,000) Category Memo Overview: 6a

Benefit: no net loss of ecological function in city jurisdictional areas

Costs: Estimated 3 year project cost for all planning efforts \$303,000

### **Restoration Plan and Watershed Management Plan Implementation**

Objective: Provide the resources required to provide broader community involvement and institutional support in the implementation of the Salmonid Recovery Plan and WRIA 1 Watershed Management Plan to facilitate achievement of the plans' objectives in the most effective manner.

WDFW currently provides minimum support for Lead Entity functions, primarily salmon recovery grant process with minimal salmon habitat project development through a grant of approximately \$65,000 per year. Additional resources are required to more fully support project list development and to achieve community vesting of the WRIA 1 Salmonid Recovery Plan and the specific actions proposed that affect agriculture, forestry and flood hazard management. This community vesting is essential for the successful implementation of the restoration of habitat forming and maintaining processes. Additional resources are also required to coordinate and support the progress on all 8 early action items set out in the WRIA 1 Salmonid Recovery Plan as well as providing the necessary institutional support for the reporting on plan implementation. The additional resources would allow the Lead Entity to ensure that the needs for salmonid recovery WRIA 1 are not overlooked in the state-wide and regional support for salmonid recovery.

Institutional support for the WRIA 1 Watershed Management Plan is also needed to ensure coordination and implementation of the salmon-recovery and protection actions. In particular, continued support for negotiation and legal mediation of the pilot projects is needed in 2007.

Benefit: local participation in regional, state salmon recovery forums; timely progress on implementation, all H-integration of WRIA 1 Salmon Recovery Plan

Costs: Estimated 3 year project cost \$645,000

### **WRIA 1 Implementation of Instream Flow Negotiations**

Note: The spreadsheet that accompanies this project description document includes two entries for the Instream Flow Negotiations due to the different priority tiers assigned to Bertrand and Middle Fork. The project description below and estimated 3-year cost is inclusive of both drainages.

Negotiations between affected parties, water rights holders, local governments, tribal governments, and the Washington Departments of Ecology and Fish and Wildlife are underway as part of the WRIA 1 Watershed Management Project. The objective of the negotiations in two pilot areas is to determine a management system for water use that supports both instream ecological functions and out-of-stream uses such as agricultural production municipal water supply, and commercial and industrial uses. Bertrand Creek and the Middle Fork Nooksack River are two sub-watersheds of the twenty-two that were defined for WRIA 1. These two pilot negotiations are scheduled to produce draft agreements for each watershed by late 2006 and will establish a template for negotiation in subsequent watersheds including those with a priority due to utilization by ESA listed early chinook salmon. Successful participation by affected parties

and negotiation of revisions to agreement in 2007 will lead to formal adoption of an agreed flow and management regime for each pilot area via appropriate state and federal procedures. A key element of the pilots and for future negotiations is the use of a skilled mediator that can facilitate reaching agreements acceptable to all the parties and that are in compliance with Indian water law, federal law and state water law.

Benefit: instream flows, flow management regime established for Middle Fork, Bertrand Creek; negotiations for other watersheds initiated

Cost: Estimated 3 year project cost \$1,725,000.

### **Habitat Monitoring to Support Adaptive Management**

This program will collect the data in Nooksack early chinook habitats required to (1) evaluate the effectiveness of voluntary habitat projects and regulatory habitat protection programs (Forest and Fish, Northwest Forest Plan, Shoreline Master Programs, Critical Areas ordinances) to the reduction of chinook habitat limiting factors, and (2) quantify the linkages among watershed processes, land use, habitat, and salmonid population response, in conjunction with information from other watersheds. The adaptive management program will be developed by late 2006 and will specify what habitat and watershed attributes will be monitored. Limited habitat data has been collected in recent years through reach assessments and project-associated monitoring, but funding is needed to build a rigorous habitat monitoring program. Adaptive management is critical to ensuring recovery strategies will be effective over the long term at restoring abundance, productivity, spatial structure and diversity of Nooksack early chinook

Benefit: development and beginning implementation of habitat component of adaptive management plan

Costs: Estimated 3 year cost \$300,000

### **Expand Monitoring and Stock Identification of Nooksack Chinook Population**

- Increased spawn survey frequency will to improve estimates of population abundances for both early chinook populations by increasing survey frequency throughout the distribution area to record live and dead adults, redds, and to collect the essential biological data including sex, fork length, coded wire tags, scales, otoliths, look for mass marks, and opercle punches (indicating hatchery turnbacks), and tissue samples. Present survey efforts are good, but inadequate to effectively cover all areas at the desired frequency, and to recovery carcasses and coded wire tags throughout the entire distribution area.
- Increase smolt trap sampling rates at the mainstem and South Fork smolt traps, to improve outmigration estimates, and by taking and analyzing DNA from non-hatchery chinook, estimate proportions attributable to the two populations and fall chinook at both traps. Smolt trap operation requires two person crews.
- Starting with the 2004 brood, the fall chinook at Samish Hatchery were otolith marked with unique marks for the groups destined for release on station in the Samish, in Lummi Bay, and in the lower Nooksack River. Beginning in 2007 we will have the first returns (3 year olds), and will need additional funding to consistently spawn survey the habitat, with emphasis on the South Fork, and to analyze the otoliths that are recovered.

Benefit: improve accuracy of early chinook escapement (including natural-origin recruits) and juvenile production estimates

Costs: Estimated 3 year project cost \$600,000

### **Fish Passage Barrier Removal Program**

Objective: to remove artificial barriers to fish passage and restore connections to historic salmonid habitats to benefit multiple salmonid species

The WRIA 1 drainage structure inventory identified 478 drainage structures that block salmonid access to 227 miles of historic habitat. An additional 423 miles are blocked by the state highway system. Whatcom County currently budgets \$250,000/year to replace barriers under county roads. The purpose of this program is to supplement that program to treat barriers, including those on private lands or in the cities of WRIA 1. Barriers providing the greatest fish benefit if removed are prioritized and will be systematically repaired.

Benefits: Restored passage at 10-15 salmonid habitat barriers per year; ~60 miles of access to historic habitats restored.

Costs: Estimated 3 year program cost \$750,000

### **Bay Road Culvert Replacement (California Creek)**

Objective: To replace a culvert under Bay Road on a tributary to California Creek to improve passage for coho salmon and sea-run cutthroat trout.

Benefits: Full fish passage will be restored to historically accessible habitats.

Costs: To be determined. Deep fill requires additional design being completed in-house by the county while funding sources are being researched.

### **Goodwin Road Culvert Replacement (Dale Creek)**

Objective: To restore access to historically utilized fish habitat in Dale Creek, a tributary to the Sumas River.

Benefits: Full fish passage will be restored to historically accessible habitats.

Costs: To be determined.

### **Riparian restoration program support: project match, conservations easements**

Objective: to restore riparian functions such as shade, future large woody debris recruitment, nutrient inputs, and bank cohesion in mainstem and tributaries of WRIA 1.

Programmatic funding for riparian restoration will provide the mechanism to continue and enhance on-going riparian restoration efforts throughout WRIA 1. Funding would be used to provide match or direct project funding to restore riparian areas or obtain conservation easements for existing or proposed riparian restoration in areas with salmonid use. WRIA 1 recovery plan species priorities would be applied.

Benefits: restore 55 acres of riparian habitat along WRIA 1 salmonid streams annually

Cost: Estimated 3 year program cost \$750,000

### **Monitor and Establish DNA baselines for Nooksack Bull Trout Populations**

- Establish Nooksack bull trout spawn survey index reaches that are consistently surveyed through the spawning period in each fork to establish trends to be established over time. The North Fork should have multiple indexes, while the Middle and South Forks may need fewer.
- Conduct snorkel surveys in bull trout streams, including Hutchinson Creek with established brook trout populations to determine current brook trout distribution limits, to later determine whether distributions are still expanding.
- Collect tissue samples from within bull trout local population areas and run micro-satellite DNA to establish baselines, and test assumptions with core local population areas. Collect and run tissues from bull trout passed upstream at the South Fork weir.

Benefit: established bull trout index reaches; improved knowledge of brook trout distribution; established DNA baseline for Nooksack bull trout

Cost: Estimated 3 year program cost \$300,000

### **Steelhead Spawn surveys and DNA Analysis**

Collect tissue samples and run DNA from native summer run steelhead collected and passed upstream at the South Fork weir. Increase spawning ground surveys to a minimum establish trends, and optimally to develop escapement estimates for winter steelhead.

Benefit: improved escapement estimate, baseline for summer steelhead

Cost: Estimated 3 year program cost \$450,000

### **Coho Spawn Surveys**

Develop an improved coho escapement methodology and implement resulting increased spawn survey coverage to improve understanding of natural and hatchery origin returns, and to refine our understanding of the geographic extent of what appear to be native Nooksack coho.

Benefit: improved accuracy of coho escapement estimate, improved understanding of coho distribution

Cost: Estimated 3 year program cost is \$120,000

## 2008 WRIA 1 Salmon Recovery Program Work Plan

The 2008 WRIA 1 Salmon Recovery Work Plan serves to identify project and program activities that partners involved in salmon recovery plan to undertake in 2008. The types of projects and programs are varied and include but are not limited to habitat restoration, riparian restoration, acquisition of high priority areas, coordination with other WRIA 1 programs that have salmon recovery elements, monitoring for project effectiveness, and WRIA 1 Salmon Recovery Program implementation. This document is intended as a tool to update the WRIA 1 Salmon Recovery Board and its associated committees on progress of salmon recovery implementation including identifying activities and projects that the WRIA 1 Board entities and other salmon recovery partners are undertaking that help further WRIA 1 Salmon Recovery Plan goals and key actions. It is a living document that will continue to be refined in terms of format and identifying measurable objectives.

### PROJECTS

#### PJ1- Habitat Projects

Primary Action	Project	Geographic Area	2008 Milestones	Task Lead	Comments/Needs	ESD	ECD	Status	Q1 Status
<b>PJ1.1</b> Large scale wood placement and riparian restoration in Upper South Fork	PJ1.1.1 Skookum Reach Restoration	Upper SF	1. Instream habitat project to setback ½-mile of road and install two ELJs and plant 10 acres riparian.	LNR	<ul style="list-style-type: none"> <li>▪ Design and additional funding in 2008</li> </ul>			Design contract advertised in January	
	PJ1.1.2 Fobes Creek Project	Upper SF	1. Instream habitat project to stabilize and protect side channel temperature refuge habitat	LNR	<ul style="list-style-type: none"> <li>▪ Preliminary design and funding acquisition</li> </ul>			Proposed for SRFB '08 funding	
<b>PJ1.2</b> Place wood to form pools, provide cover, and create cool water refugia	PJ1.2.1 Nessett's Reach	Lower SF	1. Instream habitat project to stabilize and augment 10 existing jams	LNR	<ul style="list-style-type: none"> <li>▪ Construction slated for July 2008</li> </ul>			In process for 2008 construction	
	PJ1.2.2 Todd Cr Reach ELJ	Lower SF	1. Complete geomorphic/ hydraulic analysis and engineering designs. 2. Obtain permits. 3. Construct ELJ's. 4. Replant cleared areas.	NNR	<ul style="list-style-type: none"> <li>▪ Preliminary (permit set) designs in hand 1/08.</li> </ul>	12/07 1/08 7/1/08 10/31/08	8/1/08 7/1/08 8/31/08 12/1/08		
	PJ1.2.3 Van Zandt Reach ELJ	Lower SF	1. Contract for design work. 2. Develop engineering designs.	NNR	<ul style="list-style-type: none"> <li>▪ SRFB application funded 12/07.</li> </ul>	4/1/08 10/1/08	4/30/08 7/1/09		
	PJ1.2.4 Acme Early Chinook Restoration	Lower SF	1. Finalize Acme Early Chinook designs 2. Obtain local, state, & federal permits	WCPW	<ul style="list-style-type: none"> <li>▪ Project funding from RCO Grant Project #07-1790R, Nooksack Tribe EPA grant, and County match.</li> <li>▪ Construction summer 2008</li> </ul>	01/08	05/09	Design report being finalized; Permits in process	

Primary Action	Project	Geographic Area	2008 Milestones	Task Lead	Comments/Needs	ESD	ECD	Status	Q1 Status
			3. Obtain landowner easements 4. Construct log jam & bank stabilization project 5. Replant Site 6. Scope potential subsequent projects in project reach		<ul style="list-style-type: none"> <li>Planting fall '08 – spring '09</li> </ul>				
<b>PJ1.3</b> Place wood at upstream ends, lateral margins of channel islands to encourage side channel and floodplain island stability	PJ1.3.1 Lone Tree Side Channel	Lower NF (US of Boulder Cr)	1. Contract for design work 2. Complete geomorphic/hydraulic analysis and engineering designs. 3. Construct wood jams. 4. Replant cleared areas.	NNR	<ul style="list-style-type: none"> <li>SRFB application funded 12/07.</li> <li>Design work in process.</li> </ul>	11/07 1/1/08  7/1/08 10/31/08	1/1/08 8/1/07  8/31/08 12/1/08		
	PJ1.3.2 4 Mile Flats	Upper NF	1. Additional 2-5 engineered wood structures to collect wood	USFS	<ul style="list-style-type: none"> <li>This project is planned for the 2008-2009 timeframe.</li> </ul>				
	PJ1.3.3 Middle Fork Side Channel	Middle Fork	1. Obtain permits, place key LWD at head of channel to reduce total channel avulsion and maintain split flow.	NSEA	<ul style="list-style-type: none"> <li>Wood secured.</li> <li>Location is MF Nooksack River near ML RD crossing.</li> </ul>				
<b>PJ1.4</b> Riparian restoration along South Fork, important tribs for shading	PJ1.4.1 Upper South Fork Riparian	Upper SF	1. Identify sites and prescriptions 2. Complete 55 acres of planting and thinning	NNR		9/1/07 10/1/07	4/30/08 4/30/08	Identification of sites and prescriptions in process.	
	PJ1.4.2 Todd Cr Riparian Restoration	Lower SF	1. Plant unvegetated riparian buffer along South Fork at Nooksack Tribe's Tenaska property.	NNR	<ul style="list-style-type: none"> <li>Expands riparian restoration work completed to date.</li> </ul>	10/1/08	12/31/08		
<b>PJ1.5</b> Implement riparian restoration through CREP, voluntary stewardship, WCPW DID, and community-based programs.	PJ1.5.1 Conservation Reserve Enhancement Program (CREP)	WRIA 1	1. Plant and maintain approximately 20,000 linear feet of stream bank at a 20-30 sites.	NSEA; WCD	<ul style="list-style-type: none"> <li>Funding available, need to recruit willing landowners. Seek additional funding for instream work and water quality BMPs when appropriate.</li> </ul>				
	PJ1.5.2 Special District Riparian Re-establishment	WRIA 1	1. Plant and maintain approximately 26,000 linear feet of stream bank.	WCD; WCPW	<ul style="list-style-type: none"> <li>Funding available, need to recruit willing landowners.</li> </ul>				

**PJ2- Passage Projects**

Primary Action	Project	Geographic Area	2008 Milestones	Task Lead	Comments/Needs	ESD	ECD	Status	Q1 Status
<b>PJ2.1</b> Restore anadromous fish passage at Middle Fork Diversion Dam	PJ2.1.1 Restore Passage at Middle Fork Diversion Dam	MF	1. Develop and implement funding strategy to restore passage at Middle Fork Diversion Dam 2. Evaluate feasibility/cost of passage restoration options	COB	<ul style="list-style-type: none"> <li>▪ Task is included in 5% Lead Entity Scope of Work budget as approved by WRIA 1 Salmon Recovery Board.</li> <li>▪ COB in process of evaluating costs, finalizing design for new alternative proposed in 2007.</li> </ul>	01/08			
<b>PJ2.2</b> Restore fish passage and habitat in Canyon Creek.	PJ2.2.1 Canyon Creek	NF	1. Obtain local, state, & federal permits for 520' of levee removal 2. Assist WSDOT in pursuing final design and funding for setback along SR 542 3. Implement removal of 520' of levee 4 Identify funding, develop grant applications for subsequent project phases to be completed in 2009/2010.	WCPW	<ul style="list-style-type: none"> <li>▪ Levee removal (520') funded through RCO project #07-1754R</li> <li>▪ WSDOT agreement on design; funding to accomplish setback construction</li> <li>▪ Construction may occur in 2008 or 2009.</li> <li>▪ Need to address private land in-holding and restoration priorities to guide more detailed design of future projects</li> </ul>	01/08  01/08  06/08  01/08	06/08  12/08  09/09  08/08	<ul style="list-style-type: none"> <li>▪ Permits in preparation</li> <li>▪ Discussions between WCPW and WSDOT on-going</li> </ul>	<ul style="list-style-type: none"> <li>▪</li> </ul>
<b>PJ2.3</b> Restore fish passage in Forks tributaries for bulltrout, steelhead, other anadromous salmonids.	PJ2.3.1 Deadhorse Creek	NF Tributaries	1. Culvert to bridge replacement on Deadhorse Creek	USFS					
	PJ2.3.2 Canyon Creek	NF Tributaries	1. Culvert to bridge replacement on Canyon Creek	USFS	<ul style="list-style-type: none"> <li>▪ USFS is working with NSEA on the replacement projects</li> </ul>				
	PJ2.3.3 Chain-up Creek	NF Tributaries	1. Culvert to bridge replacement on Mt. Baker Hwy at Chain-up Creek; finish design work and initiate permitting	USFS; WSDOT	<ul style="list-style-type: none"> <li>• Construction scheduled for 2010.</li> </ul>				
	PJ2.3.4 Bruce Creek	NF tributaries	1. Install new culvert to restore fish passage	WSDOT	Construction scheduled for 2008				
	PJ2.3.5 Baptist Creek	NF tributaries	1. Install new culvert to restore fish passage	WSDOT	Construction scheduled for 2008				
	PJ2.3.6 Bell Creek	SF Tributaries	1. Culvert to bridge replacement on Bell Creek	USFS					
<b>PJ2.4</b>	PJ2.4.1	Coastal	1. Culvert replacement on Bay	WCPW	<ul style="list-style-type: none"> <li>▪ Permitting in process</li> </ul>	01/08	09/08	Planned for 2008	

Primary Action	Project	Geographic Area	2008 Milestones	Task Lead	Comments/Needs	ESD	ECD	Status	Q1 Status
Restore fish passage in lower mainstem tributaries and coastal and independent tributaries	California Creek	Coastal	Road- California Creek	WCPW	▪ Construction during '08 fish window	01/08	09/08	Planned for 2008	
	PJ2.4.2 Goodwin Project	Lowland	1. Culvert replacement on Goodwin Road	WCPW	▪ Proposed for summer '08 replacement pending staff and financial resources to implement.	01/08	09/08	Tentatively planned for '08	
	PJ2.4.3 Culvert Replacements	Multiple	1. Miscellaneous culvert replacements	WCPW	▪ Multiple replacements planned based on culvert condition and maintenance needs. Fish passage will be provided where applicable.	01/08	12/08	In planning & permitting phases.	
	PJ2.4.4 Duffner Ditch	Lower Nooksack	1. Install new culver to restore fish passage.	WSDOT	▪ Construction scheduled for 2008				
	PJ2.4.5 Schneider Ditch Floodgate Replacement	Lower Nooksack	1. Replace barrier floodgate with passable structure	WCD/WDFW	▪ PIC funding secured	01/08	12/08	Planning and preliminary design underway	
	PJ2.4.6 Double Ditch 17 <sup>th</sup> Street Culvert	Lower Nooksack	1. Replace barrier culvert on Double Ditch Creek at 17 <sup>th</sup> street	Lynden	▪ Design complete				
	PJ2.4.7 Graham	Lower Nooksack	1. Replace barrier culvert on Anderson Creek	NSEA					
	PJ2.4.8 Zylstra	Lower Nooksack	1. Replace barrier culvert on Bertrand Creek	NSEA					
	PJ2.4.9 Blakely, Fuller, Ploeger, Trueblood	Lower Nooksack	1. Replace four barrier culverts on Dakota Creek	NSEA					
	PJ2.4.10 Catalyst	Lower Nooksack	1. Replace barrier culvert on Landing strip Creek	NSEA					
	PJ2.4.11 Sanders	Lower Nooksack	1. Replace barrier culvert on Squalicum Creek trib	NSEA					
	PJ2.4.12 Assink Rd	Lower Nooksack	1. Replace barrier culvert on Assink and Pangborn Rd	NSEA					

Primary Action	Project	Geographic Area	2008 Milestones	Task Lead	Comments/Needs	ESD	ECD	Status	Q1 Status
<b>PJ2.5</b> Implement hydraulic modifications in the Nooksack Estuary and distributaries.	PJ2.5.1 Smuggler's Slough	Estuary	1. Restore fish passage and tidal hydrology to Smuggler's Slough. 2. Remove remnant rock weir from Kwina Slough.	LNR	<ul style="list-style-type: none"> <li>▪ Inland acquisition and project design phase; construction to begin in 2009</li> <li>▪ Permits pending; construction in summer 2008</li> </ul>			Partially funded Fully funded	

### PJ3- Assessments

Primary Action	Project	Geographic Area	2008 Milestones	Task Lead	Comments/Needs	ESD	ECD	Status	Q1 Status
<b>PJ3.1</b> Finalize restoration assessment work initiated in 2007.	PJ3.1.1 Upper South Fork Assessment	SF	1. Complete local peer review of draft assessment including evaluating comments and finalizing report.	LNR	<ul style="list-style-type: none"> <li>▪ Upper South Fork assessment covers Saxon Bridge to headwaters.</li> </ul>				
<b>PJ3.2</b> Initiate reach-scale assessments	PJ3.2.1 Middle Fork Habitat Assessment	MF	1. Initiate MF habitat assessment 2. Prepare draft MF assessment report including identifying reach-scale actions, projects, and sequencing.	LNR	<ul style="list-style-type: none"> <li>▪ PSAR funding allocated December 2007 to conduct MF habitat assessment.</li> <li>▪ Report prepared under PSAR grant funds.</li> </ul>				
<b>PJ3.3</b> Conduct hydrologic assessment of flow, flood storage and routing, supportive of habitat improvement actions	PJ3.3.1 North Lynden Initiative	Lower Nooksack (N. Lynden)	1. Complete assessment	WCD/ WDFW	<ul style="list-style-type: none"> <li>▪</li> </ul>				

### PJ4- Acquisition

Primary Action	Project	Geographic Area	2008 Milestones	Task Lead	Comments/Needs	ESD	ECD	Status	Q1 Status
<b>PJ4.1</b> Acquire priority, high functioning areas under threat of degradation to protect salmonid habitat and habitat-forming	PJ4.1.1 South Fork Inholding	SF	1. Acquire and restore 80 acres along SF 2. Negotiate PSA; Conduct appraisal and review; Effect purchase; Clean up as	WLT	<ul style="list-style-type: none"> <li>▪ South Fork Inholding is a recently approved (12/2007) SRFB project</li> </ul>	1/08	7/08		

Primary Action	Project	Geographic Area	2008 Milestones	Task Lead	Comments/Needs	ESD	ECD	Status	Q1 Status
processes.	PJ4.1.1 South Fork Inholding	SF	necessary	WLT	▪ South Fork Inholding is a recently approved (12/2007) SRFB project	1/08	7/08		
	PJ4.1.2 Corey Slough Acquisition	NF	1. Acquire 30 acres adjacent to Boulder Creek 2. Request amendment to SRFB Project #04-1610A from WRIA 1 SRB; negotiate PSA; effect purchase	WLT	▪ A project amendment will be needed to allocate funds remaining after the Steiner reach acquisition to purchase the Corey Slough property.	1/08	5/08		
	PJ4.1.3	NF	1. Acquire 120 acres in 4 parcels along North Fork 2. Submit 2008 SRFB grant application for combination acquisition and restoration project on 4 parcels	WLT	▪ Develop 2008 SRFB grant application in partnership with Nooksack Natural Resources	3/08	9/08	conceptual	
<b>PJ4.2</b> Acquire priority areas necessary to support priority restoration projects.	PJ4.2.1 Black Slough Acquisition	SF	1. Acquire 20 acres along Black Slough 2. Negotiate PSA ; conduct appraisal and review; effect purchase	WLT	▪ Purchase is planned for use as match for 2009 SRFB grant round acquisition of yet to be identified parcels for restoration and/or protection in Saxon to Confluence reach of SF.	1/08	4/08		
	PJ4.2.2 Skookum Cr/ South Fork Acquisition	SF	1. Acquire 8 acres along Skookum Cr and SF next to Skookum Hatchery 2. Negotiate PSA; complete lot line adjustment; conduct appraisal and review; effect purchase and transfer to Lummi Nation	WLT	▪ A time extension for this SRFB project (00-1128C) was approved by SRFB-RCO in Dec. 2007. ▪ Acquisition of 8 acres along Skookum Creek and South Fork next to Skookum Hatchery	1/08	7/08		
	PJ4.2.3 Skookum Reach Acquisition	SF	1. Acquire 82 acres along South Fork next to Skookum Hatchery as outlined in Upper South Fork Nooksack Habitat Assessment, LNR 2007 2. Submit 2008 SRFB grant application for combination acquisition and restoration project on 3 parcels	WLT	▪ Develop 2008 SRFB grant application in partnership with Lummi Natural Resources	3/08	9/08	conceptual	

Primary Action	Project	Geographic Area	2008 Milestones	Task Lead	Comments/Needs	ESD	ECD	Status	Q1 Status
	PJ4.2.4 Elk Flats	SF	1. Acquire 144 acres along South Fork next to Elk Flats as outlined in Upper South Fork Nooksack Habitat Assessment, LNR 2007 2. Submit 2008 SRFB grant application for combination acquisition and restoration project on 3 parcels	WLT	▪ Develop 2008 SRFB grant application in partnership with Lummi Natural Resources	3/08	9/08	conceptual	
	PJ4.2.5 SF Acme-Confluence Parcels	SF	1. Acquire 256 acres in 4 parcels along lower South Fork as outlined in the South Fork Nooksack River Acme-Confluence Restoration Plan, NNR 2006 2. Submit 2008 SRFB grant application for combination acquisition and restoration project on 4 parcels	WLT	▪ Develop 2008 SRFB grant application in partnership with Nooksack Natural Resources	3/08	9/08	conceptual	
<b>PJ4.3</b> Acquire areas under threat of degradation to protect salmonid habitat and habitat-forming processes.	PJ4.3.1 Relocate Benson and Double Ditch Watercourses	Lower Nooksack	1. Complete design and acquire easement necessary for relocation of Benson and Double Ditch watercourses.	Lynden	▪ Funding				
	PJ4.3.2 Kamm Creek Wetland	Lower Nooksack	1. Acquire 80 acres of spring fed wetland/fish habitat	WLT	▪ Funding				

**PJ5- Nearshore and Estuary**

Primary Action	Project	Geographic Area	2008 Milestones	Task Lead	Comments/Needs	ESD	ECD	Status	Q1 Status
<b>PJ5.1</b> Restore nearshores habitats and processes described in both SRP and SMP Restoration Plans and as updated by the MRC for projects with clear salmon benefit.	PJ5.1.1 Nearshore Prioritization	Nearshore	1. Complete Whatcom County Nearshore Habitat Prioritization – Salmon Overlay	SRBST; MRC; Nrshore Subcomm	<ul style="list-style-type: none"> <li>Ranking methodology report completed in 2007.</li> <li>A salmon “overlay” is needed to help identify salmon priorities within the broader nearshore priorities, to identify areas where restoration provides multiple benefits, and to help filter for those projects that will be competitive for salmon recovery funding sources.</li> </ul>	02/08	08/08	<ul style="list-style-type: none"> <li>MRC evaluating county-wide applications of the methodology.</li> </ul>	
	PJ5.1.2 Coordinate Nearshore/Marine Projects	WRIA 1	1. Establish Nearshore/ Marine Working Group to coordinate nearshore and marine projects implemented by multiple agencies and groups in WRIA 1.  2. Develop a list of priority nearshore and marine projects; successful grant applications	MRC; PSP	<ul style="list-style-type: none"> <li>Expanded SR Staff Team will need to collaborate to help refine nearshore-related salmon recovery project evaluation criteria for use in SRFB project ranking.</li> <li>Request for PSP task support needed.</li> <li>SR Steering Committee designate staff team members to participate.</li> <li>Request for PSP task support needed.</li> </ul>	On-going  09/07	On-going  06/08	Underway	
<b>PJ5.2</b> Restore historical estuarine processes and habitats where possible in non-natal estuaries by removing fill and restoring salt marshes.	PJ5.2.1 Biological Monitoring	Cliffside Beach/ North B’ham Bay	1. Evaluate ecological benefit of removing fine wood debris from Cliffside Beach  2. Conduct biological monitoring	DOE	<ul style="list-style-type: none"> <li>Participating in the Cliffside Beach project are DNR, Puget Sound Partnership, and MRC</li> </ul>	Spring 08	12/08		
<b>PJ5.3</b> Restore wetlands benefiting nearshore areas	PJ5.3.1 Fairhaven Avenue Marsh Restoration Project	Northern Chuckanut Bay	1. Evaluate opportunity for enhancing wetland near Chuckanut Cr through culvert removal and backshore restoration  2. Wetland delineation/ characterization and evaluation of ecological benefits of removing culvert	COB and MRC		03/08	06/08		

Primary Action	Project	Geographic Area	2008 Milestones	Task Lead	Comments/Needs	ESD	ECD	Status	Q1 Status
<b>PJ5.4</b> Prioritize and implement relevant recommendations from the Bellingham Bay Pilot Project	PJ5.4.1 Circulation Model	Bellingham Bay	1. Complete circulation model for Bellingham Bay	COB; POB; DOE; DNR; Lummi; Nooksack	<ul style="list-style-type: none"> <li>Model will simulate currents under varying conditions of wind, tide, and freshwater inflow</li> </ul>				

### **PJ6- Mitigation Projects that Further Actions in the Salmon Recovery Plan**

Primary Action	Project	Geographic Area	2008 Milestones	Task Lead	Comments/Needs	ESD	ECD	Status	Q1 Status
<b>PJ6.1</b> Coordinate and/or Inform Mitigation Projects	PJ6.1.1 Capital Project List Requiring Mitigation	WRIA 1	<ol style="list-style-type: none"> <li>1. Generate a list of major capital projects by multiple agencies requiring mitigation with opportunity to leverage measurable restoration benefit.</li> <li>2. Quarterly check-in to maintain or update the list</li> </ol>	SRBST; SRB <u>Coord</u>	<ul style="list-style-type: none"> <li>Staff Team will need to take the lead to meet with individual agencies to develop list and educate on restoration needs and opportunities</li> <li>Maintain list and inform Staff Team</li> </ul>	02/08  02/08	06/08  On-going	Proposed	

## **PROGRAMS**

### **PG1- Hatcheries/Supplementation**

Primary Action	Project	Geographic Area	2008 Milestones	Task Lead	Comments/Needs	ESD	ECD	Status	Q1 Status
<b>PG1.1</b> Continue the Conservation and Propagation of the North/Middle Fork Chinook Population at WDFW Kendall Creek Hatchery		NF	1. Release 150,000 otolith marked 2008 brood fingerlings from Kendall Creek Hatchery	WDFW		4/15	5/15		
			2. Apply CWTs and Marks to 400,000 Double Index Tagged (DIT) 2007 brood fingerlings and release from the upper North Fork.	WDFW	Continuing discussion of potential alternate release structions	2/1	5/15		
			3. Release 200,000 otolith marked	WDFW		5/1	5/15		

Primary Action	Project	Geographic Area	2008 Milestones	Task Lead	Comments/Needs	ESD	ECD	Status	Q1 Status
			2007 brood fingerlings above the diversion dam in the Middle Fork Nooksack.						
			4. Identify and spawn sufficient males and females from the entire 2008 migration entering the Kendall Creek hatchery to maximize genetic diversity in eggs required to produce 750,000 fingerlings for release in 2009	WDFW	Need to identify and release surplus adults as soon as possible and return them to the river according to	7/1	9/15		
			5. Evaluate the NOR and HOR contributions to the Brood stockWDFW	WDFW					
			6. Rear fingerlings required to produce 750,000 2007 brood fingerlings in 2008 and apply otolith marks to identify release strategy.	WDFW					
			7. Review and update Genetic Broodstock Management Plans (HGMP's) and Goal Sheets for spring Chinook program at Kendall Creek Hatchery	WDFW					
<b>PG1.2</b> Implement SF Early Chinook Rescue Program	PG 1.2.1 Planning, Coordination and Oversight		1. Convene Multi agency, multi-disciplined work group to oversee project progress and evaluate assumptions.	LNR	Formalization of role of ad hoc advisory group. Contributions from all participants	1/1	12/31	Ongoing	
			2. Prepare regular reports and an annual report of Projects results and recommendations	LNR	Significant contributions from all participants	1/1	12/31		
			3. Develop and annually revise ten year plan for rescue of the SF Chinook	LNR	Significant contributions from regional co-managers	1/1	12/31		
			4. Inform funding agencies of the	WDFW	Funds required for infrastructure	1/1	12/31	Funding secured for	

Primary Action	Project	Geographic Area	2008 Milestones	Task Lead	Comments/Needs	ESD	ECD	Status	Q1 Status
			requirements for the successful SF chinook rescue program	Nooksack LNR	upgrades at Kendall and for operations at Manchester			operations through mid 2009	
	PG1.2.2 Update and Create HGMPs to cover Supplementation and Captive Brood Programs	SF	1. Modify Hatchery Genetic Management Plan (HGMP) for Supplementation of South Fork population to provide for collection of all available South Fork Population for spawning at the Lummi Skookum Creek Hatchery and transfer 250 plus eggs of known parentage to a Captive Brood Program, or 500 plus to two programs	LNR	Work has been affected by the dynamic status of the program	1/1	2/29	Most of the drafting is complete.	
		Central Puget Sound	2. Develop a HGMP for a Captive Brood Program of South Fork Chinook at Manchester Research Facility.	NMFS					
		NF	3. Develop a HGMP for a Captive Brood Program of South Fork Chinook at Kendall Creek Hatchery	WDFW					
	PG1.2.3 Implement South Fork Supplementation Program	SF	1. Maximize capture effort in the collection of potential brood stock for the supplementation program through weir operations, nets, and hook and line.	LNR	Difficulties expected given the low forecast of 47 returning adults amongst 138 early chinook expected to enter the South Fork. Significant contributions from partners	3/15	10/10	Planning	
			2. Hold all collected Chinook at Skookum Creek Hatchery until DNA Stock Assignment	LNR		4/1	10/10		
			3. Hold, and spawn SF Brood stock to maintain maximum genetic diversity, and maintain family groups through eyed stage.	LNR	Spawning protocols to be developed by advisory group based on the number of confirmed adults.	4/1	10/10	Cryo-preserved s.perm available from 2007 brood	

Primary Action	Project	Geographic Area	2008 Milestones	Task Lead	Comments/Needs	ESD	ECD	Status	Q1 Status
			4. Transfer eyed eggs identified by family grouping to Kendall for subsequent rearing, tagging and sharing with Manchester	LNR WDFW	One family group currently at Skookum will be transferred to Kendall upon reaching appropriate size	12/1	12/31		
	PG1.2.4 Implement Captive Brood Program	SF	1. Collection of juvenile and yearlings with potential to represent 2006 and 2007 Broods, with nets and traps.	LNR	Relative success in 2007 promises some improvement in accelerating the captive brood program	1/1	12/31		
2. Hold all potential Juveniles at Skookum Creek until DNA SF assignments. 500 SF juveniles for each brood year			LNR		1/1	12/31			
3. Rear SF juveniles at Kendall Creek until yearlings, then transfer ½ to Manchester			WDFW	Transfer to Manchester dependent on funding.	1/1	12/31			
PG1.3 Operation of Terminal area Hatchery Production to not impede Nooksack Early Chinook Recovery	PG1.3.1 Fall Chinook Production	Lummi Bay	1. Rear, Ad clip and release 500,000 otolith marked sub-yearlings in Lummi Bay	LNR		1/1	6/1		
			2. Rear, Ad clip and release 500,000 otolith marked sub-yearlings in Tidal Nooksack	LNR		1/1	6/1		
			3. Collect 2008 Brood stock sufficient to produce 1 million fingerlings	LNR	Continuing improvements to increase attraction	8/1	11/1	Pool structure created to enhance entrance approach	
			4. Spawn, Incubate and otolith mark eyed eggs uniquely for each release strategy	LNR		10/1	12/31		
		Samish River	1. Rear, and Release 4 million 2007 brood sub-yearlings otolith marked according to release strategy,	WDFW		1/1	6/1		
	2. Collect and spawn 2008 brood stock sufficient to meet Terminal are Release requirements		WDFW						
	3. Incubate and uniquely otolith		WDFW		11/1	2/31			

Primary Action	Project	Geographic Area	2008 Milestones	Task Lead	Comments/Needs	ESD	ECD	Status	Q1 Status
			marked eyed eggs according to release strategy for 2009 release						
	PG1.3.2 Coho Production	Lummi Bay	1. Rear and release 1,000,000 Ad-clipped 2006 yearlings	LNR		1/1	5/15		
			2. Collect and spawn 2008 brood stock and incubate eyed eggs to provide 2010 release objectives	LNR					
		SF-Skookum Creek	1. Rear and release 1,000,000 Ad-clipped 2006 yearlings						
			2. Rear, ad –clip Lummi Bay and Skookum Creek 2007 brood stock and CWT 50,000 for each release strategy						
			3. Collect and spawn 2008 brood stock and incubate eyed eggs to provide 2010 release objectives	LNR					
		NF Kendall Creek	1. Rear and release 300,000 2006 brood Kendall Creek coho program With DIT groups with minimum potential for adverse impact on chinook fingerlings.	WDFW		1/1	6/1	On site	
			2. Rear and ad clip 2007 brood Kendall Creek coho with and Implement DIT protocols	WDFW		1/1	12/31	On-site	
			3. Collect and spawn 2008 brood stock and incubate eyed eggs to provide 2010 release objectives	WDFW		10/15	12/31		
PG1.4 Hatchery Program Evaluation and Review		PG1.4.1 Review HGMPs		1. Review and update HGMP and Goal Sheets for fall Chinook program at Samish Hatchery	WDFW	Co-Manager Review	1/1	12/31	
			2. Review and update HGMP	WDFW	Co-Manager Review	1/1	12/31		

Primary Action	Project	Geographic Area	2008 Milestones	Task Lead	Comments/Needs	ESD	ECD	Status	Q1 Status
			Plans and Goal Sheets for Coho program at Kendall Hatchery						
			3. Review and update HGMP Plans and Goal Sheets for Steelhead program at Kendall Hatchery	WDFW	Co-Manager Review	1/1	12/31		
			4. Review and update HGMP for Lummi Fall Chinook program	LNR	Co-Manager Review	1/1	12/31		
			5. Review and update HGMP for Lummi coho program	LNR	Co-Manager Review	1/1	12/31		
	PG1.4.2 Hatchery Planning		1. Conduct and analyze results of Terminal Catch, Hatchery and Spawning ground programs to identify hatchery contribution to fisheries and stray rates	LNR NNR WDFW		1/1	12/31		
			2. Evaluate Fall chinook stray rate risk to recovery of SF Chinook	Co-Mgrs		1/1	12/31		
			3. Evaluate EBD and adjust according to harvest requirements and impacts on listed species	Co-Mgrs		1/1	12/31		
			4. Prepare HGMP for regional Chum Programs	Co-Mgrs		1/1	12/31		
			5. Investigate alternate fall chinook lower river release options if stray risk to impeding listed stock recovery.	Co-Mgrs		1/1	12/31		

**PG2- Harvest**

Primary Action	Project	Geographic Area	2008 Milestones	Task Lead	Comments/Needs	ESD	ECD	Status	Q1 Status
<b>PG2.1</b>	PG2.1.1	Eastern North	1. Forecast 2008 Recruit Nooksack	Co-mgr	WDFW responsible for initial NF/MF	1/1/08	3/1/08		

Primary Action	Project	Geographic Area	2008 Milestones	Task Lead	Comments/Needs	ESD	ECD	Status	Q1 Status
When the projected spawning escapement is below the low abundance threshold (LAT) ensure that fishing mortality in the Southern US is below 7% in 4 of 5 years and does not exceed 9%, the minimum fisheries regime (MFR). If projected escapement exceeds the LAT, fisheries mortality will be restricted to the (MFR), unless the total mortality in all fisheries falls below an agreed Recovery Exploitation Rate (RER)	Identify 2008 Ocean recruits	Pacific	Early Chinook Population Abundance	WG	figure. Lummi responsible for initial SF number	1/1/08	3/1/08		
	PG2.1.2 Adjust fishing regimes to meet 4.d limit RMP	Eastern North Pacific	1. Participate in Pacific Fisheries Management Council (PFMC) and North of Falcon (NOF) processes ensuring that estimates of fishing mortality generated by the Fisheries Resource Allocation Model (FRAM) fall below 7%	Co-mgr WG		3/5	4/30	Preliminary estimates under development	
	PG2.1.3 Restrict Terminal Area fisheries	Nooksack River	1. Ceremonial and Subsistence fisheries on Early Chinook stocks have a mortality impact of 20 NORs or less	Lummi/ Nooksack		3/15	7/4	Calculating hatchery / NOR ratios in the Nooksack	
		BB SB Term Area	1. Treaty Terminal Area fisheries delayed to week 31 (WE 8/4)	Lummi/ Nooksack					
		BB SB Term Area	1. Non Treaty Terminal Area fisheries delayed to week 34 (WE 8/25)	WDFW					
<b>PG2.2</b> Reduce Exploitation rates in Canadian and Alaskan Fisheries	Oregon/BC	1. Participate in PSC Southern Panel review of current fisheries and impacts on Nooksack Early Chinook	Lummi	Reductions in Canadian and Alaskan Fisheries will not recover stocks until productivity exceeds. New Models required and improved DNA resolution in Ocean Fisheries.	1/1	4/1	Current disagreement between FRAM and CTC Model X Rates		
		2. Participate in development of PSC Chinook Annex to be implemented in 2009 that will emphasize abundance based management with strategies with consideration for stocks at risk including Nooksack early chinook.	Lummi	Requires reduction in Alaskan and Canadian Abundance Based Fisheries regimes over 99 rates + additional 10%	1/1/07	1/1/09	Current Impasse		
<b>PG2.3</b> Monitor Fisheries Impacts			1. Tabulate or estimate total chinook catches in SUS Fisheries	Co-mgrs	Speedy analysis by WDFW Otolith and Head Labs essential	10/1	12/31		
			2. Sample SUS catch of chinook at	Co-mgr	Co-ordination of WDFW and Tribal	7/1	11/1	Planning	

Primary Action	Project	Geographic Area	2008 Milestones	Task Lead	Comments/Needs	ESD	ECD	Status	Q1 Status
			a minimum rate of 20% for time area strata for all CWT (clipped and unclipped)		Co-manager efforts required				
			3. Sample Ceremonial and Subsistence River Chinook fisheries at 80% plus for Otoliths and CWTs, and estimate the total contribution of each stock by release strategy where possible, and the total number of NORs.	Lummi/ Nooksack	Speedy analysis by WDFW Otolith and Head Labs essential	3/15	11/1	Planning	
			4. Sample Chinook Terminal area fall chinook fisheries for CWTs and Otoliths at a minimum of 20% by time and area strata to estimate total contributions of each catch and release strategy to the catch, with special interest in the river fisheries, and release origin of 2 and 3 year old fall chinook strays.	Co-Mgr WG	Speedy analysis by WDFW Otolith and Head Labs essential	8/1	12/31		
<b>PG2.4</b> Analyze Fisheries Data to see if goals were met			1. Analyze 2008 fisheries and evaluate performance relative to chinook plans	Co-Mgr WG	Dependent on timely data reporting and analysis of CWT's	11/1	12/31		
			2. Review 2008 fisheries harvesting late Chinook, coho and steelhead	Co-Mgr WG	Dependent on timely data reporting and analysis of CWT's	11/1	1/31/09		
<b>PG 2.5</b> Monitor Spawning Populations			1. Estimate 2008 spawning populations by stock, hatchery and wild components, and origin of release strategy.	Co-Mgr WG	Need to evaluate current methodologies to identify improvements to accuracy.	7/15	12/15	Planning	
<b>PG 2.6</b> Preparation of Annual Report			1. Compile annual report of the Terminal Area fisheries planning, implementation and results	Co-Mgr WG	Will require extra effort to compile after many years of neglect.	1/1	1/31	Planning	

**PG3- Planning/Integration**

Primary Action	Project	Geographic Area	2008 Milestones	Task Lead	Comments/Needs	ESD	ECD	Status	Q1 Status
<b>PG3.1</b> Integrate salmon recovery goals into flood management projects	PG3.1.1 Integrate salmon recovery and flood management	WRIA 1	1. Coordinate on-going flood repair and maintenance projects with salmon recovery objectives.	WCPW	<ul style="list-style-type: none"> <li>WCPW will coordinate with salmon co-managers to inform of proposed flood repair and maintenance projects and to identify restoration opportunities.</li> </ul>	01/08	On-going		
			2. Nooksack River hydraulic modeling	WCPW	<ul style="list-style-type: none"> <li>Model is calibrated</li> <li>Model is updated with new data and observations and for specific project design needs.</li> <li>Useful tool for river and salmon project.</li> </ul>	On-going	On-going	Model is complete and in use; refinements as needed for projects	
		Everson to Deming	1. Develop channel migration limits to meet SMA, salmon recovery, and flood hazard management needs.	WCPW	<ul style="list-style-type: none"> <li>WCPW is investigating flood management meander limits in Reach 4 (Everson to Deming).</li> <li>Reach 4 flood efforts to be informed by salmon recovery protection and restoration needs and priorities.</li> <li>Reach 4 may provide useful template for systematically establishing migration limits to meet objectives of this milestone.</li> </ul>	01/08	06/08	Flood elements in draft form; salmon elements to be developed in-house with co-manager review and advice.	
<b>PG3.2</b> Protect existing ecological function throughout WRIA 1.	PG3.2.1 Protection through CAO and SMP	WRIA 1	1. Continue plan to update CAO and SMP process in small cities	Cities	<ul style="list-style-type: none"> <li>Funding is limited</li> <li>Will occur on defined update schedule</li> </ul>	On-going	On-going		
			2. Implement respective CAO and SMP	Local govts	<ul style="list-style-type: none"> <li>Implementation and ability to provide external reporting is limited by staff availability</li> </ul>	On-going	On-going		
<b>PG3.3</b> Restore Instream Flows	PG3.3.1 Bertrand ISF Pilot Project	Bertrand	1. Continue ISF Pilot negotiations for Bertrand watershed 2. Develop and implement monitoring and compliance plans as part of instream flow pilot	Bertrand WID MOA Signatories	<ul style="list-style-type: none"> <li>Process for ISF Action Plan and ISF Pilot Projects is being implemented under the WRIA 1 Watershed Management Project structure/framework.</li> </ul>				

Primary Action	Project	Geographic Area	2008 Milestones	Task Lead	Comments/Needs	ESD	ECD	Status	Q1 Status
	PG3.3.2 Bertrand WID Water Mgmt	Bertrand	1. Implement a groundwater flow augmentation facility	Bertrand WID	▪ Support for permits	1/1/07	9/30/08	In process	
			2. Finalize priority of identified surface storage options	Bertrand WID	▪ Input on fisheries needs	1/1/07	12/31/08	In process	
	PG3.3.3 Middle Fork ISF Pilot Project	MF	1. Continue ISF Pilot negotiations for MF watershed	MF MOA Signatories	▪ Process for ISF Action Plan and ISF Pilot Projects is being implemented under the WRIA 1 Watershed Management Project structure/framework.				
			2. Develop and implement monitoring and compliance plans as part of instream flow pilot						
PG3.3.4 Other ISF Negotiations	TBD	1. Identify sequence for flow recommendations in other basins	ISFWG; Joint Board						
<b>PG3.4</b> Develop and implement tool to guide County water resource investment priorities and funding	PG3.4.1 CWRIP	WRIA 1	1. Complete Phase 2/3 and report – investment evaluations, work program, and funding recommendations 2. Develop water resource work program priorities for 2009/20010 budget consideration 3. Evaluate CWRIP investment and SMP restoration lists for salmon benefit. Coordinate with cooperators to enhance restoration opportunities.	WCPW	▪ First milestone to be completed by June 2008. ▪ Second milestones are dependent on Council approval of final products.	On-going 5/08 6/08	6/30/08 11/08 12/08	Consultant contract to be approved 1/29/08.	

**PG4- Monitoring**

Primary Action	Project	Geographic Area	2008 Milestones	Task Lead	Comments/Needs	ESD	ECD	Status	Q1 Status
<b>PG4.1</b> Continue monitoring project effectiveness		Priority areas	1. Monitor implementation and effectiveness of completed habitat projects described under “Project” element of	Project Sponsors	▪ Project sponsors should be contacted to ascertain commitments to effectiveness monitoring of completed projects.				

Primary Action	Project	Geographic Area	2008 Milestones	Task Lead	Comments/Needs	ESD	ECD	Status	Q1 Status
			this work plan.						
		WRIA-wide	1. Continue project level monitoring for completed flood hazard management projects.	WCPW, Diking Districts	<ul style="list-style-type: none"> <li>Partially funded via project HPA requirements.</li> <li>Integrated monitoring needs to be defined under Monitoring and Adaptive Management Plan and funding is needed to accomplish this task.</li> </ul>	On-going/ various		Pending adopted M&AM plan (PG4.2)	
		Lower SF (Hutchinson Creek)	1. Continue monitoring effectiveness of the Lower Hutch Project completed in 2006	LNR	<ul style="list-style-type: none"> <li>Monitoring not funded</li> </ul>			First year Report published in 2007	
		Upper SF (30 mile Project)	1. Continue monitoring 30-Mile project completed in 2007.	LNR	<ul style="list-style-type: none"> <li>First Year Report to be completed.</li> <li>Monitoring is funded.</li> </ul>			In process	
<b>PG4.2</b> Develop comprehensive salmon recovery monitoring and adaptive management plan.		WRIA-wide	1. Develop Habitat Monitoring Plan 2. Develop Harvest Management Monitoring Plan 3. Develop Hatchery Management Monitoring Plan 4. Develop Adaptive Management Plan	SRBST	<ul style="list-style-type: none"> <li>Documents developed are draft documents that would initiate the salmon recovery process for recommending and approving.</li> <li>Work Plan item requires direction from SC</li> </ul>				
			5. Adopt plans developed under 1-4.	SC; SRB	<ul style="list-style-type: none"> <li>Documents drafted by SRBST are done so under SC review and direction.</li> <li>SRB approval based on recommendation by SC.</li> </ul>				

**PG5- Coordination/Program Implementation**

Primary Action	Project	Geographic Area	2008 Milestones	Task Lead	Comments/Needs	ESD	ECD	Status	Q1 Status
<b>PG5.1</b> Update Salmon Recovery Program Documents	PG5.1.1 Update WRIA 1 3-Year Project List	WRIA 1	1. Solicit project list updates from project sponsors, other salmon recovery partners	SRBST	<ul style="list-style-type: none"> <li>Complementary task to PG5.4.1 and planning for or implementation of should occur concurrently</li> </ul>	02/08	12/08		

Primary Action	Project	Geographic Area	2008 Milestones	Task Lead	Comments/Needs	ESD	ECD	Status	Q1 Status
					<ul style="list-style-type: none"> <li>A project review sub-committee is needed to update recovery plan criteria and to then apply criteria to ensure all projects on 3-year list are appropriate.</li> </ul>				
	PG5.1.2 WRIA 1 Structure & Function Document	WRIA 1	<ol style="list-style-type: none"> <li>Perform annual review of WRIA 1 Structure and Function implementation</li> <li>Recommend modifications if identified.</li> </ol>	SRBST; SRBSC; SRB coord	<ul style="list-style-type: none"> <li>Review will include evaluating stakeholder participation in Salmon Recovery program and identifying recommendations, if any, for additional involvement.</li> </ul>	01/08	10/08	This will be an ongoing process	
<b>PG5.2</b> Coordinate funding opportunities associated with salmon recovery.	PG5.2.1 Technical Review for Salmon Elements	WRIA 1	<ol style="list-style-type: none"> <li>Coordinate technical review of smaller grant projects that benefit salmon in streams for which early chinook is not the primary focus.</li> </ol>	SRB Coord	<ul style="list-style-type: none"> <li>Examples of small grant programs include Community Salmon Fund, Family Forest Fish Passage, Pioneers in Conservation, and Estuary Salmon Restoration Program</li> <li>Opportunity to coordinate with mitigation (PJ6.1)</li> </ul>	04/08	11/08		
<b>PG5.3</b> Participate/Implement Public Information and Education relative to WRIA 1 Salmon Recovery Program	PG5.3.1 Beach Watchers/Watershed Masters	WRIA 1	<ol style="list-style-type: none"> <li>Assist with incorporating current salmon recovery thinking into these community involvement and education programs.</li> </ol>	WSU	<ul style="list-style-type: none"> <li>SR Staff Team &amp; LE Coordinator will need to allocate resources to assist program lead with transfer of information at workshops and courses.</li> </ul>	01/08	12/08	On-going process	
<b>PG5.4</b> Accelerate the “readiness to proceed” condition and completion of high priority chinook recovery projects	PG5.4.1 Project Development	WRIA 1	<ol style="list-style-type: none"> <li>Conduct technical workshop to develop a preferred project sequence for the higher priority recovery projects and to further refine project concepts included in the 3-Year Project List</li> </ol>	SRB Coord; SRBST; SRBSC	<ul style="list-style-type: none"> <li>This is a task in the 5% capacity scope of work.</li> <li>The tasks associated with accelerating the “readiness to proceed” condition and completion of high priority chinook recovery projects will occur through June 30, 2009 under the 5% Capacity SOW; items identified here are planned specifically to occur in 2008.</li> </ul>	02/15/08	3/15/08		
			<ol style="list-style-type: none"> <li>Identify and develop cost estimates for future funding opportunities</li> </ol>			03/15/08	4/15/08		
			<ol style="list-style-type: none"> <li>Provide opportunities for project sponsors to coordinate project activities</li> </ol>			03/15/08	12/08		

Primary Action	Project	Geographic Area	2008 Milestones	Task Lead	Comments/Needs	ESD	ECD	Status	Q1 Status
			4. Identify and implement targeted landowner or community outreach effort to assist project sponsors overcome obstacles to implementing high priority chinook recovery projects.	SRB; SRBST; SRBSC; Project Sponsors	<ul style="list-style-type: none"> <li>▪ This is a task in the 5% capacity scope of work.</li> <li>▪ SRBSC direction prior to initiating task will be needed.</li> <li>▪ Milestone PG6.1.3 may need to be completed prior to initiating task.</li> <li>▪ 5% Capacity SOW grant amendment runs through June 30, 2009.</li> </ul>	03/08	12/08		
<b>PG5.5</b> Salmon Recovery Project Tracking	PG5.5.1 Habitat Work Schedule (HWS) in WRIA 1	WRIA 1	1. Customize HWS for WRIA 1	SRBSC; SRBST; SRB Coord	<ul style="list-style-type: none"> <li>▪ HWS is a deliverable in the WDFW LE support grant</li> </ul>	02/01/08	4/30/08	<ul style="list-style-type: none"> <li>▪ Steering Committee agenda item on Jan 31 for HWS presentation an discussion</li> <li>▪ Task requires policy approval and direction</li> </ul>	
			2. Arrange for and participate in admin training	SRB Coord; SRBST	<ul style="list-style-type: none"> <li>▪ Administration training is required for obtaining password access</li> <li>▪ Project sponsor training is anticipated to be conducted by Interlocking Software</li> </ul>	02/08	02/08		
			3. Administer HWS including monitoring entries and entering projects	SRBSC; SRBST; SRB Coord		3/1/08	12/08		

**PG6- Administration**

Primary Objective	Project	Geographic Area	2008 Milestones	Task Lead	Comments/Needs	ESD	ECD	Status	Q1 Status
<b>PG6.1</b> Support WDFW grant administration requirements	PG6.1.1 LE Deliverables	WRIA 1	1. Prepare and submit four quarterly reports during FY 2007/2008	SRB Coord	<ul style="list-style-type: none"> <li>Task is coordinated through the SRB and its associated Committees</li> <li>Contract administrator for FY 2007-2008 is Lummi Nation and for FY 2008-2009 it is Nooksack Tribe</li> </ul>	01/01/08 04/01/08 07/01/08 10/01/08	01/15/08 04/15/08 07/15/08 10/15/08	<ul style="list-style-type: none"> <li>First and second FY 2007-2008 quarterly reports are delayed due to delays in contract approvals.</li> </ul>	
			2. Attend regional meetings such as LEAG, Watershed Leads, SRFB, PS Partnership	SRB; SRBSC; SRBST; SRB Coord	<ul style="list-style-type: none"> <li>The member(s) of the WRIA 1 Salmon Recovery Process attending meetings is dependent on the nature of the meeting and purpose of attendance (e.g., policy meeting versus gathering information on LE activities and reporting to WRIA 1)</li> <li>SRB Coordinator attendance at regional meetings is for purposes of information gathering and reporting to SRB committees.</li> </ul>	01/08	12/08	Ongoing	
			3. Develop guidelines for 5% capacity SOW subcontracts	SRB; SRBSC SRB Coord	<ul style="list-style-type: none"> <li>Task is a deliverable under the WDFW 5% capacity SOW.</li> </ul>	02/08	03/08		
	PG6.1.2 Annual SRFB grant cycle	WRIA 1	1. Prepare calendar for annual SRFB grant cycle that incorporates the SRFB and WRIA 1 SRB process.	SRB Coord	<ul style="list-style-type: none"> <li>Task is a deliverable under the WDFW LE support grant.</li> <li>The WRIA 1 process for the SRFB grant rounds is developed through the SRB and its associated committees</li> </ul>	02/15/08	3/01/08		
			2. Implement tasks associated with calendar developed in PG6.2.1 including criteria development, site visits, convene CRT, workshops, ranking, WRIA 1 project list approvals submit projects,	SRB; SRBSC; SRBST; SRB Coord	<ul style="list-style-type: none"> <li>Tasks and ESD will be identified in the process of developing the 2008 SRFB calendar.</li> </ul>	03/01/08	09/17/08		

Primary Objective	Project	Geographic Area	2008 Milestones	Task Lead	Comments/Needs	ESD	ECD	Status	Q1 Status
			3. Correspondence/ communication associated with SRFB review process	SRB Coord; SRBST		09/01/08	12/08		
<b>PG6.2</b> Support WRIA 1 Salmon Recovery Program Administration	PG6.2.1 Coordinator Deliverables	WRIA 1	1. Prepare LEC SOW and contract for FY 2007-2008	SRB Coord; SRBST SRBSC		01/08	01/08		
			2. Organize and Prepare Supporting Material for WRIA 1 SRB Meetings	SRB Coord	<ul style="list-style-type: none"> <li>▪ SR Program Structure and Function document identifies 3 SRB meetings per year and as needed.</li> </ul>	01/08	12/08	Ongoing	
			3. Organize and Prepare Supporting Material for WRIA 1 SRBSC meetings	SRB Coord	<ul style="list-style-type: none"> <li>▪ SR Program Structure and Function document identifies SC meetings occurring every other month and as needed.</li> <li>▪ SRBSC has tentatively scheduled meetings monthly through April and every other month through the end of 2008.</li> </ul>	01/08	12/08	Ongoing	
			4. Organize and Prepare Supporting Material for WRIA 1 SRBST meetings	SRB Coord	<ul style="list-style-type: none"> <li>▪ SR Program Structure and Function document identifies Salmon staff team meetings occurring twice a month.</li> </ul>	01/08	12/08	Ongoing	
			5. Identify deliverables for FY 2008/2009 LE Support Grant and Contract Administration	SRB; SRBSC; SRBST	<ul style="list-style-type: none"> <li>▪ Agreement reached 12/19/07 included identifying deliverables for FY contract administration for SC/SRB approvals prior to June 30, 2008</li> </ul>	02/01/08	04/30/08		
			6. Prepare Ecology integration report grant deliverable	SRB Coord; NIT; SRBST			5/15/08		

Primary Objective	Project	Geographic Area	2008 Milestones	Task Lead	Comments/Needs	ESD	ECD	Status	Q1 Status
			7. Develop long-term vision for Salmon Recovery Program implementation including identifying lead entity functions and related work plans, identifying annual benchmarks for a 5-year period, and steps or phases for establishing and/or enhancing consistency for coordinating salmon recovery in WRIA 1.	SRB; SRBSC; SRBST	<ul style="list-style-type: none"> <li>▪ Policy direction needed for initiating task.</li> </ul>	02/15/08	09/08		

Geographic Area	Action	Likely sponsor	Project or program?	Project/program status	Total cost estimate 2008-2010	Funding in Hand		Funding Needed <sup>1</sup>		2008 Chinook Recovery Projects <sup>2</sup>			2008		2009		2010		2011+		Species Benefiting													
						Funding in hand	Source of funding in hand	Total Need	Proposed source of other funds	High	Medium	Low	Year 1 Scope	Year 1 Cost	Year 2 Scope	Year 2 Cost	Year 3 Scope	Year 3 Cost	Future Scope	Future Cost	Likely end date	Limiting Factors	Habitat Type	Activity Type	Capital or Non-capital	Subtype	Primary Species	Secondary Species						
South Fork Nooksack (lower)	Acme-Confluence Reach: Active Channel Logjams (Phase 2: Todd Creek ELJ)	Nooksack Tribe	Project	Active	\$622,500	622,500	SRFB, USFWS							Construction	612,500	Monitoring		10,000							2,6,11, A3, A4, A8	I	5	Capital	Habitat Capital Projects	chinook	all anadromous species			
South Fork Nooksack (lower)	Acme-Confluence Reach: Active Channel Logjams (Phase 3: Van Zandt ELJ)	Nooksack Tribe	Project	Active	\$645,375	645,375	SRFB, USFWS, PCSRF							Project Design and permitting	70,375	Construction		565,000	Monitoring		10,000				2,6,11, A3, A4, A8	I	5	Capital	Habitat Capital Projects	chinook	all anadromous species			
South Fork Nooksack (lower)	Acme-Confluence Reach: Active Channel Logjams (Phase 4)	Nooksack Tribe	Project	Planned	\$700,000	0	SRFB, USFWS, PCSRF	700,000	SRFB, USFWS, PCSRF		X			Project Design & permitting			100,000	Construction		600,000	Monitoring		10,000		2,6,11, A3, A4, A8	I	5	Capital	Habitat Capital Projects	chinook	all anadromous species			
South Fork Nooksack (lower)	Acme-Confluence Reach: Active Channel Logjams (Phase 5)	Nooksack Tribe	Project	Planned	\$100,000	0		100,000	SRFB, USFWS, PCSRF									100,000	Construction		600,000	Monitoring									chinook	all anadromous species		
South Fork Nooksack (lower)	Acme-Confluence Reach HMZ Reconnection	Tribes	Project	Planned	\$417,000	0		417,000	DOE, BIA, USFWS, EPA		X			Work with landowners on project scope.			120,000	Construction (Caron, River Farm sites); Design, permitting, construction (McCarty, Standard sites)		297,000					2,7,A3,A4	I	4	Capital	Habitat Capital Projects	chinook	all anadromous species			
South Fork Nooksack (lower)	Lower South Fork Tributary Riparian Restoration	Tribes; NRCS-WCD; NSEA	Program	Ongoing	\$541,200	0		541,200	CREP/USFWS/DOE		X			Implement Phase 1	180,400	Implement Phase 2		180,400	Implement Phase 3		180,400	Monitor and maintain.			6,13,A3,A8	R	11	Capital	Habitat Capital Projects	chinook	coho, steelhead, cutthroat, bull trout			
South Fork Nooksack (lower)	Lower South Fork HMZ Riparian Restoration	Tribes; NRCS-WCD; NSEA	Program	Ongoing	\$981,200	0		981,200	CREP; USFWS; DOE		X			Implement Phase 1	327,067	Implement Phase 2		327,067	Implement Phase 3		327,067	Monitor and maintain.			6,13,A3,A8	R	11	Capital	Habitat Capital Projects	chinook	coho, steelhead, cutthroat, bull trout			
South Fork Nooksack (lower)	Lower South Fork Wetland Water Storage Improvement	Tribes; NRCS	Project	Planned	\$518,000	0		518,000	DOE; BIA; USFWS; EPA					Implement Phase 1	259,000	Implement Phase 2		259,000	Monitor and maintain.					6, 14, A7, A8	W	7	Capital	Habitat Capital Projects	chinook	all anadromous species				
South Fork Nooksack (lower)	Acme-Saxon Reach Active Channel Logjams (Nesset's Slough)	Tribes	Project	Planned	\$280,000	280,000		0						Project Design and permitting	50,000	Construction		150,000	Monitoring		15,000	monitoring		2012	2, 6, 11,A3, A4,A8	I	5	Capital	Habitat Capital Projects	chinook	all anadromous species			
South Fork Nooksack (lower)	Saxon Reach Restoration	Tribes	Project	Planned	\$830,000	0		830,000			X			Design and Permitting			150,000	Construction and monitoring		680,000			2014	2, 6, 11,A3, A4,A8	I	5	Capital	Habitat Capital Projects	chinook	all anadromous species				
South Fork Nooksack (upper)	Skookum Reach Restoration	LNR	Project	Planning	\$1,250,000	546,167		703,833	SRFB USFWS					Detailed Design	70,000	Construction		1,170,000	Monitoring		10,000	Monitoring		5,000	2012	2, 6, 11, A3, A4, A8	I	5		Future Habitat Project Development	chinook	all anadromous species		
South Fork Nooksack (upper)	Orphan Rd. Project Assessment	Tribes	Project	Pilot Study	\$120,000	0		120,000	City of Seattle USFWS					GIS analysis	20,000	Field assessment & prescriptions		100,000					2008	4,A2	U	12	Non-capital				chinook	all anadromous species		
South Fork Nooksack (upper)	Fobes Creek Island Side Channel Project	LNR	Project	Preliminary Design	\$375,000	0		375,000	USFWS, NMFS, SRFB		X			Funding and Design Feasibility	0	Funding, Design and Permitting		75,000	Construction, Phase 1		300,000	Construction, Monitoring		1,145,000	2015	1,2,6,A3,A4, A8	I	5	Capital	Habitat Capital Projects	chinook	all anadromous species		
South Fork Nooksack (upper)	Cavanaugh Creek Island Project	LNR	Project	Preliminary Design	\$350,000	0		350,000	USFWS, NMFS, SRFB					Funding and Design Feasibility	5,000	Funding, Design and Permitting		50,000	Construction		280,000	Monitoring		15,000	2015	1,2,6,A3,A4, A8	I	5	Capital	Habitat Capital Projects	chinook	all anadromous species		
South Fork Nooksack (upper)	Larson's Floodplain Refuge Project	LNR	Project	Preliminary Design	\$600,000	0		600,000	USFWS, NMFS, SRFB					Funding and Design Feasibility	5,000	Funding, Design and Permitting		5,000	Construction		100,000	Construction		495,000	2016	1,2,6,A3,A4, A8	I	5	Capital	Habitat Capital Projects	chinook	all anadromous species		
South Fork Nooksack (upper)	USFS Road Network Monitoring and Maintenance	USFS	Program	Ongoing	\$90,000	50,000	USFS	40,000						Monitoring and maintenance	30,000	Monitoring and maintenance		30,000	Monitoring and maintenance		30,000	Continue Supplemental until NORs sustainable		170,018 per year	2018	4, A2	U	12	Non-capital			chinook	all anadromous species	
South Fork Nooksack	Years 3 and 4 of Skookum Chinook supplementation project	Lummi; Co-Mgrs	Project	Implementation	\$510,054	170,018	Lummi, WDFW, PSC-SEF	340,036	US DOI, ?					Rear and Release 2006 brood, collect and rear 2007 Brood	170,018	Rear and Release 2007 brood, collect and rear 2008 Brood		170,018	Rear and Release 2009 brood, collect and rear 2009 Brood		170,018	Continue Supplemental until NORs sustainable		170,018 per year	2018	N/A	N/A	N/A	Non-capital	Hatchery	chinook	none		
South Fork Nooksack	Captive Brood program run at WDFW's Kendall Hatchery	Co-managers	Program	Planning and HGMP development	\$1,014,000	0		1,014,000	possibly Legislature					capitol improvements; Rear 250 fry from 2007 brood	957,000	Rear 250 fry from 2007 brood and 250 juveniles from 2007 brood		19,000	Rear 250 fry from 2009 brood and 500 juveniles from 2007 and 2008 broods		38,000			51,000 annually	N/A	N/A	N/A				chinook	none		
South Fork Nooksack	Captive Brood program run at Manchester Research Station	Co-managers	Program	Planning and HGMP development	\$750,000	0		750,000						Rear 250 fry from 2007 brood	250,000	Rear 250 fry from 2008 brood and 250 juveniles from 2007 brood		250,000	Rear 250 fry from 2009 brood and 500 juveniles from 2007 and 2008 broods		250,000			250,000 annually	N/A	N/A	N/A				chinook	none		
South Fork Nooksack	Skookum Cr Hatchery Water Supply	LNR	Project	Preliminary Design for intake, Initial funding	\$700,000	200,000	DOI BUREC	500,000						Complete Design, Permits and land access, locate new well field, rehab old wells negotiate and acquire easement over 300-600 ac of Skookum Cr riparian forest areas	150,000	Construction of new intake and additional wells		550,000							N/A	N/A	N/A	Capital	Hatchery Capital Projects	chinook	none			
South Fork Nooksack	Skookum Cr Riparian Forest Conservation Easement	WLT	Program	Ongoing	\$1,400,000	150,000	cash	1,250,000	SRFB					Identify necessary parameters, field investigation/GIS representation of results, ranking criteria	1,400,000	Identification of suitable locations, measure parameters, availability of land, cost estimates			Engineering design of facility and preparation of permits							13,A3	R	8				chinook	all anadromous species	
South Fork Nooksack	Spawning Channel Feasibility and Design	LNR	Project	Planning	\$250,000	0		250,000							60,000			60,000			130,000				1,2,4,11,15,A 2,A3,A4	I	17	Non-capital	Future Habitat Project Development	chinook	perhaps chum			
South Fork Nooksack (lower)	Lower South Fork Flood/Salmon Coordination (below Hutchinson Creek)	Tribes; WCPW	Project	Planning	\$300,000	0		300,000	Whatcom County Flood					Design and permitting, construction	285,000	Replanting		12,500	Monitoring		2,500	Monitoring		5,000	2010	2,5,A3,A4	I	4, 5	Capital	Habitat Capital Projects	chinook	all anadromous species		
South Fork Nooksack (lower)	Acme Early Chinook Restoration	WCPW	Project	Design/Construction	\$926,400	926,400	EPA; SRFB	0	Whatcom County Flood, SRFB					Permitting/Construction/Planting/Monitoring	840,000	Monitoring		2,500	Monitoring		500	Monitoring		9,500	2018	2,A3	I	5	Capital	Habitat Capital Projects	chinook	all anadromous species		
South Fork Nooksack (lower)	Acme to Confluence Restoration Acquisitions (2-5 parcels key for future restoration)	WLT	Program	Not started	\$2,000,000	300,000	cash	1,700,000	SRFB		X			Negotiate and acquire river front properties for future restoration work	2,000,000										5,A3,A4	I	8				chinook	all anadromous species		
South Fork Nooksack (lower)	Lower South Fork Joint Transportation/Restoration Planning	WCPW; Nooksack	Project	Planned	\$200,000	0		TBD	Whatcom County/BIA/WS DOT/ACOE					Work with landowners and transportation interests on project concepts	5,000	Scope projects, seek funding		25,000	Project Design & permitting		170,000	Construction, monitoring			TBD	2,5,A3,A4	I	17	Non-capital	Future Habitat Project Development	chinook	all anadromous species		
South Fork Nooksack (upper)	Bell Creek Road crossing	USFS	Project	Permitting and design complete	\$95,000	0		95,000	USFS					Construction	95,000									2008	10	I	2	Capital	Habitat Capital Projects	Dolly Varden Trout	cutthroat and rainbows?			
Subtotals-South Fork					\$16,565,729	\$3,890,460		\$12,475,269							\$7,836,360		\$4,380,485		\$3,690,485															

Geographic Area	Action	Likely sponsor	Project or program?	Project/program status	Total cost estimate 2008-2010	Funding in Hand		Funding Needed <sup>1</sup>	Proposed source of other funds	2008 Chinook Recovery Projects <sup>2</sup>			2008	2009	2010	2011+	Likely end date	Limiting Factors	Habitat Type	Activity Type	Capital or Non-capital	Subtype	Species Benefiting									
						Funding in hand	Source of funding in hand			High	Medium	Low											Year 1 Scope	Year 1 Cost	Year 2 Scope	Year 2 Cost	Year 3 Scope	Year 3 Cost	Future Scope	Future Cost	Primary Species	Secondary Species
			Projects Programs		\$9,689,329 \$6,776,400	\$3,390,460 \$500,000		\$6,098,869 \$6,276,400					\$2,771,895 \$5,144,467		\$3,374,018 \$806,467		\$2,265,018 \$825,467															
Middle Fork Nooksack	Middle Fork Reach Assessment and Restoration Planning	LNR	Project	Not started	\$160,842	160,842	PSAR	0					Data collection, analysis and synthesis	105,000	Identify and prioritize projects, write report	45,000						Future Habitat Project Development	chinook	all anadromous species								
Middle Fork Nooksack	Middle Fork Diversion Dam	COB	Project	Feasibility study, assessments, permit applications, and design initiated	\$22,300,000	6,125,000	PWTF; WA; SRFB w/Match; FRIMA	16,175,000					construction	22,300,000								Habitat Capital Projects Hatchery Capital Projects	chinook	bull trout, steelhead, coho								
Middle Fork Nooksack	Middle Fork Diversion Dam (Kokanee Program)	WDFW	Project	Not started	\$6,164,000	0		6,164,000	State legislature													Capital Projects	chinook	kokanee, sport fishermen								
Middle Fork Nooksack	Middle Fork Side Channel Reach Assessment and Design	NSEA	Project	Not Started	\$60,000	10,000	match	50,000	SRFB		X		assessment and design	60,000								Capital Projects	chinook	steelhead, pinks, coho, bull trout, chum								
Middle Fork Nooksack	Upper Middle Fork Spawner Surveys	Co-mgrs	Program	Not started	\$150,000	0		150,000					Spawn surveys, DNA and otolith analyses	50,000	Spawn surveys, DNA and otolith analyses	50,000	Spawn surveys, DNA and otolith analyses	50,000	Spawn surveys, DNA and otolith analyses	50,000		Stock Monitoring Support										
Subtotal-Middle Fork			Projects Programs		\$28,834,842 \$28,684,842 \$150,000	\$6,295,842 \$6,295,842 \$0		\$22,539,000 \$22,389,000 \$150,000					\$22,515,000 \$22,465,000 \$50,000		\$95,000 \$45,000 \$50,000		\$50,000 \$0 \$50,000															
North Fork Nooksack	Lower Canyon Creek Design and Restoration	WCPW - Phase 1 & 2; WSDOT Setback	Project	Preliminary designs in-hand; 2009 construct. Phase 1	\$2,001,385	430,000	SRFB/Whatcom County - Phase 1 520' levee removal	1,571,385	USFS, DOE, BIA, USFWS, EPA, Whatcom Co.			X	Phase 1 final design & permitting/Finalize WSDOT setback design, seek funding	50,000	Phase 1 + Setback Construction/Phase 2 preliminary design	1,101,385	Monitor Phase 1; Construct Phase 2 (estimated cost)	850,000	TBD	TBD	2019	5,8,10,A5,A3,A4	I	4, 5	Capital	Habitat Capital Projects	chinook	all anadromous species				
North Fork Nooksack	Lower North Fork Reach Stable Side Channel Restoration (Phase 1)	Nooksack Tribe	Project	Active	\$442,900	442,900	SRFB, PST, PCSRF	0		X			Design, permitting, construction	432,900	Monitoring	10,000						Capital	Habitat Capital Projects	chinook	all anadromous species							
North Fork Nooksack	Lower North Fork Reach Stable Side Channel Restoration (Phase 2)	Nooksack Tribe	Project	Not started	\$540,000	0	SRFB, USFWS, PCSRF	540,000		X			Design and permitting	140,000	Construction	400,000	Monitoring					Capital	Habitat Capital Projects	chinook	all anadromous species							
North Fork Nooksack	Lower North Fork Reach Stable Side Channel Restoration (Phase 3)	Nooksack Tribe	Project	Not started	\$100,000	0	SRFB, USFWS, PCSRF	100,000		X			Design and permitting	100,000	Construction	400,000	Monitoring					Capital	Habitat Capital Projects	chinook	all anadromous species							
North Fork Nooksack	Lower North Fork Reach Tributary Restoration	Tribes, WLT, WSDOT, USFS	Project	Not started	\$485,000	0	SRFB	485,000			X		Design and permitting	50,000	Construction	435,000						Capital	Habitat Capital Projects	chinook	all anadromous species							
North Fork Nooksack	Lower North Fork Floodplain Riparian Restoration	NSEA, Tribes	Project	Not started	\$100,000	0	CSF	100,000				X	Phase 1 Construction	50,000	Phase 2 Construction	50,000						Capital	Habitat Capital Projects	chinook	all anadromous species							
North Fork Nooksack	Lower North Fork Tributary Riparian Restoration	NSEA, Tribes	Project	Not started	\$100,000	0	CSF	100,000				X	Phase 1 Construction	50,000	Phase 2 Construction	50,000						Capital	Habitat Capital Projects	chinook	all anadromous species							
North Fork Nooksack	North Fork Restoration Acquisitions (two 5 acre parcels key for restoration)	WLT	Program	Not started	\$2,000,000	300,000	cash	1,700,000	SRFB		X		Negotiate and acquire river front properties for future restoration	2,000,000								Capital	Habitat Capital Projects	chinook	all anadromous species							
Subtotal-North Fork			Projects Programs		\$5,769,285 \$3,769,285 \$2,000,000	\$1,172,900 \$872,900 \$300,000		\$4,596,385 \$2,896,385 \$1,700,000					\$2,582,900 \$582,900 \$2,000,000		\$1,786,385 \$1,786,385 \$0		\$1,400,000 \$1,400,000 \$0															
Forks & Mainstem	Invasive Weed Control	Whatcom County Weed Control Board	Program	In-progress	\$315,000	0	NA	315,000	DOE; EPA; USFWS; WC			X	Inventory & spot control	65,000	Control	125,000	Reinventory; continue management	325,000	2013			Capital	Habitat Capital Projects	chinook	all anadromous species							
Mainstem Nooksack	Mainstem Reach Assessment and Restoration Planning	Tribes	Project	Not started	\$300,000	0		300,000		X			Scope assessment and analysis needs	15,000	Data analysis and synthesis	215,000	Design and construction	70,000				Non-capital	Future Habitat Project Development	chinook	all anadromous species							
Mainstem Nooksack	Integration of Salmon Habitat Reach Assessment & Projects with Flood Management	WCPW/Tribes	Program	Reach 4 In-progress	\$30,000	0	NA		Grant; local in-kind		X		Complete Reach 4 Flood and Fish analysis and management options; apply template	30,000	Begin reach 4 imple.; Address next priority reach, seek community consensus	TBD	Implement subsequent reaches	TBD	TBD			Non-capital	Future Habitat Project Development									
Mainstem Nooksack	Lower Bertrand Creek - passage & LWD			Pending Reach 4 analysis & policy direction	\$2,950,000	0	NA	2,950,000	WCPW; DOE; EPA				Place LWD	95,000	Monitoring	5,000	Monitoring	500	\$500/year	2018			Capital	Habitat Capital Projects	chinook	all anadromous species						
Mainstem Nooksack	Sande Bar Levee Setback & Clay Bank stabilization	WCPW	Project	Early discussion only	\$100,000	0		100,000	WCPW				Reach analysis; alternatives analysis	25,000	Design, landowner agreements, seek construction grants	125,000	Construction	2,800,000	Monitoring	\$3,000/yr	2018	2,5,A3	I	4, 5	Capital	Habitat Capital Projects	chinook	all anadromous species				
Mainstem Nooksack	Piling jam, 4 sites	WCPW; NSEA	Pilot Project	Early discussion only	\$100,000	0		100,000	WCPW				Site feasibility & design, seek funding	15,000	construction	85,000	Monitoring					Capital	Habitat Capital Projects	chinook	all anadromous species							
Subtotal-Mainstem			Projects Programs		\$3,695,000 \$3,350,000 \$345,000	\$0 \$0 \$0		\$3,665,000 \$3,350,000 \$315,000					\$245,000 \$55,000 \$95,000		\$555,000 \$425,000 \$125,000		\$2,995,500 \$2,870,000 \$125,000															
Estuary and Adjacent Waters	Modeling of Currents in Bellingham Bay under different flow regimes	Co-managers	Project	Ready to Go	\$216,000	0	NA	216,000	BBDDP; COB; MRC; DOE				Run Model under different condition of wind, tide and discharge and basic ground truthing of results	78,000	Run Model under different condition of wind, tide and discharge and basic ground truthing of results	78,000	Develop Action Plan for protecting elements of the critical habitat	60,000				Non-capital	Research									
Estuary and Adjacent Waters	Chinook Habitat Use Assessment of Bellingham Bay & Adjacent Areas	Lummi	Project	Pilot only	\$250,000	0	NA	250,000	MRC; BBDDP; NWSC		X		Analysis of Pilot Project Results, Implement Year 1 Sampling, Analysis of Year 1 data (Hatchery (Release Strategy)/Natural)	125,000	Sampling Program Year 2, Analysis of results and course of action for habitat actions	125,000	Develop Action Plan for protecting elements of the critical habitat	TBD				Non-capital	Research									
WRIA1 Marine and Nearshore	Complete WRIA1 Nearshore Habitat Prioritization with Salmon Overlay	MRC/SRBST	Project/Assessment	Proposed in 2008 SR work plan	\$75,000	0	NA	75,000	SRST and MRC member in-kind; grant				SR Staff Team and MRC Subcommittee, complete prioritization and address salmon overlay needs	75,000	Implement priorities; seek nearshore project funding	TBD	TBD					Non-capital	Future development									

Geographic Area	Action	Likely sponsor	Project or program?	Project/program status	Total cost estimate 2008-2010	Funding in Hand		Funding Needed <sup>1</sup>		2008 Chinook Recovery Projects <sup>2</sup>			2008		2009		2010		2011+		Species Benefiting											
						Funding in hand	Source of funding in hand	Total Need	Proposed source of other funds	High	Medium	Low	Year 1 Scope	Year 1 Cost	Year 2 Scope	Year 2 Cost	Year 3 Scope	Year 3 Cost	Future Scope	Future Cost	Likely end date	Limiting Factors	Habitat Type	Activity Type	Capital or Non-capital	Subtype	Primary Species	Secondary Species				
Squalicum Creek/Bellingham Bay	Squalicum Creek Estuary Restoration	Port of Bellingham	Project	Conceptual restoration design complete	\$875,000	535,000	MRC, DNR, BBDPP	340,000	Port of Bellingham				Remove derelict structure and pilings Prepare final design and secure necessary permits.	535,000	Restore estuarine marsh	300,000	Monitoring	20,000	Monitoring	20,000					7,11,A4	ERD	1	Capital	Habitat Capital Projects	chinook	all anadromous species	
Estuary Marine-Northern Chuckanut Bay	Smuggler's Slough Acquisition & Reconnection	Lummi	Project	On-going	\$3,000,000	1,783,866	SRFB, Coastal, PSNRP	1,216,134	Wetland Reserve (NRCS); USFWS, PSNRP				Wetland Acquisition (250 ac), Final Design, Permitting and Riparian Planting (25 ac)	680,000	Instream construction, Riparian work	2,090,000	Monitoring	80,000						5,7,A3,A4,A5	ERD	1,8	Capital	Habitat Capital Projects	chinook	all anadromous species		
Subtotal-Estuary/Adjacent Waters	Chuckanut Village Marsh Restoration	COB and MRC	Project	Feasibility underway	\$20,000	20,000	MRC, COB grant	0	COB grant, TBD				Feasibility Assessment	20,000	TBD based on alternatives identified in assessment	TBD	TBD	TBD						18,A11	NB, NE	1	Capital	Habitat Capital Projects	unknown	copepods		
			Projects		\$4,436,000	\$2,338,866		\$2,097,134					\$1,513,000	\$2,593,000	\$160,000																	
					\$4,436,000	\$2,338,866		\$2,097,134					\$1,513,000	\$2,593,000	\$160,000																	
Bertrand Creek	Bertrand Creek Wetlands Enhancement	Bertrand WID	Project	Planned	\$55,000	0		55,000							Design and permitting, site preparation	55,000								14,A7	W	7	Capital	Habitat Capital Projects	fall chinook, steelhead, coho	bull trout, cutthroat, sockeye, chum		
Mainstem Nooksack Fish Trap Creek	Relocate Double Ditch and Benson watercourses between Main and Badger to new corridor	City of Lynden	Project	Feasibility underway	\$1,000,000	10,000	local	990,000	CCW, FCAP, County, State				Scoping & feasibility		Purchase 5,000'x 200' foot easement	250,000	initiate channel construction, riparian work	500,000	complete channel construction	250,000				8	I	5	Capital	Habitat Capital Projects	steelhead, chinook, coho, cutthroat	bull trout		
Mainstem Nooksack Fish Trap Creek	Improve stream crossing on Fish Trap and Double Ditch	City of Lynden	Project	Engineering underway	\$2,000,000	0	Local Transportation Dollars	2,000,000	State and local transportation				Double Ditch @ 17th, engineering complete, construction summer 07	750,000	Fish Trap @ Main, design & engineering	50,000	Construction	1,200,000					10	I	2	Capital	Habitat Capital Projects	steelhead, chinook, coho, cutthroat	bull trout			
Mainstem Nooksack Fish Trap Creek	Improve habitat, storage, and drainage along Border to Badger reach	Fish Trap WID, NSEA, APC	Projects		\$800,000	300,000	CCW, APC, WCD	500,000	CCW, County Local, FCAP				Complete hydro analysis, initiate border to badger channel / riparian work	100,000	Continue Border to Badger work Complete feasibility of flood mitigation alternatives	100,000	Complete Border to Badger riparian work	100,000	Construct flood mitigation projects Complete levee relocation, channel and riparian improvement,	750,000	500,000		8	I	5,6			steelhead, chinook, coho, cutthroat	bull trout			
Mainstem Nooksack Fish Trap Creek	Set back levee along 10,000 feet of lower Fish Trap reach	County Flood	Project		\$300,000	0								Design engineering	50,000	Purchase 40 acres of easements	250,000						5,A3	I	4	Capital	Habitat Capital Projects	chinook	all other anadromous except pinks			
Schneider, Cougar, and Whiskey Creek	Flood gate Modification	WCPW; NSEA	Project	Preliminary assessment underway	\$150,000	30,000	Diking district,NSEA	150,000					Assessment, design, Construct Schneider	50,000	Complete Schneider, Design Courgar	50,000	Complete Courgar, Design Whiskey	50,000	Daylight creek, install new flood gate	100,000				10	I	2	Capital	Habitat Capital Projects	chinook	coho, steelhead, cutthroat		
Subtotal-Lower Nooksack Tributaries			Projects		\$4,305,000	\$340,000		\$3,695,000						\$900,000	\$555,000	\$2,100,000																
					\$4,305,000	\$340,000		\$3,695,000						\$900,000	\$555,000	\$2,100,000																
Lower Nooksack watershed	Update Lynden SMP	City of Lynden	Program	scheduled for 2007	\$60,000	0		60,000					SMP update	60,000										N/A	N/A	N/A	Non-capital	Habitat protection - participation in policy or regulatory updates				
Lower Nooksack watershed	Update Ferndale SMP	City of Ferndale	Program	~90% complete, 6-9 months more work	\$30,000	0		30,000					SMP update	30,000										N/A	N/A	N/A	Non-capital	Habitat protection - participation in policy or regulatory updates				
Lower Nooksack watershed	Update Nooksack SMP	City of Nooksack	Program	planned	\$60,000	0		60,000					SMP update	60,000										N/A	N/A	N/A	Non-capital	Habitat protection - participation in policy or regulatory updates				
Lower Nooksack watershed	Update Everson SMP	City of Everson	Program	planned	\$60,000	0		60,000					SMP update	60,000										N/A	N/A	N/A	Non-capital	Habitat protection - participation in policy or regulatory updates				
Drayton Harbor watershed/Strait of Georgia	Update Blaine CAO/SMP	City of Blaine	Program	SMP update in progress, CAO planned	\$33,000	0		33,000					SMP update	15,000	CAO update	18,000								N/A	N/A	N/A	Non-capital	Habitat protection - participation in policy or regulatory updates				
Watershed	Restoration Plan and Watershed management plan implementation	Joint policy boards of WRIA 1 WMP and Salmon Recovery Program	Program	expansion	\$645,000	200,000	DOE; EPA	495,000	WDFW; DOE; DOI				Assist in Implementation of pilots, and coordination of participating partners and sponsors	315,000	Assist in Implementation of pilots, and coordination of participating partners and sponsors	165,000	Assist in Implementation of pilots, and coordination of participating partners and sponsors	165,000	Evaluation of progress and facilitate any adaptive management actions	annual requirement 2025				N/A	N/A	N/A	Non-capital	Watershed plan implementation				
WRIA 1	WRIA 1 Instream Flow Negotiations (Early chinook habitats)	WRIA 1 Policy Boards; ISF Negotiation Parties	Program	Ongoing	\$800,000	90,000	City of Bellingham/Participating governments/others	285,000					Middle Fork negotiation: public notifications, communications and meetings; Middle Fork: flow adoption. Begin next priority area	400,000	Other subwatersheds: facilitate renegotiation, evaluate agreement compliance with Indian water law, federal law and state water law	400,000	Continue flow selection and adoption process in priority areas.	150,000/yr					14,A7	N/A	N/A	Non-capital	Habitat protection - participation in policy or regulatory updates	chinook	all species			
WRIA 1	WRIA 1 Instream Flow Negotiations (Other salmonid habitats)	WRIA 1 Policy Boards; ISF Negotiation Parties	Program	Ongoing	\$800,000	147,000	Whatcom County/ Participating governments	653,000					Finalize adoption of Bertrand; begin instream flow adoption process in next priority area	400,000	Continue flow selection and adoption process in priority areas.	400,000	Continue flow selection and adoption process in priority areas.	150,000/yr					14	N/A	N/A	Non-capital	Habitat protection - participation in policy or regulatory updates	prioritized non-chinook species				

Geographic Area	Action	Likely sponsor	Project or program?	Project/program status	Total cost estimate 2008-2010	Funding in Hand		Funding Needed <sup>1</sup>		2008 Chinook Recovery Projects <sup>2</sup>			2008		2009		2010		2011+		Species Benefiting									
						Funding in hand	Source of funding in hand	Total Need	Proposed source of other funds	High	Medium	Low	Year 1 Scope	Year 1 Cost	Year 2 Scope	Year 2 Cost	Year 3 Scope	Year 3 Cost	Future Scope	Future Cost	Likely end date	Limiting Factors	Habitat Type	Activity Type	Capital or Non-capital	Subtype	Primary Species	Secondary Species		
Nooksack early chinook habitats	Habitat monitoring to support adaptive management	Tribes	Program	Some monitoring underway; adaptive management program needs to be developed.	\$300,000	0	NA	300,000			X		Habitat monitoring to support adaptive management	100,000	Habitat monitoring to support adaptive management	100,000	Habitat monitoring to support adaptive management	100,000	Habitat monitoring to support adaptive management	\$100,000/year	2106	N/A	N/A	N/A	Non-capital	Habitat Project Monitoring				
Nooksack chinook habitats	Expand Monitoring and Stock Identification of Nooksack Chinook Populations	Co-mgrs	Program	Existing population monitoring ongoing but needs expansion	\$600,000	0	NA	600,000					Spawn surveys, smolt trapping, DNA and otolith analyses	200,000	Spawn surveys, smolt trapping, DNA and otolith analyses	200,000	Spawn surveys, smolt trapping, DNA and otolith analyses	200,000	Spawn surveys, smolt trapping, DNA and otolith analyses	200,000			N/A	N/A	N/A	Non-capital	Stock Monitoring Support			
WRIA 1	Fish passage barrier removal program	NSEA; Co-mgrs; WCD	On-going Program	Inventory complete; need imple. Funding Design in-progress; seeking funding	\$750,000	0	NA	750,000	FFFF; CSF; Whatcom Co.				Obtain landowner agreements and implement top 10 priority barriers	250,000	Obtain landowner agreement & do next 10 barriers	250,000	Obtain landowner agreement & do next 10 barriers	250,000	Continue down priority list until done; monitor effectiveness	TBD	2017	10	I	2	Capital	Habitat Capital Projects	generally coho	steelhead, cutthroat, bulltrout, occasionally chinook		
Coastal Creeks	Bay Road Culvert Replacement (California Creek)	WCPW	Project	In scoping	\$500,000	0	NA	500,000	WCPW & grant				Design and detailed cost estimates	25,000	Obtain Funding; Construct	475,000	Monitor	TBD	Monitoring	TBD	2014	10	I	2	Capital	Habitat Capital Projects	coho	cutthroat, steelhead, chum		
Sumas watershed	Goodwin Road Culvert Replacement (Dale Creek)	WCPW	Project	In scoping	\$0	0	NA	TBD	WCPW & grant				Feasibility	TBD	Detailed design and specifications	TBD	Construction	TBD	Monitoring	TBD	2015	10	I	2	Capital	Habitat Capital Projects	coho	cutthroat, steelhead, chum		
Sumas watershed	Update Sumas SMP	City of Sumas	Program	planned	\$60,000	0	NA	60,000					SMP update	60,000									N/A	N/A	N/A	Non-capital	Habitat protection - participation in policy or regulatory updates			
WRIA 1	Riparian restoration program support: project match, conservation easements	WCD; Tribes	On-going Program		\$750,000	0	NA	750,000	TBD		X		Leverage grant sources; do priority riparian restoration	250,000	Leverage grant sources; do priority riparian restoration	250,000	Leverage grant sources; do priority riparian restoration	250,000	Continue down priority list until done; monitor effectiveness	TBD	2025	13	R	11	Capital; non-capital	Habitat capital projects; future habitat project development	if prioritized, chinook	coho, steelhead, bull trout, cutthroat, chum		
Nooksack bull trout habitats	Monitor and establish DNA baselines for Nooksack bull trout Populations	Co-mgrs; USFWS	Program	Not started	\$300,000	0	NA	300,000					Spawn surveys, DNA baseline establishment and analysis	100,000	Spawn surveys, brook trout surveys	100,000	Spawn surveys, DNA analysis	100,000	Spawn surveys, DNA analysis	100,000			N/A	N/A	N/A	Non-capital	Stock Monitoring Support			
Nooksack steelhead habitats	Steelhead Spawn Surveys and DNA Analysis	WDFW	Program	Not started	\$450,000	0	NA	450,000					DNA analysis	150,000	DNA analysis	150,000	DNA analysis	150,000	DNA analysis	150,000			N/A	N/A	N/A	Non-capital	Stock Monitoring Support			
Nooksack coho habitats	Coho Spawn Surveys	Co-mgrs; NSEA	Program	Not started	\$120,000	0	NA	120,000					Spawn surveys, DNA baseline establishment and analysis	40,000	Spawn surveys, DNA analysis	40,000	Spawn surveys, DNA analysis	40,000	Spawn surveys, DNA analysis	40,000			N/A	N/A	N/A	Non-capital	Stock Monitoring Support			
Subtotal - Other Geographic Areas			Programs		\$6,318,000	\$437,000		\$5,506,000						\$2,515,000		\$2,548,000		\$1,255,000												
<b>Total Resource Need</b>					\$69,923,856			\$54,573,788					<b>total year 1 need</b>	\$8,107,280	<b>total year 2 need</b>	\$2,512,870	<b>total year 3 need</b>	\$1,650,385												

<sup>1</sup>Intended to convey total funding need. WRIA 1 Salmon Recovery Board anticipates the need for, and is committed to, leveraging other potential funding sources to optimize available salmon recovery funding to accomplish priority projects.  
<sup>2</sup>The 2008 Chinook Recovery Project actions are identified as projects potentially eligible for SRFB funding and having a direct benefit to chinook recovery. The subset list of actions was given a priority rating relative to each other and based on a sequencing or staging approach for project proposals. The 2008

2007 Shared Strategy Limiting Factor Key

- 1- Degraded floodplain and in-river channel structure
- 2- Degraded nearshore and estuarine conditions and loss of associated habitat
- 3- Riparian area degradation and loss of in-river large woody debris
- 4- Excessive sediments in spawning gravels
- 5- Degraded water quality and temperature
- 6- Impaired instream flows
- 7- Barriers to fish passage

2008 Limiting Factors (yellow highlighted are from the PSP template; others from draft HWS customization for WRIA 1)

- 1 Altered stream morphology/stream flow patterns
- 2 Channel structure and complexity
- 3 Disease/predation
- 4 Excessive sediment
- 5 Floodplain connectivity and function
- 6 High water temperatures
- 7 Loss of habitat
- 8 Loss of tributary habitat diversity
- 9 Predation/competition/disease
- 10 Reduced access to spawning habitat (fish passage, anthropogenic and natural barriers)
- 11 Reduced habitat capacity
- 12 Regulatory mechanisms
- 13 Riparian areas and LWD recruitment
- 14 Stream flow
- 15 Stream substrate
- 16 Unscreened water diversions
- 17 Water quality
- 18 Unknown

A1	Channel instability	Channel Stability	WRIA 1 (EDT)
A2	High fine sediment load	Sediment Load	WRIA 1 (EDT)
A3	Lack of habitat diversity	Habitat Diversity	WRIA 1 (EDT)
A4	Loss of key habitat	Key Habitat Quantity	WRIA 1 (EDT)
A5	Obstructions	[same]	WRIA 1 (EDT)
A6	Water diversions	Withdrawals	WRIA 1 (EDT)
A7	Impacted flow regime	Flow	WRIA 1 (EDT)
A8	High water temperatures	Temperature	WRIA 1 (EDT)
A9	Oxygen	Oxygen	WRIA 1 (EDT)
A10	Toxic contaminants	Chemicals	WRIA 1 (EDT)
A11	Decreased food availability	Food	WRIA 1 (EDT)
A12	Biotic Interactions	[same]	WRIA 1 (EDT)



### **Habitat Types from PSP 3-Year Program Template**

- I Instream
- R Riparian
- U Upland
- W Wetland
- ERD Estuary River Delta
- NB Nearshore beaches
- NRC Nearshore rocky coast
- NE Nearshore embayments

## Activity Types from PSP 3-Year Program Template

- 1 estuary or nearshore
- 2 fish passage
- 3 fish screening
- 4 floodplain restoration
- 5 instream
- 6 instream flow
- 7 instream wetland
- 8 land protected/acquired/leased
- 9 nutrient enrichment
- 10 project maintenance
- 11 riparian
- 12 sediment reduction
- 13 upland-agriculture
- 14 upland-vegetation
- 15 upland-wetland
- 16 water quality improvement
- 17 planning/assessment/feasibility/design