2011-2013 WRIA 1 SALMON RECOVERY 3-YEAR PROJECT PLAN

Format of Narrative

The format for the 2011-2013 WRIA 1 Salmon Recovery 3-Year Project Plan narrative includes three sections: (1) overview of the WRIA 1 Watershed Recovery Strategy and WRIA 1 Near-Term Actions; (2) summary of the 2011-2013 WRIA 1 3-Year Project Plan; and (3) responses to questions posed in 2011 Three Year Work Plan/Program Guidelines. The overview of the WRIA 1 Watershed Recovery Strategy and WRIA 1 Near-Term Actions are included because they summarize the 10 year objectives for the *WRIA 1 Salmonid Recovery Plan* and provide context for responses to the questions posed by the Puget Sound Partnership in the 2011 guidelines.

Overview of WRIA 1 Watershed Restoration Strategy and Near-Term Actions

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, 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 and steelhead by implementing actions with mutual benefit to both early chinook, and bull trout and steelhead and by removing fish passage barriers in presumed bull trout and steelhead 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 the Puget Sound Evolutionarily Significant Unit (ESU) for Chinook salmon.

Table 1. Planning targets for Nooksack Early Chinook.

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

[1] Ocean Recruits at MSY
[2] Spawners at MSY
[3] Productivity at MSY

[4] Diversity Index refers to the percentage of estimated potential life history trajectories that are sustainable.

WRIA 1 Near-Term Actions

The WRIA 1 Near-Term Actions that address the priorities presented above include:

1. Implement North Fork/Middle Fork and South Fork Chinook Recovery Hatchery programs
2. Implement harvest and hatchery management plans
3. Restore anadromous fish passage at early chinook barriers (Middle Fork diversion dam and Canyon Creek)
4. Habitat restoration and protection in the Forks, mainstem Nooksack River, and major early chinook tributaries
5. Habitat protection and restoration in estuarine and nearshore areas
6. Integrate salmon recovery needs into floodplain management planning
7. Habitat protection through local land use regulations
8. Setting and managing instream flows
9. Restore functioning riparian and water quality conditions and reconnect isolated habitats in lower mainstem tributaries and independent tributaries in WRIA 1

Expected results of implementing the near-term actions were modeled using through Ecosystem Diagnosis and Treatment (EDT) when the WRIA 1 Salmon Restoration Strategy was prepared, and are presented in Table 2. The results represent the long-term benefits of actions implemented in a 10-year time frame, rather than the expected population status after 10 years.

Table 2. Estimated benefits of near-term actions on Nooksack early chinook populations.
Note: Benefits are projected over the long term and assume no net degradation from land use.
Table 1 footnotes apply.

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

2011-2013 WRIA 1 Salmon Recovery 3-Year Project Plan

Overview of 3-Year Project Plan

The projects, plans, and programs associated with the *2011-2013 WRIA 1 3-Year Plan* are organized in the associated spreadsheet under six worksheet tabs. The tabs generally correlate to the WRIA 1 Salmon Recovery Plan near-term actions:

(1) Near Term Habitat Actions-Chinook

Addresses WRIA 1 Salmon Recovery Plan near term actions: a) habitat restoration and protection in the Forks, upper Mainstem Nooksack, and major early chinook tributaries; and b) restore anadromous fish passage at early chinook barriers (Middle Fork diversion dam and Canyon Creek).

(2) Near Term Habitat Actions- Other

Addresses WRIA 1 Salmon Recovery Plan near term actions: a) habitat restoration in lower Mainstem Nooksack and associated tributaries; and b) restore functioning riparian and water quality conditions and reconnect isolated habitats in lower mainstem tributaries and independent tributaries in WRIA 1

(3) Estuary and Nearshore

Addresses WRIA 1 Salmon Recovery Plan near term action: habitat protection and restoration in estuarine and nearshore areas

(4) Hatchery-Harvest

Addresses WRIA 1 Salmonid Recovery Plan near term action: a) implement North Fork/Middle Fork and South Fork Chinook recovery/rebuilding hatchery programs; and b) implement harvest and hatchery management plans

(5) Population Monitoring-Research

Supports the hatchery and harvest program actions by monitoring populations

(6) Programs

Addresses WRIA 1 Salmon Recovery Plan near term actions: a) integrate salmon recovery needs into floodplain management planning; b) habitat protection through local land use regulations; and c) setting and managing instream flows. This worksheet tab also references the 2011 WRIA 1 Salmon Recovery Staff Team Annual Work Plan, which is where the programmatic activities are identified along with milestones and timelines for implementation (Attachment A- 2011 WRIA 1 Salmon Recovery Staff Team Work Plan).

An overview of the 2011-2013 WRIA 1 3-Year Project Plan worksheet tab and status of key actions is presented below.

Near Term Habitat Actions- Chinook

This tab of the 2011-2013 WRIA 1 Project Plan focuses on habitat actions in the priority areas for recovery of North Fork/Middle Fork and South Fork Chinook: North Fork, Middle Fork, and South Forks of the Nooksack River. All habitat actions on this tab have chinook as the primary species benefitting. Because recovery of chinook is the WRIA 1 salmon recovery priority, the vast majority of habitat actions in process or planned are in the Nooksack Forks.

The prioritization included in the worksheet labeled *2011 Restoration Priority* reflects outcomes of the March 17, 2011 Project Development technical workshop. The goal of the workshop was to identify and prioritize appropriate restoration strategies by reach, and to identify the level of opportunity to implement each strategy in each reach (Attachment B- March 17, 2011 Project Development Workshop). An effort was also made at the workshop to approximate the status of implementation of a particular strategy in an identified reach (i.e., estimated percent complete). The outcomes of the workshop were also used to guide project sponsors applying for 2011 SRFB grant funds: Tier 1 projects (i.e. those with high level of importance for chinook recovery) and Tier 2 projects (moderate level of importance) were included in the 2011 Project Matrix Strategy; the Strategy and associated reach map provided to potential grant applicants is shown in Attachment C.

Following is a summary of the 2011-2013 WRIA 1 actions benefitting chinook as the primary species:

Multiple Geographic Areas

There are a number of actions included in the 2011-2013 WRIA 1 3-Year Project Plan applicable to multiple priority reaches within the Nooksack River Forks including:

- Implementing a strategic plan for acquiring and/or conserving land for purposes of achieving habitat targets continues to be part of the 3-Year Project Plan. The March 17, 2011, workshop included acquisition for protection and acquisition for restoration as project strategies and is reflected in the reach strategy matrices previously described. Implementation of these strategies will be contingent on landowner willingness and available funding. The *2011-2013 WRIA 1 3-Year Project Plan* includes placeholders for acquisition of parcels or conservation easements as necessary for salmon recovery purposes.
- Orphan Road Assessment and Implementation- A pilot to identify orphaned road segments and treatments needed to restore slope hydrology and reduce mass wasting in a priority area of the South Fork watershed was completed in January 2011. The 2011-2013 3-Year Project Plan includes a placeholder to implement prescriptions identified for the pilot area, and a placeholder for conducting the assessment in other priority areas.

South Fork Nooksack

- The lower South Fork is the primary focus 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 more uniform land-use (i.e. commercial forestry) affords more passive restoration through retention and recovery of riparian zones. Conditions are less degraded in the upper South Fork than in the lower South Fork, which is dominated by agricultural and rural land use.
- All South Fork projects underway and planned in the South Fork address the following limiting factors: (1) habitat diversity by placing wood jams to provide instream complex 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 side channels; (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 and or treating forest roads, channel-adjacent landslides, and other sediment sources; and (5) lateral and vertical channel stability (the impact of which is believed to be under-estimated in EDT) by removal/setback of levees and/or bank hardening to improve egg-to-alevin survival.
- A hydraulic modeling project to evaluate cumulative flood risk impacts of instream log jam projects in the lower South Fork reaches was completed in early 2011. The outcomes of the modeling are being used to inform restoration project sequencing and location. Additional project modeling is done as part of the project design to balance the need to not increase flood risk to adjacent landowners, while also complementing, and not precluding, long term restoration plan options.

North Fork Nooksack

- The North Fork between the Middle Fork confluence and Glacier Creek is the primary focus of restoration for the NF/MF population.

- The projects underway or currently planned in the North Fork address the following limiting factors: (1) channel stability, through log jam placement within and throughout the historically active channel to restore channel roughness and promote the development of the stable spawning habitats, such as side channels and stable forested islands; and (2) key habitat quantity, through reconnection of abandoned side channels and log jam placement to form deep, complex pools and complex edge habitat.
- Lower Canyon Creek Phase 2 is planned for construction to address a fish passage barrier and hydraulic constraints on habitat forming processes and functions due to a flood management levee. Phase 1 construction was completed in 2010 and Phase 2 design is expected to be completed in summer 2011.

Middle Fork Nooksack

- The *Middle Fork Habitat Assessment* initiated in 2008 will be completed by June 30, 2011. The Assessment will include recommendations for projects and sequencing.
- The March 17, 2011, technical workshop matrix and the 2011 Project Strategy Matrix for the Middle Fork reflect information from the Middle Fork Habitat Assessment.
- The project placeholder in the *2010-2012 WRIA 1 3-Year Project Plan* has been replaced with specific project concepts in the updates to the *2011-2013 WRIA 1 3-Year Project Plan.* All of the projects in the updated 3-Year plan are consistent and complement the strategies and reaches identified in the draft *Middle Fork Habitat Assessment*, the March 17th workshop outcomes, and *WRIA 1 Salmonid Recovery Plan*.
- The status of the Middle Fork Diversion Dam project is outlined in the action description document that accompanies the *2011-2013 WRIA 1 3-Year Project Plan*. Generally, a feasibility study for a siphon alternative was pursued and a scaled physical model to test the concept developed. This is a different design alternative than had been considered in the *2010-2012 WRIA 1 3-Year Project Plan*. The siphon alternative appears to have promise as a preferred option, and a report on design and cost estimates is anticipated to be available in summer 2011. The WRIA 1 Management Team submitted the Middle Fork Diversion Dam to the Puget Sound Partnership to consider as a project of regional significance.

Upper Mainstem Nooksack

- The Upper Mainstem Reach Assessment and Restoration Planning remains on the 2011-2013 WRIA 1 3-Year Project Plan as a proposed project. Implementation is contingent on funding and availability of staff resources to either conduct the assessment or to scope and contract the work. Preliminary work on this assessment or its scoping may occur in 2011 as part of the WRIA 1 Salmon Recovery Staff Team work plan to the extent that it supports and informs discussion and progress on the WRIA 1 Salmonid Recovery action to integrate salmon recovery needs into floodplain management planning.

Near Term Habitat Actions- Other

This worksheet tab of the 2011-2013 WRIA 1 3-Year Project Plan represents habitat actions outside of the Nooksack Forks that are important to other WRIA 1 salmonids. Because the priority for of WRIA 1 salmon recovery is the North Fork/Middle Fork and South Fork Chinook, the habitat actions benefitting other WRIA 1 salmonids are not prioritized. Restoration projects included under this worksheet include:

- Limited small-scale restoration projects (piling jams) and larger projects, such as setback of tributary levees where they cross the Nooksack floodplain, that address both flood and salmon

concerns are proposed; these address limiting factors of habitat diversity (complex cover, floodplain reconnection) and key habitat quantity (deep pools, backwaters, edge habitat, flood refuge habitat).

- Fish passage barrier removal projects to address high priority fish passage barriers. The 2006 *Whatcom County Fish Passage Barrier Inventory* is a source for identifying project priorities. Data documenting barriers corrected since the original inventory were compiled by Whatcom County for WRIA 1 restoration partners and submitted to WDFW for inclusion in the statewide barrier database. A maintenance update to the 2006 inventory is identified on the 2011 Salmon Recovery Staff Team annual work plan and will to be implemented contingent on available staff resources.
- Riparian restoration program to support ongoing voluntary riparian restoration (e.g. Tenmile Creek partnership, Bertrand Watershed Improvement District, Birch Bay Watershed and Aquatic Resource Management, Drayton Harbor Shellfish District, Fishtrap Watershed Improvement District) along lower mainstem and independent tributaries.

Estuary and Nearshore

The Estuary and Nearshore worksheet of the *2011-2013 WRIA 1 3-Year Project Plan* includes the following proposed actions:

- Estuarine and Marine Nearshore Needs Assessment and Prioritization to compile existing data and research (proposed project name changed from "Chinook habitat use assessment of Bellingham Bay and adjacent areas" in the 2010-2012 3-year project plan). An RFP has been prepared for the work and a consultant is expected to be selected in 2011, contingent upon available funding.
- Restoration of floodplain connectivity upstream of the Nooksack delta including preliminary steps that will lead to future modification or removal of the left bank levee between Slater Road and Marine Drive. Possible repairs or replacement of the head structure on the Lummi River near Ferndale Road may also be evaluated when budget and staffing permit.
- Lower Nooksack River Restoration including acquisition of floodplain areas. This is a new project on the 2011-2013 WRIA 1 3-Year Project Plan and includes elements of the PSNERP project proposed for the Lower Nooksack.
- Multiple riparian restoration projects and fish passage projects are planned or underway in independent coastal streams.
- Restoration of connectivity (upstream and downstream) and estuarine habitat quantity and quality on the Lummi delta including the on-going Smuggler's Slough restoration project.

Harvest-Hatchery

Actions outlined in the 2011-2013 WRIA 1 3-Year Project Plan Harvest-Hatchery worksheet tab represent the ongoing Salmon Co-Manager efforts to implement the North Fork/Middle Fork and South Fork Chinook population recovery programs. The objective of the program is to increase population abundance through captive brood rearing while maintaining good genetic diversity. Ultimately, the objective is to increase natural origin population abundance through having returns spawn naturally. Hypotheses related to these programs are incorporated in the Co-Managers work plans and management plans associated with the program. The co-manager representatives responsible for implementing these programs are active participants in the local recovery activities,

and include members of the WRIA 1 Salmon Recovery Staff Team. This integrated participation improves integration and consistency in implementation of all recovery actions.

Since the tasks outlined on the Harvest-Hatchery worksheet are part of an on-going program, they are not significantly different than those listed in the 2010-2012 3-Year Project Plan. The accompanying 2011-2013 WRIA 1 Salmon Recovery 3-Year Plan Action Description document provides a summary of these ongoing programs. Generally, however, elements of the program include:

- Collection of South Fork Chinook broodstock by beach seining juvenile Chinook and DNA analysis to ascertain stock identity.
- Captive rearing at Kendall and Manchester facilities
- Ripening adults transferred to Skookum Hatchery for spawning
- Offspring reared at Skookum Hatchery and released to South Fork

Population Monitoring-Research

This worksheet tab in the 2011-2013 WRIA 1 3-Year Project Plan represents an on-going Salmon Co-Manager program, which is described in the accompanying 2011-2013 action description document. Generally, elements of the program include:

- Nooksack South Fork and North/Middle Fork Chinook Population Monitoring
- Mainstem smolt trap population monitoring
- Steelhead population monitoring
- Bull trout population monitoring
- Coho population monitoring

Programs

This tab of 2011-2013 WRIA 1 3-Year Project Plan outlines the programmatic activities associated with the WRIA 1 Salmon Recovery Plan near term actions. Additionally, this tab connects the 3-Year Project Plan to the Salmon Recovery Staff Team's Annual Work Plan by reference. The Salmon Recovery Staff Team's annual work plan outlines in greater detail programmatic activities and milestones associated with implementing near term actions in the WRIA 1 Salmonid Recovery Plan in addition to the Lead Entity operational activities. Following are the near term program actions included on the 2011-2013 WRIA 1 3-Year Project Plan.

Integration of salmon recovery and floodplain management (outlined in the attached 2011 WRIA 1 Salmon Recovery Work Plan)

- Implement measures to ensure flood and transportation projects maximize benefit to salmon to the extent possible (ongoing).
- Continue planning for a 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 for affected landowners and stakeholders.
- Consultation with salmon recovery staff for flood projects (ongoing). This has been occurring on a project specific basis.
- Identify options for earlier two-way consultation during project development phases for both salmon recovery and flood projects. A flood/fish subcommittee has been established to identify the options and any related policy issues.

- Continued discussion and refinement of County procedures and guidelines for complying with the FEMA Biological Opinion on the National Flood Insurance Program and the review of floodplain development will occur during the next couple years. Revisions to county code and an ESA checklist used to help evaluate development proposals will occur in 2011 and may be modified in the future based on local input and as the existing checklist is utilized and as FEMA/NOAA guidance becomes more clear and consistent.

Setting and Managing Instream Flows in WRIA 1

- The goal of the WRIA 1 Watershed Management Project as it relates to the instream flow element of salmon habitat and 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. The following actions are proposed or underway for the 3-year time frame:

  a. Nooksack Forks- The instream flow negotiation settlement process is still underway. The process is conducted under confidentiality agreements. The scope of the discussions has included the Nooksack Forks, however, details associated with the scale or potential solutions for managing water are not available at this time.

  b. Lower Mainstem Nooksack- The Lower Nooksack Strategy, which includes an objective to initiate instream flow negotiations in the lower Mainstem Nooksack River, was approved by the WRIA 1 Watershed Joint Board in October 2010. The funding strategy for the Lower Nooksack Strategy involves multiple sources including state funds, to fund negotiations and supporting technical analyses. Implementing the instream flow negotiations will be contingent on funding.

Other programmatic actions

- Salmon recovery implementation oversight and coordination (refer to 2011 Salmon Recovery Staff Team Annual Work Plan).
- Habitat and water quality monitoring in early Chinook habitats to evaluate project/program effectiveness and status and trends
- Monitoring and Adaptive Management Program (MAMP) is in development. A draft outline and preliminary habitat targets have been completed. Subcommittees for each of the elements of the MAMP are being established and expected to be in place in May 2011. Once it is available, the RITT monitoring template for watersheds will be considered in the development of the WRIA 1 MAMP approaches. Additionally, information that is provided by the RITT and other sources will be considered during the development of the MAMP. A draft WRIA 1 MAMP is anticipated to be completed by the end of 2011. Additional timelines and milestones are outlined in the 2011 Salmon Recovery Staff Team Work Plan.

Summary of Changes to the *2011-2013 WRIA 1 3-Year Plan* from the *2010-2012 WRIA 1 Salmon Recovery 3-Year Implementation Plan*

- The format of the 2011-2013 WRIA 1 3-Year Project Plan has been modified in an effort to separate habitat actions focused on chinook as the primary species, habitat actions focused on other WRIA 1 salmonids, habitat actions in the estuary and nearshore environment, ongoing hatchery and harvest programs implemented by the Salmon Co-Managers, and programmatic actions. This format better correlates actions underway and proposed with the near term actions

identified in the *WRIA 1 Salmonid Recovery Plan* and outlined in the "Overview of WRIA 1 Watershed Restoration Strategy and Near-Term Actions" section of this narrative.

- Projects that were not initiated in 2010 were shifted to a projected 2011 or later start date. Specific start date is depended on budget and staff capacity to implement.
- A column was added to the 2011-2013 WRIA 1 3-Year Project Plan to identify the 2011 Priority Restoration tier for chinook restoration actions. This prioritization is only relevant to the worksheet labeled "Near Term Habitat Action-Chinook", and is based on a technical workshop to develop a reach-level strategy for project implementation in the Nooksack Forks.
- Programmatic actions that involve the WRIA 1 Salmon Recovery Staff Team have all been moved from the 3-Year Project Plan to the Staff Team's annual work plan. The annual work plan is identified by reference on the worksheet and is included as an attachment in the 2011-2013 WRIA 1 3-Year Project Plan package.
- Projects were added that were considered feasible to implement or initiate within the projected timeframe, or that are associated with tasks in process. The additional projects include: (a) several new restoration projects in the Nooksack Forks that will be staged from concept through construction within the 3-year horizon; (b) several new projects in the lower Nooksack River tributaries; and (c) several new projects added under Estuary/Nearshore category associated with the Lower Nooksack River.
- The 2010-2012 placeholder for Middle Fork habitat restoration projects that was pending completion of the Middle Fork Habitat Assessment has been removed and replaced with specific project proposals that are consistent with the draft Middle Fork Habitat Assessment that will be completed June 30th.
- 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.

Responses to Questions Posed in 2010 Three Year Work Plan/Program Guidance

Consistency Question

1. *What are the actions and/or suites of actions needed for the next three years to implement your salmon recovery chapter as part of the regional recovery effort?*

   The actions are identified in the *2011-2013 WRIA 1 3-Year Project Plan* spreadsheet submitted with this narrative. Descriptions of the actions are in the accompanying *2011-2013 WRIA 1 3-Year Project Actions.* The "Overview of the 3-Year Project Plan" section of this narrative organizes the key actions from the spreadsheet according to the WRIA 1 Salmon Recovery Plan 10-year action that they address. These actions can be grouped into the following categories;

   - Actions necessary to stabilize the two natural origin Nooksack early Chinook populations through artificial supplementation.
   - Habitat actions to address critical limiting factors in priority reaches for Nooksack early Chinook.
   - Habitat actions to address multiple species needs of WRIA 1 salmonid populations
   - Actions to address local implementation infrastructure including the integration of salmon recovery and watershed management administrative and policy functions are proceeding as per the integration plan.

Pace/Status Question

2. *What is the status of actions underway per your recovery plan chapter? Is this on pace with the goals of your recovery plan?*

   Progress is being made on all of the key actions identified in the WRIA 1 Salmon Recovery Plan either directly through the WRIA 1 Salmon Recovery Board and its committees or through the activities of the individual entities represented on the Board. Implementation is not, however, on track to achieve the recovery goals identified in the Salmon Recovery Plan.

   The project staging approach that was initiated in 2009 continues in the current 3-Year Project Plan (e.g., design and feasibility funding staged first followed by construction funding when feasibility of design is known). The sequencing of restoration projects and focusing on areas that benefit chinook continues to be a priority for implementation. Significant progress has also been made on the North Fork/Middle Fork and South Fork Chinook recovery programs, and integration of salmon recovery needs into other WRIA 1 programs (e.g., CAO/SMP updates, flood hazard program, instream flow processes).

   Barriers to implementation, including funding and capacity constraints experienced by many of the local recovery partners, continue to hinder the pace at which some key actions are being implemented. Some actions have barriers to implementation imposed at a federal or regional level that have implications to local actions (e.g., FEMA no rise, WDFW streamlined permitting). In addition, restoration of physical and biological processes is a complex undertaking, with factors such as full geomorphic and floodplain ecologic response to instream projects and subsequent population response taking years to occur.

   The WRIA 1 Salmon Recovery Staff Team is in the process of developing habitat targets to support recovery goals as part of the task to develop a WRIA 1 MAMP. The completed MAMP will enable the Staff Team to better quantify the status and pace of recovery, and provide a quantitative assessment of the pace of recovery.

3. *An excel document is attached which includes a spreadsheet called 'PSP Staff Work – Watershed Goals.' This spreadsheet will be filled out by PSP staff based on your watershed chapter plan to identify the 10-year recovery goals & objectives. PSP staff will send each watershed this information in preparation for the three-year work plan update process. This spreadsheet is to help track progress (and changes) toward recovery goals. What is the general status of implementation towards your habitat restoration, habitat protection, harvest management, and hatchery management goals? Progress can be tracked in terms of 'not started, little progress, some progress, or complete' or in more detail if you choose.*

Sequence/Timing

4. *What are the top implementation priorities in your recovery plan in terms of specific actions or theme/suites of actions? How are these top priorities being sequenced in the next three years? What do you need to be successful in implementing these priorities?*

   The top implementation priorities have been actions that will maximize benefit to the two Nooksack early Chinook populations, namely habitat restoration in the Forks and conservation hatchery programs to sustain the populations while the habitat recovers. Assessment work and restoration planning has been completed for the entire South Fork. Projects identified in the 3-Year Project Plan are consistent with the restoration plans. Assessment work for the Middle

Fork Nooksack is nearing completion. This assessment is informing restoration priorities for the Middle Fork as reflecting in the 2011-2013 WRIA 1 3-Year Project Plan. The assessment work that has been completed for the North Fork also informs restoration projects by reach. A project development workshop that reviewed project strategies by reach within the Nooksack River Forks further informs sequencing and staging of projects that will benefit chinook recovery. The outcomes of that workshop are also reflected in the proposed projects in the 2011-2013 WRIA 1 3-Year Project Plan.

Completing the WRIA 1 MAMP is a priority action for the Salmon Recovery Staff Team. The timeline is to have a draft MAMP completed by the end of 2011. Tasks towards completing that draft are underway with identified milestones set that will help keep the plan development on track. The completed MAMP will help quantify progress on recovery goals.

Successful implementation of restoration priorities will depend on the community and landowner willingness to support the actions. Resolution of barriers involving floodplain management and project permitting that involve federal and regional policies can have implications to successful implementation of local recovery efforts. Additionally, adequate levels and timing of funding is needed to successfully implement the salmon recovery priorities.

Next Big Challenge

5. *Do these top priorities reflect a change in any way from the previous three-year work program? Have there been any significant changes in the strategy or approach for salmon recovery in your watershed? If so, how and why?*

   The project priorities in the 2011-2013 3-Year Project Plan have not changed from the previous 3-year project plan. The approach for implementing restoration projects has not changed and remains focused on sequencing and staging projects to more effectively use available funds. A project development workshop was conducted in March to refine strategies and reaches

   Developing a WRIA 1 MAMP was a priority in the previous 3-Year Project Plan but the strategy for completing it has changed. The current strategy establishes subcommittees for different components of the MAMP along with a timeline and milestones. This sharing of responsibility for establishing elements of the MAMP will help advance development assuming staff resources continue to be available.

6. *What is the status or trends of habitat and salmon populations in your watershed?*

   Although population and limited habitat and water quality monitoring is underway, progress has not been made on comprehensively quantifying and summarizing status and trends. The development of a WRIA 1 MAMP will support that need. Based on available information, population data indicates that the North Fork population has been stabilized through artificial propagation, although the natural origin (wild) population has declined in abundance for three consecutive years. Productivity remains well below replacement levels. The South Fork population has reached critically low levels, prompting the implementation of a captive brood stock program. This extreme measure was not anticipated in the original recovery plan. The current priority on habitat projects in the South Fork targets key limiting factors with the intent of providing for improved spawner to smolt survival conditions when the brood stock program begins to produce juveniles for out-planting.

SRST is in process of establishing habitat targets in the Nooksack Forks as part of the MAMP. As part of that work, SRST and Co-Managers will be able to quantitatively evaluate status or trends. Based on limited monitoring data and anecdotal evidence, however, the following statements can be made:

- Early Chinook population status is fairly stable, at low levels. The wild abundances were lower in 2010, and North/Middle Fork NORs declined for the third consecutive year in 2010. Hatchery origin spawners from the Kendall Hatchery North/Middle Fork spring Chinook rebuilding program did not experience this decline. The South Fork population estimate was also lower in 2010, though inclimate weather reduced spawn surveys during the critical window, and the escapement estimate may be artificially low. Juvenile broodstock collection has recently been much more promising from the 2010 brood year, and will be used in for the South Fork spring Chinook captive brood program, with good juvenile representation for brood year 2007 through 2009, and BY 2010 collections are promising to date. Baseline abundance data is being collected for winter-run steelhead.
- Pool quantity, residual pool depth, area in complex cover, large wood and log jam numbers and volume, and, to a lesser extent, temperature refuges have increased modestly in the South Fork.
- Availability of stable side channel habitat in the North Fork has improved modestly, due to the Lone Tree log jam project.
- More land is in conservation status, especially along the Forks.
- Riparian function of lowland chinook tributaries is somewhat improved, due to extensive planting of riparian areas (within 30-50' of stream) in the last decade.

7. *Are there new challenges associated with implementing salmon recovery actions that need additional support? If so, what are they?*

The challenges associated with implementing salmon recovery actions have not changed from the previous 3-Year Project Plan:

- Community relationships in the current anti-government, anti-tax, anti-environmental protection political environment
- Although there has been limited progress with integrating flood hazard management and salmon recovery, planning and implementing multiple objective projects involving multiple partners remains a challenge because of differing perspectives and priorities. We appear to be losing ground on levee vegetation removals, due to new direction from ACOE staff. Additionally, the FEMA no-rise policy has reduced effectiveness of instream projects.
- Implementation of FEMA NFIP Bi-Op on floodplain development lacks solid guidelines and clear policies as to how it may/may not relate to salmon recovery projects.
- Challenge of decreasing staffing and budgetary resources of SRB entities affects staff involvement in all aspects of salmon recovery.
- WDFW is applying a more conservative approach to evaluating proposed restoration projects under the streamlined process (RCW 77.55.181) than was used prior to 2011, and are telling some restoration practitioners that they must instead use a full Jarpa, include

SEPA, and obtain a County Shorelines exemption (or permit). This adds costs and additional process and review time for projects.

- Steelhead are now listed, but they are not yet explicitly integrated into our recovery priorities nor have critical habitats been federally designated providing some guidance on relative priority and multiple species restoration opportunity. Even so, this has created additional needs for population monitoring, managing harvest etc. No funds are yet identified for steelhead.

2011- 2013 WRIA 1 SALMON RECOVERY 3-YEAR PLAN

ACTION DESCRIPTIONS

The 2011-2013 WRIA 1 Salmon Recovery 3-Year Plan Action Description document is formatted to align with the projects and programs listed in the *2011-2013 WRIA 1 Salmon Recovery Plan 3-Year Plan* spreadsheet.

Near Term Habitat Action-Chinook

Geographic Area: Multiple Areas in the Nooksack River Forks and Tributaries

Riparian and Stream Restoration in Nooksack Forks and Tributaries

Type: Restoration

Objective: Improve riparian conditions on the Nooksack River Forks and Tributaries

Partnering with private landowners, NSEA's Washington Conservation Corps (WCC) Crew will implement multiple riparian revegetation projects. NSEA presently has funding from other sources that provide project administration, oversight, materials and contractor expenses. PSAR funding for the WCC crew will be used for match for existing and future grant funding for this project. 2010 projects include Stavik / Tinling Creek, Hollinsworth / Tinling Creek, Anderson / Black slough, Walker / Coal Creek, Farwell / Middle Fork, Van Dyk / Middle Fork, Hutchinson / Bear Slough, Bennet / North Fork, Hatchery / North Fork, Barker / Black Slough, WLT / Landingstrip Creek, Brown / Tinling Creek, WDNR / Middle Fork, Thompson / Landingstrip Creek Tributary, Ohern / Landingstrip Creek Tributary

Knotweed Survey and Management

Objective: to use existing inventory data to implement controls on 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 is using existing inventory information to guide the control of 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 WRIA 1 with the primary emphasis being on seed/plant source areas within or draining into Chinook priority areas.. Specific targets include Japanese knotweed (Polygonum cuspidatum), Giant (P. sachalinense) and Himalayan (P. polystachyum). Existing inventories will be supplemented as new infestations are documented. 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; less competition for native riparian species

Cost: $105,705 (SRFB grant and County match)

Forest Road Assessment and Implementation

Type: Assessment/Restoration

Objective: Assess orphan roads in Nooksack River Forks watersheds

This project consists of the following stages: (1) compile information from RMAPs on known orphan roads and identify additional orphan roads from LiDAR and other data sources; (2) work with forest landowners to identify (and remove from further study) those road segments planned for future use; (3) prioritize road segments based on potential for mass wasting and sediment delivery to streams; (4) contract with qualified forest engineer to field survey priority orphaned road segments and develop prescriptions for road abandonment or road drainage improvement/fill removal.

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 Nooksack Forks and its tributaries.

Nooksack River Forks Priority Reach Conservation Plan for Salmon Recovery Habitat Targets

Type: Plan/Program

Develop and implement a plan for prioritizing conservation easements and/or acquisitions for purposes of achieving habitat targets. The initial emphasis is on conservation and/or acquisition for restoration. Project is contingent upon landowner willingness to sell, allow conservation easements, or allow restoration to proceed.

Implement Nooksack River Forks Priority Reach Conservation Plan for Salmon Recovery: South Fork, Middle Fork, North Fork Acquisitions

Type: Program/Combination

Implement acquisition and/or conservation easement actions identified through the SRST planning process (refer to *Nooksack River Forks Priority Reach Conservation Plan for Salmon Recovery Habitat Targets*). The objective of is to acquire key properties to implement planned priority restoration projects and/or provide protection for intact habitat in the Nooksack River Forks. This action is listed as a single action in the accompanying WRIA 1 2011-2013 project plan spreadsheet under "Multiple Geographic Areas Within the Nooksack Forks and Tributaries", and is included in this Action Description document here and under each of the applicable section of this project action description document (e.g., Geographic Area: South Fork Nooksack, etc).

Geographic Area: South Fork Nooksack

Reaches- Multiple South Fork Reaches

South Fork Strategic Plan

Type: Plan/Program

Develop sequence and priorities for implementing WRIA 1 Salmon Recovery Plan actions in the South Fork watershed. This planning involves hydraulic modeling of South Fork reaches that is currently underway. The tools developed will help guide integrated salmon and flood projects in the South Fork and to support community vision for restoration and future management. A strategic plan will also 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.

HMZ Reconnection

Type: Restoration

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. Potential locations, HMZ area made accessible, and length of bank hardening removed/setback may 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. Projects may be informed by an effort underway to assess (through hydraulic modeling and geomorphic assessment) the interactions between restoration scenarios and flood hazard management in the lower South Fork**.** Project is contingent upon landowner willingness to sell or allow restoration to proceed.

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

Implement Nooksack R. Forks Priority Reach Conservation Plan for Salmon Recovery: South Fork Acquisitions (Corresponds to 2011-2013 WRIA 1 3-Year Project Plan spreadsheet action "Implement Nooksack R. Forks Priority Reach Conservation Plan for Salmon Recovery")

Objective: Acquire properties on the South Fork Nooksack that have been identified as necessary to implement planned priority restoration projects and / or provide protection for intact habitat.

This project will purchase fee simple interest in 1-2 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. Focus on priority reaches from confluence to Skookum Creek.

Cost: Estimated cost of the project is $500,000

Lower South Fork Joint Transportation/Restoration Planning

Type: Plan/Restoration

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 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; (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, and (3) improvements to the infrastructure to alleviate hydraulic constrictions and/or to reconnect historically connected side channel or floodplain habitats. The project will be implemented in two phases by area, with an estimated planning cost of $100,000 for each area. Emphasis in the 2011-2012 period will be the Potter Road bridge area and the Black Slough reach per the South Fork at Five Cedars Black Slough Reach project proposed in the Todd Creek Reach. Projects are likely to require landowner willingness to proceed with implementation.

Benefit: Two restoration plans coordinated with transportation plans or projects.

Lower South Fork Wetland Water Storage Improvement

Type: Restoration

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 remeandering 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.

South Fork Reach Projects and Programs

Reach: VanZandt
South Fork Instream Restoration- VanZandt

Type: Restoration

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

This project involves design and construction of stable log jams within a 0.5-mile segment of the lower the South Fork Nooksack River (RM 0.9-1.4) in an area of known cool water influence (mouth of Tawes and Caron Creeks). The objectives of the project are to increase habitat diversity, quantity of deep pools with cover, and availability of temperature refuges, while not increasing flood risk to adjacent landowners.

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

Reach: Todd
South Fork at Five Cedars Black Slough Reach

Type: Restoration

This project will restore habitat in the South Fork Nooksack River (RM 2.8-3.2), continuing our strategy of locating log jams at regular intervals along the lower South Fork to improve holding and rearing habitat for South Fork Nooksack early chinook and other salmonids. Log jams will be designed to form pools and provide complex cover.

Benefit: Increase in number of log jams engaged with low flow channel, main channel pools,

Reach: Hardscrabble
South Fork at Sygitowitcz

Type: Restoration

This project will restore habitat in a reach that scored 3rd highest among 18 reaches in the South Fork in terms of restoration potential; projects in the other two reaches are already underway. Specifically, this project will construct 7 engineered log jams, stabilize one existing log jam, and remove about 250 feet of riprap in the South Fork Nooksack River near Sygitowicz Creek (RM 3.85-4.0) in order to: (1) Increase habitat diversity (i.e. increase quantity of complex wood cover in low-flow and high-flow channels, increase habitat unit diversity); (2) increase key habitat quantity (increase number and depth of pools forholding and rearing, number of pool tailouts for spawning); and (3) increase availability of summer temperature refugia by encouraging formation of deep, thermally-stratified pools in groundwater discharge and tributary confluence areas. The project is also designed to not significantly increase flood risk to adjacent landowners.

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

South Fork at Hardscrabble

Type: Restoration

This project will design and construct engineered log jams in the South Fork Nooksack Hardscrabble Creek Reach (~RM 5.1-5.4). Log jams will be designed to address factors most limiting SFN early Chinook in the reach, including low habitat diversity and lack of deep holding pools with cover. Structures presented in the conceptual designs are similar to those constructed in the Todd Creek reach downstream in summer 2008; those structures have been successful at promoting scour and formation of deep, thermally stratified pools.

Benefit: Increase in number of log jams engaged with low flow channel, main channel pools

Reach: Standard
South Fork at Standard Creek

Type: Restoration

This project will construct log jams along the left bank of the South Fork Nooksack River (5.8-6.2) to increase habitat diversity and form deep holding pools with cover. The project will expand earlier work completed along the right bank and associated side channel in 2007.

Benefit: Increase in number of log jams engaged with low flow channel, main channel pools

Reach: BNSF
Acme-Confluence Reach HMZ Reconnection: Jones/McCarty (RM 7.5-8.0)

Type: Restoration

Objective: Reconnect disconnected floodplain to reduce mainstem velocities and restore channel migration processes that create habitat diversity and reduce fine sediment loading by promoting overbank sediment deposition.

This project is to acquire approximately 90 acres bordering the South Fork and on the Jones and McCarty Creek alluvial fans for future HMZ reconnection and off-channel habitat and riparian restoration. The property was recently (2011) acquired by a private party. While details were not available at the time this narrative was updated, the new landowner is apparently working cooperatively with WSU-Skagit on a demonstration farm the plans for which are still in development. The new landowner will need to be contacted to determine potential to pursue restoration actions or possible purchase. Coordination with Whatcom County Public Works River and Flood regarding Jones Creek alluvial fan hazard mitigation plans will also be necessary. Acquisition would create opportunities to setback an existing levee, to open up a constriction caused by the BNSF bridge/trestle, to remeander the channel of Jones Creek to create improved floodplain tributary habitat and eliminate an anadromous barrier, to connect two floodplain ponds to provide off-channel rearing and flood refugia, and to engage the Acme Elementary School and the community in an active and community oriented restoration and education site.

Benefit: up to 90 acres of historic floodplain and alluvial fan/tributary habitat reconnected; up to 0.3 miles of tributary habitat access improved, setback 1,500' of left bank levee

Catalyst Floodplain and Wetland Riparian Restoration

Objective: improve fish passage, water storage, and instream, riparian and wetland habitat conditions

- Daylight 1000 feet of Landingstrip Creek tributary
- Make minor channel modifications and install LWD structures along Landingstrip Creek and tributary
- Work with Acme Flood Control District to stabilize South Fork left bank (upstream of Dozer hole) using LWD
- Revegetate 127 acres of riparian and flood plain habitat with appropriate native vegetation on

South Fork Riparian Enhancement Project

Type: Restoration

Objective: Improve riparian conditions on the South Fork Nooksack River and several tributaries.

Plant 34 acres with appropriate native vegetation, and maintain for a period of 3-years. Improvements in riparian vegetation will benefit multiple Salmonid species and lifestages by providing shade and cover, reducing erosion, filtering inputs from adjacent agricultural lands, and providing a future source of LWD. This project is related to SRFB Project #07-1828R, which provided funding to acquire the largest of project sites for restoration and conservation.

Reach: Acme

Acme Early Chinook Restoration – Project completed in 2010.

Type: 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. The project was constructed in two phases and was completed in the spring of 2011. Final construction costs were $450,800. Remaining grant balance of $137,000 was reallocated through WRIA 1 to a priority acquisition project upstream of the Acme project site.

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.

Reach: Hutchinson
South Fork Hutchinson Reach Restoration

Type: Restoration

This project will design and implement instream restoration projects along the South Fork Nooksack River from ~RM 9.3-10 to increase habitat diversity and form deep holding pools with cover. There are several flood hazard concerns in the proximity, so this reach presents potential opportunities for flood-salmon integration and education/outreach to the community of the South Fork valley.

Benefit: Increase in number of log jams engaged with low flow channel, main channel pools

Reach: Saxon
Saxon Reach Restoration

Type: 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

- Benefit: 10-13 log jams, 5-10 pools with complex cover, cooler water areas local to the logjams during summer low flow
- Habitat structures along right bank of Nesset's Creek, flowing into the downstream section of the right bank of the project reach

Reach: Skookum
Skookum Reach Restoration

Type: Restoration

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

The Skookum Reach project will consist of 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 feet of bank protection, installing 3 active channel logjams, re-locating 3000 feet of Saxon Road to upland areas and restoring 11.8 acres of riparian buffer stand.

Reach: Cavanaugh
Cavanaugh Creek Island 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 installing two engineered logjams (ELJs) to draw the thalweg of the main channel toward the head of the island. An ELJ downstream of the side channel inlet will raise high flow water surface elevations for increased engagement into inlet. Habitat structures comprised of key pieces of LWD will be installed in the side channel for habitat complexity. 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. Another project component will be three more ELJs along the lateral bar of Cavanaugh Island. These ELJs will engage mainstem flows with a forested wetland cool

water outflow. 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, habitat complexity in the side channel, 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.

Reach: Larson's Bridge

Larson's Floodplain Refuge 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.

Fobes Creek Reach Restoration

Type: Restoration

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.

Reach: Elk Flats
Elk Flats Restoration Design

Type: Restoration

Objective: To design a project that restores floodplain connectivity within the channel migration zone (CMZ) and removes a major sediment source from upper South Fork.

Elk Flats is situated at RM 22.6 of the South Fork. Rural residential structures on the Elk Flats CMZ are being removed to permit channel occupancy on a low-gradient floodplain. Engineered logjams upstream of Elk Flats will be designed to encourage channel occupancy away from an actively eroding bank and towards Elk Flats. A log revetment may also be designed to retain sediment at the toe of the bank, similar to the downstream Larson's Reach project.

Geographic Area: Middle Fork Nooksack

Reaches- Multiple Middle Fork Reaches

Reach Scale Restoration Design

Type: Planning/Restoration

Develop sequence and priorities for implementing actions in the Middle Fork Nooksack. This action will incorporate results of the Middle Fork Reach Assessment and Restoration Planning that is in process.

Implement Nooksack R. Forks Priority Reach Conservation Plan for Salmon Recovery: Lower Middle Fork Acquisitions

Objective: Acquire properties on the North Fork Nooksack that have been identified as necessary to implement planned priority restoration projects and / or provide protection for intact habitat.

This project will purchase fee simple interest in 1-3 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. Focus on priority reaches from confluence to River mile 3..

Cost: Estimated cost of the project is $250,000

Middle Fork Diversion Dam

Type: Restoration

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 project is expected to improve the abundance, productivity, spatial structure and diversity of NF/MF Nooksack early chinook.

Design and engineering work for a fish ladder and relocation of a new intake have been completed and evaluated. Both approaches have been discarded over cost and constructability. A new intake design, utilizing a siphon and the existing tunnel has been completed and a physical model run to test the feasibility of this approach. Tentative results appear promising and cost are currently being evaluated.

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

Middle Fork Reach Projects and Programs

Reach: Welcome

Ring Forest Off-channel Reach Restoration

Type: Restoration

Objective: To improve floodplain connectivity, re-create an anabranching system of islands and off-channels, provide off-channel holding and rearing opportunities, increase wood recruitment potential and shading through riparian enhancement.

The Ring Forest Off-channel project is located between RM 3.0 and 2.0. The project will be constructed in two phases and likely use two to three logjam types. Approximately 11 ELJs will be built to increase habitat function in the active channel. The project will use helicopters to delivery key pieces of LWD to restored side channels.

Lower Middle Fork Downstream of Ring Forest Side Channel

Type: Restoration

Design structures to stabilize existing wood debris, collect transient wood and provide key instream structure in active channel of the Middle Fork from downstream end of LNR Ring Forest Side channel Project (approximately RM 0.0 - 1.8) to the confluence with the North Fork prioritized based on results of 2007 SRFB funded Middle Fork Assessment**.**

Benefit: The project will improve and protect stable spawning habitat, a primary limiting factor of North /Middle Fork ESA listed native chinook.

Reach: Porter

Middle Fork LWD Placement 2012

Type: Restoration

The objective of the Nooksack Middle Fork Instream Phase 2 project is to extend Phase I LWD placement downstream approximately 0.8 miles to upstream end of the LNR Ring Forest Side channel Project.

Benefit: The project will improve and protect stable spawning habitat, a primary limiting factor of North /Middle Fork ESA listed native chinook in a reach which currently attracts up to 80% of the Middle Fork chinook spawning population and prior to 1995 supported the majority of MF tributary steelhead spawning. When complete the project is expected to 1) encourage the preservation of a 100 acre forested channel island and an associated spring fed side channel, 2) balance flows between two one mile long river channel reaches to maximize habitat area and provide considerable protection to developing stable spawning habitat and 3) initiate habitat recovery of the mile long Porter Creek channel reach

Geographic Area: North Fork Nooksack

Reaches- Multiple North Fork Reaches

Implement Nooksack R. Forks Priority Reach Conservation Plan for Salmon Recovery: North Fork Acquisitions

Objective: Acquire properties on the North Fork Nooksack that have been identified as necessary to implement planned priority restoration projects and / or provide protection for intact habitat.

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 inorder to fully control and restore planned salmon habitat structures. Focus on priority reaches from Mosquito Lake Road bridge upstream to Glacier.

Cost: Estimated cost of the project is $750,000

North Fork Reach Projects and Programs

Reach: Farmhouse

North Fork Farmhouse Reach Restoration

Type: Restoration

This project will design and implement instream restoration throughout the North Fork Nooksack River Farmhouse Reach (RM 46.8-49.4) that will restore historic channel planform (island-braided morphology), habitat diversity, and habitat functions, including stable spawning and rearing habitats for NF/MF Nooksack early chinook. Potential concepts include placement of wood to protect side channels and existing and incipient forest islands. The Farmhouse reach of the North Fork Nooksack River is one of two project reaches among 14 reaches that scored

highest in terms of restoration potential in the North Fork Nooksack River. Feasibility and design was funded in 2009 SRFB/PSAR round; construction of phase 1 is expected in summer 2011.

Benefit: increased stability, low flow connectivity of side channels; increased key habitat quantity (primary pools; complex edge, backwater habitat); increased area and age of floodplain forest.

North Fork Channel Island LWD Augmentation- Farm Reach

Type: Restoration

This project will implement a component of the design developed through the *North Fork Farmhouse Reach Restoration* project, namely stabilization and augmentation of existing log jams.

Benefit: increased stability of log jams, increased roughness

Reach: Lone Tree

North Fork Reach Stable Side Channel Restoration- Lone Tree

Type: Restoration

This project will design and implement instream restoration throughout the North Fork Nooksack River Lone Tree Reach. Up to two large and four small logjams on the left bank floodplain of the North Fork Nooksack River at RM 53 will be constructed in order to roughen the floodplain, encourage channel island and side channel development, and encourage flow into a 1.1 km side channel that was the focus of Phase I (07-1802R).

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

Reach: Wildcat

North Fork Wildcat Reach Restoration

Type: Restoration

This project will design and implement instream restoration throughout the North Fork Nooksack River Wildcat Reach (RM 53.3-54.8) that will restore historic channel planform (island-braided morphology), habitat diversity, and habitat functions, including stable spawning and rearing habitats for NF/MF Nooksack early chinook. Potential concepts include placement of wood to protect side channels and existing and incipient forest islands. The Wildcat reach of the North Fork Nooksack River is one of two project reaches among 14 reaches that scored highest in terms of restoration potential in the North Fork Nooksack River. Feasibility and design was funded in 2009 SRFB/PSAR round; construction of phase 1 is expected in summer 2011.

Benefit: increased stability, low flow connectivity of side channels; increased key habitat quantity (primary pools; complex edge, backwater habitat); increased area and age of floodplain forest.

Reach: Canyon

Lower Canyon Creek Phase 2 Design and Restoration

Type: Restoration

Objectives: to improve adult passage and restore physical and biological processes that form and maintain habitat diversity and complexity for early chinook and pink salmon, steelhead, 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. The Phase 1 project has been completed with Phase 2 design and permitting, and property acquisition and easements are happening in 2011. Phase 2 construction is scheduled for 2012. Habitat priorities include setting back the flood levee to remove a hydraulic constriction that limits floodplain and habitat forming processes, providing improved in-stream habitat structure and diversity, and promoting recovery of riparian areas. Passage at the river-mile 0.2 bedrock reach was evaluated and determined to not be a barrier for the three ESA listed target species (spring Chinook, steelhead, and bull trout) but may be problematic for weaker swimmers such as sockeye and pink salmon. The reach scale habitat restoration plans will factor in maintaining or improving long-term passage at the bedrock reach to provide access to upstream spawning and rearing 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.

Habitat Assessments

Middle Fork Nooksack Habitat Assessment

Type: Assessment

Objective: Prepare assessment and restoration strategy for Middle Fork Nooksack

This project will assess limiting habitat conditions and plan restoration projects Middle Fork Nooksack River

Expand North Fork Assessment

Type: Assessment

Build on existing assessment work for the North Fork watershed. Tributary habitat mapping and scoping of the expanded assessment will occur in 2010.

Upper 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

Near Term Habitat Action- Other

Geographic Area: Mainstem Nooksack River and Tributaries

Lower Mainstem

Double Ditch Acquisition and Relocation

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.

Goodwin Road Culvert Replacement (Dale Creek)

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

This project is on hold pending funding availability and completion of other higher priority barrier corrections.

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

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.

This project has been funded. Permits are in preparation and easements are being obtained with an eye on 2011 construction. Delays in obtaining appropriate easements may mean the project is built in 2012.

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

Riparian Restoration Program – Fishtrap Border to Badger Reach

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

Fish Trap Reach Levee Setback

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.

Fish Passage Barrier Removal Program (Lake Terrell Passage)

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 replaces barrier drainage structures under county roads as the design life is met, as sections of road are improved, and as funding becomes available for larger, more complex projects (e.g. Bay Road). 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. Nooksack Salmon Enhancement Association has taken the leadership role in working with private landowners to systematically treat drainage structures that create barriers – removing them where possible and replacing them with passable structures where landowners need to retain access. Barriers providing the greatest fish benefit if removed are prioritized and will be systematically repaired.

Whatcom Conservation District and WDFW secured a community salmon grant funding to retrofit the Dam on Lake Terrell to provide fish passage which has blocked anadromous fish access to the lake and Butler Creek since the 1940s.

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

Flood Gate Modification

Objective: Improve fish access to an estimated 20,000 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

Estuary and Nearshore

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

Bellingham Bay Nearshore and Pocket Estuaries Design, Restoration and Creation (*General action description for multiple projects listed on the 2011-2013 WRIA 1 3-Year Project Plan spreadsheet*)

Type: Restoration

Objective: Restore historic estuarine habitat, create new estuarine habitat, improve water quality, restore tidal and saltwater influence for improved utilization and productivity of early Chinook and steelhead.

The City of Bellingham will partner with multiple landowners to implement pocket estuary restoration projects within Bellingham Bay. Projects will likely include riparian restoration, LWD placement, removal of fish barriers, increased shoreline length, increased hydrologic connectivity, and increased salt marsh area. These actions will increase habitat availability, habitat function, habitat diversity and habitat connectivity for Nooksack early chinook and steelhead.

Slater Road Elevation

Objective: Construct new elevated road to cross the left bank flood plain east of the Nooksack river crossing. Elevating roadway is prerequisite to removal of levee south Slater Road and the reconnection of 600 acres of floodplain.

The project supports continuing efforts of the WDFW and Whatcom County to reduce flood hazards and restore critical off channel and transitional riverine habitats. The project represents a component of the third phase of the earlier Marietta Slough restoration effort which purchased the fee simple title to 600 acres of flood plain wetland habitat, removed four homes, and began the process of restoring wetland and riparian habitats on the acreage. The long term objective of the Marietta slough project is to modify sections of existing levees to reconnect the floodplain with the tidal influenced river. Slater road, which provides primary access to the Lummi Reservation, two refineries and Alco aluminum is prone to flooding and frequently is closed. Hydraulic modeling indicated flooding of Slater road could be exacerbated with levee modification. Given the past history of road closures and the desire to re-connect the floodplain immediately downstream of Slater road, the elevation of the road way is a critical component to achieving the **:**long term objective of modifying the levee to reconnect the 600 acres of floodplain with the Nooksack River. The project is designed and mostly permitted and lacks full funding to implement.

Benefit: The project is designed and permitted. Completing the elevation of the roadway will remove a critical obstacle to the modification/removal of levees disconnecting 600 acres of wetland and floodplain from the Nooksack River.

Cost $9,000,000

Marietta Acquisition

Objective: Purchase 8-10 flood prone properties located in the lower tidal reach of the Nooksack River as a prerequisite to modifying Nooksack River levees to reconnect 600 acres of tidal influenced flood plain and wetlands habitats.

The project supports continuing efforts of the WDFW and Whatcom County to reduce flood hazards and restore critical off channel and transitional riverine habitats. The project represents a component of the third phase of the earlier Marietta Slough restoration effort which purchased the fee simple title to 600 acres of flood plain wetland habitat, removed four homes, and began the process of restoring wetland and riparian habitats on the acreage. The long term objective of the Marietta slough project is to modify sections of existing levees to reconnect the floodplain with the tidal influenced river. The town site of Marietta routinely floods generating repetitive flood damage losses. Hydraulic modeling indicated flooding in the Marietta town site could be exacerbated with levee modification. Given the past history of flood loss and the desire to re-connect the floodplain immediately upstream of Marietta, the removal of residences from the site is a prudent use of public funds

Benefit: Purchase of flood prone properties reducing future flood loss claims and the removal of a major obstacle to the restoration of 600 acres of tidally influence flood plain.

Cost $800,000

Coastal Stream and Marine Shoreline Riparian Assessment and Restoration Prioritization

Objective: Inventory riparian condition of coastal streams and marine shoreline.

The inventory for Dakota, California, Terrell, marine border to Pt. Whitehorn was completed in 2010. The inventory for the remainder of coastal streams and marine shoreline south of Point Whitehorn can proceed when funding is identified.

Benefit: Inventories will be used to fill a key data gap and to identify restoration priority areas and projects.

Cost: $100,000

Nearshore Habitat Restoration 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: To be determined; may be able to accomplish as a Salmon Recovery Staff Team work product when time is available.

Lower Nooksack River Restoration

Objective: Restore floodplain connectivity to restore habitat forming processes, moderate flood velocities and improve flood refugia, and improve flood hazard management in the lower Nooksack River, upper estuary, and floodplain tributaries.

This project supports restoration of riverine and floodplain function in the lower Nooksack River from approximately the Lummi River south to the delta.

Phase 1. An initial phase of work has been packaged in an application for 2011 ESRP funding ($425,000) to do detailed hydraulic modeling of the project reach to evaluate various levee removal, partial removal, and setback alternatives to determine hydraulic and habitat benefits. Additional acquisition of flood-prone properties in the community of Marietta that limit future restoration actions on the east floodplain are also included. This project is also on the current list of Puget Sound Nearshore and Estuary Restoration Program projects. If successful, the larger structural elements (e.g., levee setback, bridges, etc.) of the project would be funded and constructed under PNSERP.

Phase 2. WDFW will pursue the acquisition of approximately 140 acres of right bank flood plain east of Ferndale Road in support of the larger Lower Nooksack River objective. Cost $1, 350,000

Benefit: Purchase of flood prone properties reduces future flood loss claims and opens up restoration opportunities for over 1,200 acres of floodplain and upper estuary.

Cost: Initial assessment and acquisition costs are $425,000 with the cost of full implementation to be determined.

Estuarine and Marine Nearshore Needs Assessment and Prioritization

Objective: Identify distribution and abundance of early Chinook in Bellingham Bay.

Compile relevant exiting data and studies such as beach seine and open water salmonid surveys, implement a two year program to identify areas and habitat types most frequented by juvenile Chinook. The project would regularly sample on shore and off shore habitats from Chuckanut Bay to Portage Island, 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

Hatchery/Harvest

South Fork Nooksack Chinook Captive Brood Recovery Program

Type: Captive Brood Hatchery Population Recovery Program

Objective: Increase population abundance in South Fork, through captive brood rearing, while maintaining good genetic diversity. Ultimately, increase natural origin population abundances through having returns spawn naturally.

Continue seining juvenile Chinook for a complete brood cycle, run DNA for best fit assignment to the three stock baselines. Retain the South Fork Chinook population juveniles (1000 per year), and transfer the individuals that have been held temporarily at Skookum Hatchery to Kendall Hatchery where approximately half rear to maturity in freshwater. The other half are transferred from Kendall Hatchery to NMFS's Manchester Research Facility in Port Orchard for salt water rearing to maturity. Pit tag individuals and associate the tags with the individual DNA. Transfer ripening adults back to Skookum Hatchery for spawning, with pair mating input from geneticists. Incubate eggs, and raise offspring for traditional sub-yearling release after coded wire tag marking to the South Fork. Release adequate numbers from the hatchery to obtain broodstock upon return, with the remainder off-station to increase the portion that spawn naturally, to ultimately increase population natural origin abundances. After captive rearing a full brood cycle to maturity, transition to a Skookum Hatchery traditional population rebuilding program similar to North Fork Nooksack Chinook program at Kendall Hatchery. Coded wire tag the juveniles released to the river.

Program requires facility upgrades at Skookum, Kendall and Manchester hatcheries, more water at Skookum Hatchery, and will likely require some coho that are reared at Skookum Hatchery to be reared at Kendall Hatchery to have adequate water. An off-station de-stressing release site in upper river will eventually be needed too, as will improving conditions for adult Chinook attraction back to the hatchery when released juveniles return as adults.

Benefits: Increase population abundances with good genetic and life history representation from the population, while improving habitat improves population productivity through better land management and restoration actions. The cwt data will eventually lead to improved understanding of South Fork Chinook migration and river entry timing.

Skookum Creek Hatchery Water Supply

Type: Skookum Hatchery water supply

Objective: To insure a steady supply of water 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 backups to ensure the safety of the chinook supplementation program while meeting 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 improve water intake, minimize the transport of sediment into the hatchery, to meet appropriate screening criteria and to 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 rebuilding program as well as meeting other hatchery objectives. Project requires landowner willingness to proceed. If adequate water cannot be located, some coho rearing of Lummi Bay releases may shift to Kendall Hatchery.

Benefit: Stable cool, clean water supply sufficient to support Skookum Chinook population rebuilding program needs, as well as other hatchery needs.

North/Middle Fork chinook population rebuilding program

Type: Hatchery Population rebuilding program

Objective: Increase population natural origin abundances by having hatchery returns spawn naturally in a manner that generally distributes them well, within the spawning habitat for this population. Release 150,000 into the North Fork at the hatchery, 200,000 into the Middle Fork, and 400,000 double index coded wire tag Chinook into the upper North Fork consistent with the Pacific Salmon Treaty spring chinook harvest management indicator stock criteria. Upper North Fork and Middle Fork releases need de-stressing acclimation sites where fish can be held a few days to maximize survival.

Benefits: Increase population natural origin abundances while improving population productivity through better land management and restoration actions. Provide data for PSC Chinook Technical Committee use on exploitation rates.

Evaluate stray contributions of Samish Hatchery origin summer/fall Chinook releases

Type: Hatchery evaluation program

Objective: Collect otoliths from hatchery summer/fall chinook, read them, and evaluate the origin and distribution of hatchery summer/fall Chinook on Nooksack spawning grounds, with emphasis in South Fork and Bertrand Creek.

All summer/fall Chinook originating from Samish Hatchery have one or more unique marks. The largest release is to the Samish River, and it has a unique otolith mark. The releases to Lummi Bay and into Bertrand Creek (a lower Nooksack tributary) each also have unique otolith marks. All of these are also adipose fin clipped, except for 50% of the coded wire tag (cwt) release into the Samish River. The Bertrand Creek release was shifted from the lower Nooksack River beginning in 2008, in hopes of having them home to Bertrand Creek as adults. Bertrand Creek is not within either Nooksack spring Chinook population's spawning area. In 2008 the release was un-acclimated (meaning directly into lower Bertrand Creek), and in 2009 the release was held for two weeks in the creek, prior to release, to try to increasing their imprinting on that release location so they home back as adults.

In addition to the spring Chinook surveys, later timed Chinook surveys (after Oct. 7th) can collect otoliths from all adipose fin clipped and/or cwt spawned out Chinook, and have these read by the WDFW otolith laboratory. The laboratory will determine the origins of the carcasses, which can help evaluate the contribution rates into the Nooksack spring Chinook spawning areas from these releases, and also whether the releases into Bertrand Creek are mostly homing to that non-spring Chinook tributary.

Benefits: Potentially reduce stray contributions to early Chinook spawning areas. Determine the respective stray contributions from various releases to the South Fork and Bertrand Creek. Test the hypothesis that shifting the release to Bertrand Creek results in homing back to that creek. Results may take a few years to be informative.

Shift the former steelhead hatchery releases to Samish River to Whatcom Creek

Type: Hatchery steelhead program adjustment.

Objective: Have non-native steelhead returns recruit back to a hatchery rack, instead of spawning naturally with wild steelhead. Until 2008, the Samish River received 35,000 Chambers Creek origin steelhead as an off-station release transferred from Kendall Hatchery. Since these did not have the ability to recruit back to a hatchery rack, uncaught returns spawned naturally. To reduce competition and the potential for cross breeding with native steelhead, this release was shifted to Whatcom Creek, and the hatchery on the lower creek will collect adults that return as a secondary broodstock for Kendall Creek Hatchery.

Benefit: Reduce non-native hatchery steelhead spawning in the Samish River, creating a wild steelhead zone for a relatively strong steelhead river with relatively early native spawning due to

its low elevation setting. This reduces the risk of interbreeding between Samish steelhead and Chambers Creek origin steelhead.

Diversify and maintain Washington's sport kokanee program after loss of certified pathogen free water status when the Middle Fork diversion dam passage is restored

Type: Hatchery sport program

Objective: Diversify and maintain hatchery sport kokanee releases to Washington lakes. The fisheries co-manager disease policy requires disease testing of eggs and fish that are transferred out of the respective fish health zones and not raised on certified pathogen free water. This is very expensive, as this has been the traditional source for most kokanee released in Washington lakes. While the risk of virus transfer to Lake Whatcom through the 9 mile long pipeline from the Middle Fork is low, restored anadromous access to the Middle Fork will change the pathogen free water status of Lake Whatcom.

WDFW has begun a captive brood kokanee program near Spokane, where 14,000 kokanee are being raised to adulthood on certified pathogen free water, in anticipation of the changed water status in Lake Whatcom. The current plan is to spawn these fish when ripe, raise offspring and release them into 37 lakes, in anticipation of Lake Whatcom kokanee not being available.

Benefit: Maintain an important recreational fishery while restoring anadromous use to the Middle Fork.

Monitor Southern US Chinook harvest to show consistency in meeting harvest commitments to not impede recovery

Type: Chinook harvest monitoring

Objective: Monitor and assess all sport, commercial, and ceremonial and subsistence fisheries to collect data essential to determining the exploitation rates on the Nooksack early Chinook management unit. Monitor and sample all fisheries, including mark-selective fisheries to estimate total mortality (including non-retention mortality), and to detect and collect coded wire tags. Meet as co-managers to discuss cwt inputs to WDFW, for expansion by the Chinook Technical Committee. Sample the limited in-river ceremonial and subsistence fisheries for coded wire tags, otoliths, scales, adipose fin clips, and DNA of probable wild Chinook to estimate hatchery and wild compositions of the catch. Compile data for inclusion in Puget Sound post-season harvest report to NOAA Fisheries.

Benefit: Show consistency with Southern US exploitation rate ceiling for Nooksack early Chinook (North/Middle Fork and South Fork Chinook) using Kendall double index coded wire tag program and other data.

Agree on pre-season Chinook forecasts for Nooksack early Chinook and summer/fall Chinook, and establish seasons consistent with these

Type: Chinook pre-season fisheries planning

Objective: Agree on Chinook preseason forecasts per Puget Sound Salmon Management Plan criteria, shape fisheries consistent with summer/fall chinook hatchery escapement needs, and the Southern US exploitation rate ceilings for Nooksack early Chinook.

Benefit: Be consistent with harvest commitments to Chinook recovery, and with gaining needed escapements to hatcheries.

Monitor Nooksack wild steelhead harvests in sport, commercial and subsistence fisheries adequately to Steelhead harvest

Type: Steelhead harvest

Objective: Monitor sport, commercial, and subsistence fisheries adequately to estimate and report wild Nooksack steelhead harvest to show consistency with co-manager steelhead harvest plan commitments.

Benefit: While recent steelhead harvest was not considered a significant factor in the threatened species listing, show consistency with the harvest commitment to recovery, while habitat protection and improvements result in reversing the decline in population productivity.

Population Monitoring-Research

Nooksack South Fork and North/Middle Fork Chinook Population Monitoring

Type: Chinook population monitoring

Objective: Conduct spawn surveys of all suitable habitat for the two populations at the two methodology frequencies to count redds and adults, and to collect CWT's, otoliths, DNA, adipose fin status, scales, % spawned, sex, and fork length. After analysis use this data to estimate escapements. Funding constraints and weather limit the ability to completely count all redds, live and dead Chinook in all accessible habitats. Regardless, these surveys, and the coded wire tags and other data collected enable us to estimate total early Chinook abundances for the two populations and hatchery and natural origin contributions to the escapements. WDFW laboratories read the scales for age and life history information, otoliths, and microsatellite DNA from natural origin South Fork Chinook. These data inform the escapements and natural origin abundances. For the South Fork population, explore unsurveyed areas above partial barriers in the Upper South Fork and Skookum Creek above known Chinook use. This is to seek an explanation for the microsatellite DNA parent analysis results of 2007 and 2008 brood year seined juveniles, where the number of parents was larger than the total escapement estimates.

Benefit: Monitor population status of these two high risk populations that are critical for recovery, and collect essential coded wire tags for use by the PSC Chinook Technical Committee. Ultimately see whether population productivity is changing in response to habitat shifts.

Mainstem smolt trap population monitoring

Type: Population monitoring

Objective: Enumerate outmigration of chinook and other species encountered, and estimate overall abundances; initiate juvenile coho mark and recapture effort to improve estimate of smolt productivity from basin.

Benefit: Population timing and long-term trend information.

Spawn surveys for Nooksack wild winter-run steelhead, and occasional summer snorkel surveys for summer-run steelhead

Type: Steelhead population monitoring

Objective: As conditions are suitable, conduct aerial spring flights to count spring steelhead redds in forks and mainstem (WDFW), and survey all accessible tributaries (all). 2004 is the only year when information was available for an informal abundance estimate of total Nooksack wild winter-run steelhead, as viewing conditions for aerial flights were comparatively good that spring. In 2009 aerial surveys were not suitable to estimate spawning abundances in the forks and mainstem, but fairly complete tributary spawn survey data was collected. The more recent tributary data can be used to evaluate the tributary indexes and expansions proposed in the informal methodology. Optimally we will refine an escapement methodology for the tributary portion of the population using the recent comprehensive surveys to establish representative indexes.

Since summer-run steelhead spawn areas of the South Fork that are inaccessible in late winter, there is little chance that escapement surveys can occur. While there is not dedicated funding, summer snorkeling of portions of the South Fork for adult counts could eventually lead to data that can be used to establish population trends. Additional limited hook and line sampling to collect tissues on summer-runs and other important species including bull trout can improve the understanding of population genetics. Collecting steelhead tissues as opportunities arise will increase temporal and spatial representation of Nooksack steelhead, adding to initial co-manager 2009 collections that have had DNA analysis.

Benefits: Abundance and trend information for Nooksack wild steelhead, and better understanding of Nooksack population genetics.

Establish bull trout Nooksack spawn survey index areas

Type: Bull trout population monitoring

Objective: Establish spawn survey indexes for Nooksack bull trout in each fork, as there are no indexes in the Nooksack core area. All accessible areas of Thompson Creek is a good first index for the North Fork, as adult counts have been highest in this creek. No funding to date.

Benefit: Data collection to establish baseline for abundance trends

Microsatellite DNA sampling of Nooksack bull trout core area local populations

Type: Bull trout population monitoring

Objective: In the draft Bull Trout Recovery Plan for the Puget Sound Management Unit (USFWS 2004) and the WRIA 1 SRP (2005), the Nooksack core population is comprised of 10 proposed local populations, representing the smallest interactive reproductive groups. We neither have a general genetics baseline representing the whole core area, nor individual baselines testing the underlying hypotheses for the local populations. Representative tissue sampling within these local areas, DNA analysis and evaluation is needed to better our understanding.

Benefit: Refine our understanding of Nooksack core area bull trout, and the local population groupings within it.

Improve coho escapement estimates

Type: Coho population monitoring

Objective: Improve the existing crude proposed Nooksack coho escapement estimate methodology by developing an independent estimate of minimum natural abundance. Sample the in-river coho fishery for percentages that are natural and hatchery origin, and use the hatchery return data from the same years to estimate minimum natural coho escapements. An assumption is that all hatchery coho not caught in commercial or sport fisheries return to the hatcheries and are enumerated. The total hatchery returns are then expanded by the proportion natural fish in the sampled fishery to estimate total natural abundance, assuming the same migration timing. While the marked Kendall Hatchery coho releases ended in 2008, returning adults to Kendall Creek will still be enumerated at the Kendall ponds before being passed up Kendall Creek. All Skookum and Lummi Bay coho smolts are adipose fin clipped.

Benefit: A low cost way to improve our understanding of minimum natural coho abundance, as our proposed methodology is based on only a handful of indexes that were never based on a study determining their respective contributions toward total abundance.

Programs

WRIA 1 Watershed Plan/ Salmon Recovery Plan Program Implementation and Coordination

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

WRIA 1 Salmon Recovery Plan- Updates

This task is to prepare a schedule and initiate updates to the WRIA 1 Salmon Recovery Plan. The task is pending completion of the WRIA 1 Adaptive Management Plan. Updates anticipated include projects completed and adjustments to the restoration strategy to reflect information gained through completed assessments and strategic plans.

WRIA 1 Lower Nooksack Strategy

Objectives: 1) Negotiated settlement of water rights on the Mainstem Nooksack River; 2) Lower Nooksack River Subbasin water budget; 3) Update Whatcom County Coordinated Water System Plan; 4) Targeted Streamflow and water quality sampling; and 5) Advance implementation tools

WRIA 1 Joint Board approved a multi-objective work plan and funding strategy to implement actions that advance a negotiated settlement of Tribal and state in-stream flow water rights on the Mainstem of the Nooksack River, while maximizing the economic and environmental benefits of out-of-stream water use in the Lower Nooksack sub-basin.

Salmon Recovery 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

WRIA 1 Instream Flow Negotiations (Nooksack Forks)

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 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. Initially, the negotiations were started in Bertrand and Middle Fork watersheds as pilot areas. Under the confidentiality agreement and negotiation settlement framework, the geographic area changed to the Nooksack Forks. Once completed, the negotiation effort will be initiated for the Nooksack River below the Forks.

Benefit: instream flows, flow management regime established for the Nooksack Forks; negotiations for Nooksack below the Forks initiated

Lower Nooksack Tributaries Wetlands Enhancement

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.

Benefit: increased instream flow in lower Nooksack River tributaries

WRIA 1 Salmon Recovery Staff Team Annual Work Plan

The annual WRIA 1 Salmon Recovery Staff Team Work Plan outlines programmatic tasks and actions associated with Lead Entity functions and Salmon Recovery Plan implementation. The 2011 WRIA 1 Salmon Recovery Staff Team Annual Work Plan is included as an attachment to the *2011-2013 WRIA 1 3-Year Project Plan*.

Project Information														
Type	Project Name	Brief Project Description	2011 Restoration Priority	Sponsor	Limiting Factors	Reference Document	Habitat Type	Project Performance	Species Benefitting		Current Project Status	2011	
									Primary	Secondary		task	cost
Estuary/Nearshore													
Combination	Smuggler's Slough Acquisition and Restoration	Multi-phased project to restore tidal action, saltwater inundation, and freshwater flow through a network of tidal sloughs and freshwater channels	Estuary	Lummi	passage, habitat diversity & complexity, riparian condition; hydrology	WRIA 1 Salmon Recovery Plan	estuary	# acres acquired and restored; passage barriers removed;	chinook; Chum, coho, sockey, pink; Bald eagles; Bull trout; steelhead trout; surf and longfin smelt; sandlance starry flounder;	Orca whale, marbeled murrelet, Bald eagle; Pacific herring	wetland acquisition; final design; permitting; riparian planting	Final Design, Permits, Construct Phase 1 and 3	$1,755,675 (Nearshore Partnership RCO #07-1069)
Restoration	Squalicum Cr Estuary Restoration	Project will remove several partial fish passage barriers and improve estuary habitat at the mouth of Squalicum Cr	Estuary	Port of Bellingham, City of Bellingham, Bellingham Bay Action Team, WDFW	7, 11, A4	Bellingham Bay Pilot Habitat Study	Estuary		Chinook		conceptual design, conducting structural analysis on Roeder Ave Bridge,	prepare final design and secure permits	$300,000
Restoration	Chuckanut Village Marsh Restoration	Replace culvert to improve fish passage and hydrodynamic connectiivty between salt marsh and Chuckanut Bay nearshore.	Estuary	City of Bellingham,	18, A11	Bellingham Bay Pilot Habitat Study, Management Recommendations for City of Bellingham Pocket Estuaries	Estuary		Chinook were recently found in the marsh area; coho and chum from Chuckanut creek	copepods	Design complete, have obtained all permits, will be constructed in 010 or 2011	completed	$75,000
Restoration	Padden Cr Estuary Restroration	Complete feasibility study to improve water quality, circulation,reduce sediment accumulation, improve habitat	Estuary	City of Bellingham, Bellingham Bay Action Team		Management Recommendations for City of Bellingham Pocket Estuaries	Estuary		Coho, Chum, Chinook		RFQ for feasibilty and design services will be published in mid- May	Feasibility and design	approx. $50K
Restoration	Little Squalicum Estuary creation	Create 1 acre salt marsh estuary at mouth of Little Squalicum Cr as part of EPA cleanup of ravine.	Estuary	City of Bellingham, Bellingham Bay Action Team			Estuary		Chinook		Need structural analysis of RR bridge supports. Also need soil characterization study to define type and extent of soil contamination	soil characterization	$105,000
Restoration	Padden Cr @ Fairhaven Park	Increase habitat diversity, add LWD, improve floodplain connectivity	Estuary	City of Bellingham			In stream		Coho, Chum, Chinook		Final design complete, awaiting permits		
Restoration	Padden Cr 24th- 30th	Increase habitat diversity, add LWD, improve floodplain connectivity, reduce flood hazard	Estuary	City of Bellingham			In stream				final design complete, awaiting permits and funding		
Restoration	Squalicum Creek Re-Route	Increase habitat diversity, improve floodplain connectivity, reduce flood hazard, improve fish access	Estuary	City of Bellingham			In stream		Coho, chum, steelhead, pink		feasibility	design	$ 85,000
Restoration	Willow Spring	daylight piped stream	Estuary	City of Bellingham			In stream		TBD		completed		
Restoration	Fish Passage Barrier Removal Program	City prioritized list of culvert replacements or retrofits	Estuary and freshwater	City of Bellingham	Reduced access to spawning habitat, Obstructions		In stream	linear miles of habitat opened	all		finalizing priority list		

Project Information														
Type	Project Name	Brief Project Description	2011 Restoration Priority	Sponsor	Limiting Factors	Reference Document	Habitat Type	Project Performance	Species Benefitting		Current Project Status	2011		
Restoration	Riparian Restoration Program	restore riparian habitat	Estuary	City of Bellingham	Reduced access to spawning habitat,		upland, wetland	linear miles or acres of restored riparian area	all		implemented on an ongoing basis	implemented on an ongoing basis	$	325,000
Construction	Slater Road Elevation	Construct new elevated road to cross the left bank flood plain east of the Nooksack river crossing. Elevating roadway is prerequisite to removal of levee south Slater Rd and reconnection of 600 acres of floodplain	Estuary	WCPW; Lummi	flood plain connection		tidal influenced	linear miles or acres of restored riparian area	chinook	coho, steelhead, coastal cuthroat trout, bull trout	project designed and permitted, waiting for funding, possible appropriation in 2012	Seek funding if opportunity presents		
Acquisition	Marietta Acquisition	Purchase fee simple title to homes and property prone to flooding to provide opportunity for future levee removal/ modification	Estuary	WCPW	Flood Plain Connection	Whatcom County CFHMP	Tidal Influenced	acres made available to support floodplain and estuary functions	chinook		Flood model completed, approximately 12 properties have been purchased	Seek grant funding; ESRP and PSNERP applications in process		
Assessment	Coastal Stream and marine shoreline riparian assessment and restoration prioritization	Inventory riparian condition of coastal streams and marine shoreline.	Estuary	WCPW	Riparian condition; shade; lwd recruitment; water quality/temperature	WRIA 1 SRP data gap; WRIA 1 Salmonid limiting factors report	coastal streams; estuary; nearshore	length of stream bank and marine shoreline inventoried; numbers of projects identified	Dakota Chinook,	coho, steelhead, coastal cuthroat trout, bull trout	Inventory for Dakota, California, Terrel, marine border to Pt. Whitehorn completed	Seek funding to complete remainder of marine shoreline and coastal streams	In-kind	
Plan	Nearshore habitat restoration salmon overly	Complete WRIA 1 nearshore habitat prioritization with salmon overlay	Estuary	WCPW/ MRC	Estuary & nearshore juvenile rearing and foraging	WRIA 1 SRP	estuary; nearshore	List with project identification and relative priority	Chinook	coho, steelhead, coastal cuthroat trout, bull trout	MRC report developed; action is dependent on staffing resources; and outcome of nearshore assessments in progress	Salmon Recovery Staff Team and MRC Nearshore Subcommittee complete prioritization and address salmon overlay needs	$75,000	
Assessment & Acquisition	Lower Nooksack River Restoration (Phase 1)	Assess lower river hydraulics to define restoration alternatives; acquire key properties to facilitate existing and future restoration opportunities	Estuary	WCPW, WDFW, Lummi Nation	Estuary juvenile rearing and foraging, flood refugia	WRIA 1 SRP and CFHMP	Estuary and adjacent waters	Project list; acquisition priorities	Chinook	coho, steelhead, coastal cuthroat trout, bull trout, chum	Grant proposals are in to ESRP and PSNERP	Proceed with assessment and Marietta acquisitions under ESRP if grant is successful	$425,000	
Acquisition	Lower Nooksack River Project (Phase 2)	Acquire fee simple title to 140 acres of Right bank floodplain	Estuary	WDFW	Estuary & nearshore juvenile rearing and foraging	WRIA 1 SRP	estuary; nearshore	Chinook	coho, steelhead, coastal cuthroat trout, bull trout		making application to National Coastal wetland Grant			

Project Planning					Project Cost and Sources		
2012		2013		Beyond 2013	Total Project Cost	Est. 2011-2013 Budget	Existing funds (grants and local)
task	est cost	task	est cost				
Construct Phase II	$2,477,900 (ESRP RCO #09-1735)	Monitoring	$20,000	yes		$4,233,575	$1,660,375
restore estuarine marsh, modify bridges,	$600,000	monitoring	$20,000	2012		$920,000	
						$75,000	
construction	TBD						$65,000
		constuction	$2,000,000			$2,000,000	
construction	$75,000					$75,000	
		constuction	$ 700,000			$700,000	
construction	$ 800,000						

Project Planning					Project Cost and Sources		
2012		2013		Beyond 2013	Total Project Cost	Est. 2011-2013 Budget	Existing funds (grants and local)
implemented on an ongoing basis	$ 325,000	implemented on an ongoing basis	$ 325,000				
			$10,000,000		$10,000,000		
purchase 8 properties	TBD				TBD	TBD	None
Inventory remainder of coastal streams and marine shoreline	$75,000	Identify restoration prioirty areas and prjoects.	$25,000	yes	$100,000	$100,000	$100,000
Implement priorities; seek nearshore project funding	TBD	TBD	TBD				
TBD based on 2011 outcomes and PSNERP	TBD	TBD based on 2012 outcomes and PSNERP	TBD	Yes	TBD	TBD	0
		1,350,000					

Project Information									Project Planni			
Type	Project Name	Brief Project Description	Sponsor	Limiting Factors	Reference Document	Project Performance	Species Benefitting		Current Project Status	2011		201
							Primary	Secondary		task	cost	task
Hatchery/Harvest												
Hatchery	South Fork chinook Captive Brood Program	Seine juvenile chinook for a complete brood cycle, run DNA, retain 1000/brood yr South Fork chin. population, transfer to Kendall Hatchery where appx half rear to maturity in freshwater, and half later transfer to NMFS Manchester Research Facility for salt water rearing to maturity. Transfer ripening adults back to Skookum Hatchery for spawning and offspring rearing for traditional sub-yearling release	NMFS, WDFW, Lummi, Nooksack	low abundance	WRIA 1 SRP	increase population abundance and % of chinook in South Fork, while maintaining good genetic diversity. Ultimately, increase natural origin abundance	chinook		draft Hatchery Genetics Managment Plan developed, program in place	mostly funded through PST mitigation funds		
Hatchery	South Fork chinook Captive Brood Program	run DNA on wild juveniles seined, retain those that assign to South Fork population DNA baseline. Run DNA on individually pit tagged chinook	WDFW	low abundance	WRIA 1 SRP	increase population abundance and % of chinook in South Fork, while maintaining good genetic diversity. Ultimately, increase natural origin abundance	chinook		ongoing	funded		
Hatchery	South Fork chinook Captive Brood Program	seine juveniles from well distributed sites in the South Fork to gain broodstock that have good representation of the parent spawners	Nooksack; Lummi	broodstock for program	WRIA 1 SRP	optimally 1000 S Fk population juvs per brood year for 5 years with good representation of the parent spawners	chinook		as of 4/1/10 BY 06: 22 juv's (all at Kendall); BY 07: 429 juv's (199 at Kendall, 230 at manchester), BY 08: 908 juvs (429 at Kendall, 219 at Manchester), and BY 09: 63 juvs. (all at Kendall)	partially funded by PST, with other program funds also supporting		
Skookum Hatchery	South Fork chinook population rebuilding program	Spawn ripe captive brood chinook, incubate, rear and release sub-yearlings into S Fk. Transition to traditional population rebuilding program similar to North Fork Nooksack Chin. Program at Kendall.	Lummi	low abundance	WRIA 1 SRP	initially increased abundances, then increased natural origin abundances	chinook		first adults likely to ripen fall 2010, with first release into S Fk spring 2011	funded		
Skookum Hatchery	Skookum Cr Hatchery Water Supply	increase available quantity of good water for hatchery	Lummi		WRIA 1 SRP		chinook			construct new intake and additional wells	$550,000	
Skookum Hatchery	improve adult chinook attraction to Skookum Hatchery	future chinook broodstock collection	Lummi		WRIA 1 SRP	volitional recruit of S FK population adult chinook to hatchery	chinook		planning	seeking funding		
Kendall Hatchery	South Fork chinook Captive Brood Program	Rear juveniles, PIT tag, transfer to Manchester, upgrade water and rearing capacity	WDFW	low abundance	WRIA 1 SRP	increase population abundance and % of chinook in South Fork, while maintaining good genetic diversity. Ultimately, increase natural origin abundance	chinook		2006-2009 brood chinook rearing on station	funded		
Kendall Hatchery	South Fork chinook Captive Brood Program	rear Lummi Bay coho from eyed egg to smolt stage to free up water at Skookum for South Fork chinook. Fish will be transferred to Lummi Bay for release.	WDFW	low abundance	WRIA 1 SRP		chinook		not needed yet	funded		
Kendall Hatchery	North/Middle Fork chinook population rebuilding program	spawn returning adults to achieve needs to release 150,000 at hatchery, 400,000 DIT upper North Fork release, and 200,000 M Fk release	WDFW		WRIA 1 SRP	increase NOR abundance of population by creating more natural spawners, serve as a Puget Sound spring chinook indicator stock	chinook		currently operating as planned. Optimally, locate of create off-station release sites where fish can de-stress a few days prior to release	funded		

Project Information									Project Planni		
Type	Project Name	Brief Project Description	Sponsor	Limiting Factors	Reference Document	Project Performance	Species Benefitting		Current Project Status	2011	201
Manchester Hatchery	South Fork Captive Brood Program	rear approximately half of the South Fork captive brood juveniles to adulthood in salt water in Port Orchard	NMFS	low abundance	WRIA 1 SRP	increase population abundance and % of chinook in South Fork, while maintaining good genetic diversity. Ultimately, increase natural origin abundance	chinook		currently operating. Infrastructure additions funded.	funded	
Hatchery	off-station release sites in each fork	investigate opportunities for de-stressing spring chinook releases off station by holding them a few days	WDFW, Lummi, Nooksack	maximize survival by reducing stress. Minimize straying to S Fk.	WRIA 1 SRP	release survival and homing	chinook		evaluating Excelsior side channel, planning 2010 release into Lone Tree side channel, Bridge Camp and potentially a site near Glacier, Middle Fork release will hold in McKinnon Ponds	undetermined	
various Samish Hatchery summer/fall chinook releases	Minimize stray contributions from summer fall hatchery chinook releases	collect otoliths from fall chinook, read them, and evaluate origin and distribution of hatchery fall chinook on Nooksack spawning grounds, with emphasis in South Fork and Bertrand Creek	WDFW, Lummi, Nooksack	Increase homing to Bertrand Creek and minimize straying to early chinook spawning areas	WRIA 1 SRP		chinook		ongoing	funded	
Hatchery	Middle Fork Diversion Dam- Kokanee Program	diversify and maintain the State's sport kokanee program to account for loss of pathogen free water source status once diversion dam passage is restored.	WDFW		WRIA 1 SRP		sport Kokanee fishery		Captive brood rearing, with offspring released to 37 lakes	funded	
Hatchery steelhead release	shift Samish River steelhead release to Whatcom Creek	Make premanent the change in 2008 which increased the Whatcom Creek steelhead release of Chambers Creek origin steelhead and deleted the Samish release.	WDFW	reduce potential for cross breeding	WDFW Steelhead White Paper, NMFS Status Review	drop Samish hatchery steelhead release to reduce the risk of interbreeding, and create a second broodstock collection at Whatcom Creek Hatchery	steelhead		last release to Samish was 2007	funded	
chinook Harvest	monitor and evaluate Cereminal and Subsistance fisheries	determine total catch, and hatchery and wild contributions by population	Lummi, Nooksack		annual post-season harvest reporting of to NMFS, consistent with co-manager harvest plan		chinook		ongoing		
chinook Harvest	estimate total sport, C&S, and commercial harvest	monitor all fisheries and report catches	Lummi, Nooksack, WDFW		annual post-season harvest reporting of to NMFS, consistent with co-manager harvest plan		chinook		ongoing		
chinook Harvest	preseason harvest planning	agree on run forecasts, shape annual fisheries to be consistent with summer/fall chinook hatchery escapement needs and the Southern U.S. Explotation rate for Nooksack early chinook	Lummi, Nooksack, WDFW		consistency with co-manager chinook harvest plan submitted to NMFS		chinook		ongoing		
steelhead harvest	estimate total sport, C&S, and commercial harvest	estimate total sport, subsistance, and commercial harvest of Nooksack wild steelhead	Lummi, Nooksack, WDFW		consistency with co-manager steelhead harvest plan submitted to NMFS		steelhead		plan submitted to NMFS		

ng				Project Cost and Sources		
2	2013		Beyond 2013	Total Project Cost	Est. 2011-2013 Budget	Existing funds (grants and local)
est cost	task	est cost				

ng				Project Cost and Sources		
2	2013		Beyond 2013	Total Project Cost	Est. 2011-2013 Budget	Existing funds (grants and local)

Project Information								Project Planning					
Type	Project Name	Brief Project Description	Sponsor	Reference Document	Project Performance	Species Benefitting		Current Project Status	2011		2012		201
						Primary	Secondary		task	cost	task	est cost	task
Research, Monitoring, and Evaluation													
Population monitoring	Nooksack North/Middle Chinook Population Monitoring	Conduct spawn surveys of all suitible habitat at methodology's frequency to count redds and adults, and to collect CWT's, otoliths, DNA, adipose fin status, % spawn, sex, length etc.	Lummi, Nooksack, WDFW	WRIA 1 SRP	population monitoring per existing methodology to estimate escapement and wild and hatchery portions	chinook	record data for all species observed	ongoing		Mass mark funding, other funding that is insuffient			
Population Monitoring	Coded wire tag, Otolith and scale analysis	CWTs read with data submitted to Chinook Technical Committee, otoliths read to determine hatchery release strategy performances, to ID stray origins, and proportions hatchery and natural origin. Scales read for age composition.	WDFW labratories	WRIA 1 SRP	population monitoring per existing methodology to estimate escapement and wild and hatchery portions	chinook		ongoing		tribes fund spring chin otolith work			
Population Monitoring	Nooksack South Fork chinook population monitoring	Conduct spawn surveys of all suitible habitat at methodology's frequency to count redds and adults, and to collect CWT's, otoliths, DNA, adipose fin status, % spawn, sex, length etc.	Lummi, Nooksack, WDFW	WRIA 1 SRP	population monitoring per existing methodology to estimate escapement and wild and hatchery portions	chinook	record data for all species observed	ongoing		Mass mark funding, other funding that is insuffient			
Population Monitoring	Nooksack South Fork chinook population monitoring	snorkel or seine in Upper S Fk and Upper Skookum Creek for presence of chinook in areas above known distribution	Lummi, Nooksack, WDFW	WRIA 1 SRP	seek explanation for why parent analysis of seined wild juveniles in BY 07 and BY 08 indicate abundances larger than esc. estimates	chinook	record data for all species observed	only discussion		unfunded			
Population Monitoring	mainstem smolt trap	enumerate outmigration of chinook and other species encountered, and estimate overall abundances; initiate juvenile coho mark and recapture effort to improve estimate of smolt productivity from basin;	Lummi, Nooksack, WDFW	WRIA 1 SRP	freshwater productivity	chinook	record data for all species observed	ongoing		operating to extent current funding allows			
Population Monitoring	spawn surveys for winter-run steelhead	As conditions are suitible, conduct aerial flights to count spring steelhead redds in forks and mainstem (WDFW), and survey all accessible tributaries (all)	Lummi, Nooksack, WDFW	WRIA 1 SRP	Attempt to determine population abundance and to develop an escapement methodology with indexes	winter-run steelhead	record data for other species observed like cutthroat	2004 is only year with good aerial surveys, 2009 is only year with nearly full trib. Surveys.					
Population Monitoring	snorkel surveys and hook and line sampling for summer run steelhead in S Fk.	attempt occasional summer snorkel surveys of a sub-set of possible distrubution area of summer steelhead in upper S Fk, and hook and line sampling for DNA sampling	Lummi, Nooksack, WDFW	WRIA 1 SRP	data collection to establish baseline for abundance trends	summer-run steelhead	record data for other species observed like chinook and bull trout	one good day of surveys in 2008, but WDFW funding cuts in 2009		no dedicated funding			
Population Monitoring	establish spawn survey indexes for Nooksack bull trout in each fork		Lummi, Nooksack, WDFW		data collection to establish baseline for abundance trends	bull trout	record data for other species	Thompson Cr. is a good candidate, but no funding		no funding			

Project Information									Project Planning					
		Type	Project Name	Brief Project Description	Sponsor	Reference Document	Project Performance	Species Benefitting		Current Project Status	2011		2012		201
		Population Monitoring	confirm/refine Nooksack core area bull trout sub-populations and establish overall Nooksack bull trout population DNA baseline		Lummi, Nooksack, WDFW		data collection to improve understanding of population	bull trout	record data for other species	no action until funding		no funding			
		Population Monitoring	Improve coho escapment estimate Develop methods to use in-river coho catch mark/unmark and hatchery return data to estimate minimum coho escapement		Lummi, Nooksack, WDFW		low cost way to improve understanding of abundance as we have no escapement estimate methodology	coho		preliminary work underway					

		Project Cost and Sources		
3	Beyond 2013	Total Project Cost	Est. 2011-2013 Budget	Existing funds (grants and local)
est cost				

		Project Cost and Sources		
3	Beyond 2013	Total Project Cost	Est. 2011-2013 Budget	Existing funds (grants and local)

Project Information						Project Planning					
Type	Project Name	Brief Project Description	Sponsor	Reference Document	WRIA 1 Programe	Current Project Status	2011		2012		201
							task	cost	task	est cost	task
Programs, Plans, and Assessments											
WRIA 1 Watershed Plan and Salmon Recovery Plan Program Implementation and Coordination											
Program	Habitat Monitoring to Support Adaptive Management	Develop and implement habitat monitoring plan	SRST		Salmon Recovery	Prelim Habitat Targets; draft outline for MAMP	complete MAMP; coordinate with RITT	$ PSAR Capacity Funds; existing	Habitat monitoring	$100,000	habitat monitoring
Non-Capital Project	WRIA 1 Salmon Recovery Plan-updates	Update WRIA 1 SRP using outcomes of adaptive mgmt plan	SRST		Salmon Recovery	Conceptual pending development and approval of monitoring and adaptive mgmt plan	No activity planned	$0	Review Status	$0	TBD
Non-Capital Project	WRIA 1 Lower Nooksack Strategy	Specific actions from the WRIA 1 WMP including ISF negotiations in lower nooksack, water budget, monitoring, water supply planning, and implementation tools	WRIA 1 Watershed Team; WRIA 1 Management Team	WRIA 1 WMP; Detailed Implementation Plan; Lower Nooksack Strategy	Watershed Management	in-process	RFPs; agreements; initiate water budget	$610,000	ongoing	$470,000	ongoing
Non-Capital Project	WRIA 1 Instream Flow Negotiations (Nooksack Forks)	Complete instream flow negotiations in Forks of the Nooksack River	WRIA 1 Watershed Team	WRIA 1 SRP; WRIA 1 WMP; WRIA 1 Instream Flow Action Plan	Salmon Recovery; Watershed Management	in-process	complete ISF agreements in early chinook watersheds; identify solutions; outreach	$100,000	implement solutions in early chinook watersheds; monitoring	$75,000	continue implementing solutions and monitoring
Capital	Lower Nooksack Tributaries Wetlands Enhancement	Implement strategies for water storage, ground water augmentation, and infiltration to increase discharge to and augment baseflows	TBD	WRIA 1 SRP; WRIA 1 WMP; WRIA 1 Instream Flow Action Plan	Salmon Recovery; Watershed Management	Conceptual	No activity planned	$0	Review Status	TBD	TBD
Program	WRIA 1 Salmon Recovery Staff Team Annual Work Plan	Implement action and tasks associated with LE functions and Salmon Recovery Plan implementation (work plan attached)	SRST	WRIA 1 SRP	Salmon Recovery	in-process	ongoing	$60,000 LE contract; existing local	ongoing	TBD	ongoing
Combination Acquisition/ Restoration	Priority restoration and protection acquistions	Acquire properties with high value habitat for protection and/or restoration	variable	technical assessments; planning documents;	variable	On-going, as restoration and protection needs and priorities are identified and as opportunites arise	Work with partners to identify parcels	TBD	Negotiate, due diligence, complete transactions.	TBD [see near term tab $750k]	Negotiate, due diligence, complete transactions.
Partner Programs											
Program	Farm Planning, Nutrient Management Planning and Implementation	Ongoing technical assistance for preparing, updating and implementing nutrient management plans, farm plans for berry growers, CPAL, Drainage Improvement	WCD	watershed plans; critical areas ordinance; shoreline management	Whatcom Conservation District						

		Project Cost and Sources		
3	Beyond 2013	Total Project Cost	Est. 2011-2013 Budget	Existing funds (grants and local)
est cost				
$100,000	yes		$200,000	
	yes			
$530,000	yes	TBD	$1,610,000 (not all funds are in hand)	$540,000 JB; $20,000 PUD; 105,000 POB/Cities; $620,000 Ecy; $320,000 EDI
$25,000	yes		$200,000 (estimate subject to change; does not include expenditures prior to 2010)	
TBD	yes			
TBD	yes			
TBD [$500k+250k =750k]	revisit scope/needs		TBD	
	yes			

DRAFT 2009-2011 WRIA 1 3-Year Project Plan Pending WRIA 1 Salmon Staff Team Review and Steering Committee Approval

Limiting Factors Key is from the 2009 WRIA 1 3-Year Project List

2007 Shared Strategy Limiting Factor Key
1- Degraded floodplain and in-river channel structure
2- Degraded nearshore and estuarine conditions and loss of associated habit
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

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 natura
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 Stat	WRIA 1 (EDT)	
A2	High fine sediment load	Sediment Loa	WRIA 1 (EDT)	some redundancy with HWS "
A3	Lack of habitat diversity	Habitat Diver	WRIA 1 (EDT)	some redundancy with HWS "
A4	Loss of key habitat	Key Habitat (	WRIA 1 (EDT)	some redundancy with HWS "
A5	Obstructions	*[same]*	WRIA 1 (EDT)	some redundancy with HWS "
A6	Water diversions	Withdrawals	WRIA 1 (EDT)	some redundancy with HWS "
A7	Impacted flow regime	Flow	WRIA 1 (EDT)	some redundancy with HWS "
A8	High water temperatures	Temperature	WRIA 1 (EDT)	some redundancy with HWS "
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)	

at

from draft HWS customization for WRIA 1)

al barriers)

'Excessive sediment"
'Channel structure and complexity"
'Loss of habitat"
'Reduced access..."
'Unscreened water diversions..."
'Stream flow"
'High water temperatures"

Project Information												Project Planning								Project Cost and Sources		
Type	Project Name	Brief Project Description	2011 Restoration Priority	Sponsor	Limiting Factors	Reference Document	Habitat Type	Project Performance	Species Benefitting		Current Project Status	2011		2012		2013		Beyond 2013	Total Project Cost	Est. 2011-2013 Budget	Existing funds (grants and local)
									Primary	Secondary		task	cost	task	est cost	task	est cost				
Mainstem Nooksack River and Tributaries																						
Lower Mainstem																						
Combination	Double Ditch Acquisition and Relocation	Relocate Double Ditch and Benson watercourses between Main and Badger to new corridor	no	Lynden; WDFW	Loss of tributary habitat diversity		Instream; Land protected, acquired, or leased		Steelhead	coho, fall chinook, chum	feasibility underway	purchase two parcels and a 5,000'x200' easement	$1,250,000	initiate channel construction, riparian work	$500,000	complete channel construction	$250,000	yes		$2,000,000	$200,000
Passage	Goodwin Road Culvert Replacement (Dale Creek)	Replace priority culvert; dependent on getting funding	no	WCPW	Reduced access to spawning habitat		Instream		coho	cutthroat; steelhead; chum	scoping in process	detailed design and specifications	TBD	Construction	TBD	Monitoring	TBD				
Passage	Bay Road Culvert Replacement (California Cr)	Replace priority culvert; dependent on getting funding	no	WCPW	Reduced access to spawning habitat	WRIA 1 passage inventory (2006)	Instream	length of habitat opened up	coho	Steelhead and cutthroat trout	design completed; funding obtained; seeking easements	Finalize easements & permits, construct	$475,000	Construct if doesn't happen in 2011	$475,000	monitoring	TBD	yes		$475,000	$475,000
Restoration	Riparian Restoration Program- Fishtrap border to badger reach	Continue riparian restoration efforts along 3 mile reach of Fishtrap US border to Badger Roads. Replace wet crossing	no	NSEA	Channel complexity, shade, water temperature reduced access to spawning habitat	WRIA 1 Limiting factors report,	Instream	restore 3 miles of riparain corridor	Steelhead	coho, fall chinook, chum	riparian work underway	Plant and maintain riparian US Pangborn	$100,000	Continue riparian work DS Pangborn remove inwater crossing @ Sanga; complete Border to Badger riparian work	$200,000				$300,000	$300,000	
Restoration	Fish Trap Reach Levee Setback	Set back levee along 10,000 ft of lower Fish Trap Reach	no	WCPW & Diking District	Channel Structure & Complexity; Floodplain Connectivity & Function; Habitat Diversity	WRIA 1 Limiting factors report, WRIA 1 SRP	Instream; riparian	10,000 ft setback, 40 acres reconnected	Steelhead	coho, cutthroat trout	conceptual	assess channel response to a 100-200 foot levee setback; preliminary designs	$10,000; HETA	Seek landowner interest and support (contingent on staff availability)	$50,000	Purchase 40 acres of easements funding contingent	$250,000	yes $750,000	$1,050,000	$300,000	
Restoration	Lake Terrell Passage	Retrofit the dam on Lake Terrell to provide Fish Passage	no	WCD	Passage	Fish Passage Inventory		Passage to miles of stream	coho	cutthroat trout	designed and funded	construct 2012	$150,000								
Restoration	Flood Gate Modification	Relace fish blocking flood gates on Whiskey and Couger Creeks	no		Reduced access to 5 miles of spawning and rearing habitat habitat		Instream		Steelhead	coho	Evaluate Schnieder Ditch SRT gate.	Discuss SRT options with Whiskey and Cougar Creek landowners, complete conceptual design	Covered under other resources	Secure funding, complete design finalize landowner agreements	$25,000	Install Whiskey and cougar creek SRT gates daylight Whiskey Cr channel	$150,000		WCD, NRCS, NSEA	$175,000	$0
Restoration	Fish Passage Barrier Removal Program	Correct priority barriers identified in 2006 inventory; multiple leads including NSEA, WCPW, cities, WSDOT, forest landowners, private landowners, WDFW	no	NSEA; WCPW; WDFW, NNR, LNR	Reduced access to spawning habitat, Obstructions	WRIA 1 passage inventory (2006)	Instream	Miles stream opened up	Steelhead	coho, fall chinook, chum, cutthroat trout, bull trout	On-going; funding dependent.	Correct prioirty sites with allocated funding. - sponsors operating independently based on mandates and budget.	TBD	Correct prioirty sites with allocated funding. - sponsors operating independently based on mandates and budget.	TBD	Correct prioirty sites with allocated funding. - sponsors operating independently based on mandates and budget.	TBD	Yes	TBD	TBD	TBD

Project Information															
Type	Project Name	Brief Project Description	2011 Restoration Priority	Sponsor	Limiting Factors	Reference Document	Habitat Type	Project Performance	Species Benefitting		Current Project Status	2011	
									Primary	Secondary		task	cost
Multiple Areas in the Nooksack River Forks and Tributaries													
Multiple Geographic Areas Within the Nooksack Forks and Tributaries													
Restoration	Riparian and Stream Restoration in Nooksack Forks and Tributaries	Funding for Washington Conservation Corp crew to complete riparian and instream restoration projects in priority reaches of the Nooksack River Forks.		NSEA & Whatcom County	multiple Recovery Plan factors	Nooksack MF Watershed Habitat Limiting Factors (LNR 2008), NF Nooksack Restoration Optimization Report (NNR 2006), SF Nooksack River Acme-Saxon Reach Restoration Plan (LNR and NNR, 2003)	Riparian / Instream	# trees planted; approximate #acres riparian forest restored	Chinook	steelhead, bull trout, coho, chum, other salmonids	funded in 2010 ($192,450 PSAR/SRFB; $38,182 LM)	implement sites RCO 10-1842	$80,000
Restoration	Knotweed Survey and Management	Funding covers additional survey and management of knotweed species in the riparian areas of the forks and key tributaries	2a - 2c depending on reach	Whatcom County	loss of riparian function, and floodplain forest encroachment	WRIA 1 SRP	Riparian / Instream	stream miles inventoried, acres treated, percent regrowth post-treatment	Chinook	steelhead, bull trout, coho, chum, other salmonids	funded in 2010 ($105,750 SRFB)	Inventory and treat sites	
Restoration	Forest Road Assessment and Implementation	Assess high-risk orphaned roads in priority watersheds and develop prescriptions		Nooksack; SRST	excessive sediment; channel instability	WRIA 1 SRP	Upland	prescriptions for 15 miles of orphaned road; volume of fill removed; miles of road abandoned	Chinook		pilot assessment completed in SF reach	prescriptions for 15 miles of orphaned road	$50,000
Plan	Nooksack R. Forks Priority Reach Conservation Plan for Salmon Recovery Habitat Targets	plan for conservation and/or acquistion for restoration and/or protection		SRST; WLT	program			priorites for conservation and/or acquisition	chinook		In-process	SRST/WLT planning	existing
Program; Combination	Implement Nooksack R. Forks Priority Reach Conservation Plan for Salmon Recovery	Implement sequence of tasks leading to conservation of priority properties to meet habitat targets in South Fork, Middle Fork, and North Fork reaches.		TBD	multiple Recovery Plan factors		Land Protected, Acquired, or Leased		Chinook		in process	Landowner contacts; appraisals; acquisition	$278,935 (RCO 10-1777; PSAR capacity $23,000)
South Fork Nooksack and Tributaries													
Multiple Reach Projects and Programs													
Acquisition	South Fork Reach Acquisition	Original SF In-Holding project amended by RCO to reach level acquisition (Acme Hwy 9 bridge to original parcel)		WLT			Land Protected, Acquired, or Leased		Chinook		final acquisition; closing project	final grant acquisitions	$951,915 (RCO #07-1805)
Plan	South Fork Strategic Plan	Develop sequence and priorities for implementing SRP actions in the SF watershed, including flood/salmon coordination	n/a	SRST	multiple Recovery Plan factors		Instream, floodplain		Chinook	steelhead, bull trout, coho, pink, other salmonids	In process	reach strategies	existing
Restoration	HMZ Reconnection	Coordinate implementation of South Fork Strategic Plan and Conservation Plan to reconnect disconnected floodplain required to achieve habitat targets	TBD	TBD	multiple Recovery Plan factors	WRIA 1 SRP	Instream, Riparian/Floodplain	176 acres of HMZ reconnected	Chinook		conceptual pending completion of SF Strategic Plan and Priority Reach Conservation Plan	No activity planned	$0

Project Information														
Type	Project Name	Brief Project Description	2011 Restoration Priority	Sponsor	Limiting Factors	Reference Document	Habitat Type	Project Performance	Species Benefitting		Current Project Status	2011		
Plan	Lower South Fork Joint Transportation/ Restoration Planning	Develop habitat restoration projects in conjunction with possible replacement or relocation of existing County transportation infrastructure	TBD	WCPW	Multiple; specific factors tied to infrastructure location	WRIA 1 SRP	Instream, Riparian/Floodplain	TBD -dependent on limiting factors addressed	Chinook	steelhead, bull trout, coho, pink, other salmonids	In process, pending 2011 update of 3-Year plan	Consult with County Roads design engineers and permit preparers regarding Potter Road Bridge replacement designs; identify opportunities, alternatives, feasibility	TBD/in-kind	
Restoration	Lower South Fork Wetland Water Storage Improvement	Plant, promote water storage in wetlands to restore temperature and baseflow maintenance functions	TBD	TBD	water quality; stream flow		Wetlands	180 acres wetland restored	Chinook		Planning Concept	No activity planned	$0	
South Fork Reach Projects and Programs														
Reach: VanZandt														
Restoration	South Fork Instream Restoration-VanZandt	Complex logjams within a 0.5-mile segment of the lower South Fork Nooksack River near the mouths of Tawes and Caron Creeks.		Nooksack	low habitat diversity, lack of deep pools with cover, high temperatures	SRP; Acme-Confluence Assessment	Instream	.5 miles treated; 12 structures placed	Chinook		In process of closing	post project monitoring	match	
Reach: Todd														
Restoration	South Fork at Five Cedars Black Slough Reach	ELJ construction	Tier 1b	Nooksack	low habitat diversity, lack of deep pools with cover, high temperatures	SRP; Acme-Confluence Assessment	Instream	xx miles treated; xx log jams placed (To be determined by design)	Chinook		design	design	$68,540 (RCO #10-1808)	
Reach: Hardscrabble														
Restoration	South Fork at Sygitowicz	ELJ construction	Tier 1b	Nooksack	low habitat diversity, lack of deep pools with cover, high temperatures	SRP; Acme-Confluence Assessment	Instream	.15 miles treated; 7 log jams placed	Chinook		design	Flood risk analysis; Final Design; Permits; Construction; Monitoring	$286,765 ($59,000 RCO 09-1684; $227,765 RCO 10-1442)	
Restoration	South Fork at Hardscrabble	ELJ construction	Tier 1b	Nooksack	low habitat diversity, lack of deep pools with cover	SRP; Acme-Confluence Assessment	Instream	xx miles treated; xx log jams placed (To be determined by design)	Chinook		design	Design; Monitoring	$57,600 (#09-1683)	
Reach: Standard														
Restoration	South Fork at Standard Creek	ELJ construction	Tier 1b	Nooksack	low habitat diversity, lack of deep pools with cover, high temperatures	SRP; Acme-Confluence Assessment	Instream	xx miles treated; xx log jams placed (To be determined by design)	Chinook		Conceptual			
Reach: BNSF														
Restoration	Acme-Confluence Reach HMZ Reconnection: Jones/McCarty (RM 7.5-8.0)	Acquire approximately 90 acres bordering the South Fork and on the Jones and McCarty Creek alluvial fans for future HMZ reconnection and off-channel habitat and riparian restoration	Tier 1b, 1c, 2c	WCPW	floodplain connectivity, channel hydraulics; low habitat diversity; fish passage	SRP; Acme-Confluence Assessment	Floodplain; tributary	~90 acres for restoration; ~0.3 miles for passage	Chinook	steelhead, cutthroat, bull trout, coho	dependent on Jones Creek flood planning & new owner nursery plans	No activity planned	$0	

Project Information														
Type	Project Name	Brief Project Description	2011 Restoration Priority	Sponsor	Limiting Factors	Reference Document	Habitat Type	Project Performance	Species Benefitting		Current Project Status	2011		
Combination	Catalyst Floodplain and Wetland Riparian Restoration	Fish Passage Barrier removal, LWD placement, riparian planting on 129 acres bordering South Fork and containing South Fork tributaries		NSEA; WLT	multiple Recovery Plan factors	SF Nooksack River Acme-Saxon Reach Restoration Plan (LNR and NNR, 2003)	Instream; Floodplain; Land Acquired/ Protected/ Easements	Daylight 1000 ft of tributary, install 15-20 LWD structures, Plant 120 acres of riparian / floodplain habitat	Chinook	steelhead, bull trout, coho, chum, other salmonids	final acquisition; grant closing in process	Acquisition; closing grant		
Restoration	South Fork Riparian Enhancement Project	Improve riparian conditions	Tier 3c	NSEA	multiple Recovery Plan factors	SF Nooksack River Acme-Saxon Reach Restoration Plan (LNR and NNR, 2003)	Instream	plant 34 acres; 3 yr maintenance	Chinook	steelhead, bull trout, coho, chum, other salmonids	In-Process	maintenance	covered in #09-1671	
Reach: Acme														
Restoration	Acme Early Chinook Restoration	Increase habitat diversity, improve floodplain connectivity, reduce flood hazard to Acme		WCPW	Temperature; complex pools	WRIA 1 SRP	Instream; riparian	4 large jams, 6 small jams, 630' cumulative length; 3/4 acrre planted; 9.5 acres interplanted	Chinook	steelhead, bull trout, coho, pink, other salmonids	In process of closing	close grant; monitoring		
Reach: Hutchinson														
Restoration	South Fork Hutchinson Reach Restoration	ELJ construction	Tier 1b	TBD	low habitat diversity, lack of deep pools with cover, high temperatures	SRP; Acme-Saxon assessment	Instream; riparian function	xx miles treated; xx log jams placed (To be determined by design)	Chinook	steelhead, bull trout, coho, pink, other salmonids	Phase 1 constructed 2006; Design for Phases 2 through 4 in process.	Phase 2-4 Design	68540 (RCO 10-1807)	
Reach: Saxon														
Restoration	Saxon Reach Restoration	7 logjams will be built to encourage split flows and pool development; pools will provide cover; a bank roughening complex will be built on the left bank to provide woody cover and scour pools	Tier 1b, 2b	Lummi	lack of habitat-forming processes (wood recruitment, pool development from logjams, multi-threaded channels); pool cover; refugia	SRP; SF Assessment	Instream	.75 miles treated; 7 ELJs; 1 bank roughening log complex	Chinook	BullTrout; Steelhead	70% (permit-set) design; JARPA and fish habitat exemption permits submitted	final design; construction	$1.3 million (RCO 10-1300)	
Reach: Skookum														
Restoration	Skookum Reach Restoration Project	Logjams; relocate road from river bank; restore riparian buffer		Lummi	Habitat complexity; tributary capacity; riparian shading; flow capacity	SRP; SF Assessment	Instream	.5 mi treated; 3 ELJ; 11.8 ac buffer; 2500ft road relocated	Chinook	BullTrout; Steelhead	completed; closing grant	Construction; Monitoring	$1,180,386 (#07-1803 SRFB & PSAR 2007, 2009)	
Reach: Dye's Canyon														
Reach: Cavanaugh														
Restoration	Cavanaugh Cr Island Project	Improve habitat diversity in the Cavanaugh Creek reach.	Tier 1a	Lummi	1, 2, 6, A3, A4, A8	Upper S. Fork Nooksack River Habitat Assessment	Instream	# LWD structures; riparian area restored	Chinook	BullTrout; Steelhead	design funded	funding and design feasibility	$84,204 (RCO 10-1806)	
Reach: Larson's Bridge														
Restoration	Larson's Floodplain Refuge Project	Improve connectivity with cool water side-channel. Increase habitat diversity in an area with abundant groundwater seeps from an adjacent terrace.	Tier 1a, 2a	Lummi	1, 2, 6, A3, A4, A8	Upper S. Fork Nooksack River Habitat Assessment	Instream	#LWD Structures	Chinook	BullTrout; Steelhead	conceptual			

Project Information														
Type	Project Name	Brief Project Description	2011 Restoration Priority	Sponsor	Limiting Factors	Reference Document	Habitat Type	Project Performance	Species Benefitting		Current Project Status	2011		
Restoration	Fobes Creek Reach Restoration	Stabilize forested islands; maintain high flow connectivity; foster cold water habitat potential	Tier 1a, 2a	Lummi	unstable wood accumulations; high water temperatures; loss of habitat; lack of habitat diversity	SRP; SF Assessment	Instream	1.4 mi treated; 14ELJs	Chinook	BullTrout; Steelhead	design; permtis	Construction	$810,436 (RCO 09-1686)	
Reach: Lyman Pass														
Reach: Elk Flats														
Restoration	Elk Flats Restoration	Remove bank armoring and install log revetment to allow channel to migrate into southern terrace and move away from large sediment source	Tier 2a	Lummi	Sediment	Upper S. Fork Nooksack River Habitat Assessment	Instream		Chinook	BullTrout; Steelhead	Development			
Reach: Howard														
Middle Fork Nooksack and Tributaries														
Multiple Reach Projects and Programs														
Plan	Reach Scale Restoration Design	Develop sequence and priorities for implementing actions in the Middle Fork	n/a	SRST; Nooksack			Instream, floodplain		Chinook	steelhead, bull trout, coho, pink, other salmonids	Conceptual	Preliminary Designs	$20,000	
Restoration	Middle Fork Diversion Dam	Identify and implement preferred alternative for addressing barrier.	Tier 1a	Bellingham; Co-Managers	reduced access to spawning habitat; obstructions	SRP	Fish Passage		Chinook		siphon feasibility, initial design and testing complete study	TBD based on completed study and cost estimates	TBD w/refined design	
Middle Fork Reach Projects and Programs														
Reach: Kulshan														
Reach: Welcome														
Restoration	Ring Forest Off-Channel	ELJ construction	Tier 1b	Lummi	low pool frequency	MF Habitat Assessment	Instream	n/a	chinook	Bull Trout, steelhead	conceptual design	design; feasibility	$65,000	
Restoration	Lower Middle Fork downstream of ring forest side channel (approximately RM 0.0 - 1.8)	LWD placement	Tier 1b	NSEA	Channel Island and side channel development/ longevity / stability	LNR Middle Fork Assessment and recommendations	Instream	Channel Island and side channel enhancement	chinook	Bull Trout, steelhead, coho		Applying for 2011 SRFB funding for design / feasibility		
Reach: Porter														
Restoration	Middle Fork LWD Placement 2009	Augment existing LWD accumulations	Tier 1a	NSEA	Channel Island and side channel development/ longevity / stability	NF Nooksack Restoration Optimization Report (NNR 2006)	Instream	Channel Island and side channel enhancement	Chinook	Bull Trout, steelhead, coho	permitted	Construction	$189,880 (#09-1670 PSAR) +$190,000 state funds	
Restoration	Middle Fork LWD Placement 2012 (Phase 2)	Augment existing LWD accumulations	Tier 1a	NSEA	Channel Island and side channel development/ longevity / stability	LNR Middle Fork Assessment and recommendations	Instream	Channel Island and side channel enhancement	Chinook	Bull Trout, steelhead, coho	permitted	Applying for 2011 SRFB funding to extend 2010 project downstream to upstream end of ring forest side channel		
Reach: MF Canyon														
Reach: Clearwater														

Project Information										Current Project Status	2011	
Type	Project Name	Brief Project Description	2011 Restoration Priority	Sponsor	Limiting Factors	Reference Document	Habitat Type	Project Performance	Species Benefitting			
Reach: Galbraith												
Reach: Warm												
Reach: Rankin												
North Fork Nooksack and Tributaries												
North Fork Reach Projects and Programs												
Reach: Hatchery												
Reach: Farmhouse												
Restoration	North Fork Farmhouse Reach Restoration	restore historic channel planform, habitat diversity, and habitat functions	Tier 1a	Nooksack	channel instability, low habitat diversity	SRP, North Fork Assessment	Instream	XX structures placed; xx miles treated; xx miles of stable spawning habitat	Chinook		Conceptual	Feasibility; Design	$176,475
Restoration	North Fork Channel Island LWD Augmentation- Farm Reach	Protect and enhance channel islands, provide stable spawning and rearing habitat, and augment LWD		NSEA; Nooksack	channel instability, low habitat diversity	NF Nooksack Restoration Optimization Report (NNR 2006)	Instream	XX structures stabilized	Chinook	steelhead, bull trout, coho, chum, other salmonids	Completed	post-project monitoring	
Reach: Maple Creek												
Reach: Mahaffey Canyon												
Reach: Below Boulder												
Reach: Lone Tree												
Restoration	North Fork Reach Stable Side Channel Restoration Lone Tree	Design and install log jams to restore stable side channel habitats and promote floodplain island formation to improve egg-fry survival		Nooksack	channel instability, low habitat diversity	SRP, North Fork Assessment	Instream	structures placed; miles treated	Chinook		construction completed; post proj monitoring	post-project monitoring	$10,000
Reach: Wildcat												
Restoration	North Fork Wildcat Reach Restoration	restore historic channel planform, habitat diversity, and habitat functions	Tier 1a	Nooksack	channel instability, low habitat diversity	SRP, North Fork Assessment	Instream	XX structures placed; xx miles treated; xx miles of stable spawning habitat	Chinook		Design; permits	final design; Phase 1 construction	$117,650 (RCO 09-1682); $830,279 (RCO 10-1810)
Reach: Canyon												
Restoration	Lower Canyon Creek Phase 2 Restoration	Complete next phase in a series of projects to restore habitat forming process and passage in the lower mile of Canyon Creek	Tier 1a	WCPW/ WCFCZD	passage, habitat diversity & complexity, riparian condition	WRIA 1 SRP (2005); HEC (2007), KWL (2003)	instream; fish passage; riparian	access to 3.9 miles; channel structures; acres of historic channel area reopened	Chinook	steelhead, pink, coho, salmon, bull trout, cutthroat trout	Design; permits	final design, permits (RCO 10-1340)	$239,873
Habitat Assessments												
Nooksack Forks												
Assessment	Middle Fork Nooksack Habitat Assessment	Prepare assessment and restoration strategy for Middle Fork Nooksack	n/a	Lummi	Habitat diversity inputs (low wood loading); no split flows	SRP	Instream		chinook		completing grant	identify and prioritize projects, write report	$149,487 (2007 PSAR)

Project Information															
Type	Project Name	Brief Project Description	2011 Restoration Priority	Sponsor	Limiting Factors	Reference Document	Habitat Type	Project Performance	Species Benefitting		Current Project Status	2011	
Assessment	Expand North Fork Assessment	Expand coverage of North Fork Assessment including fish section	n/a	SRST; Nooksack			Instream		chinook		draft assessment sections	scope assessment elements and implement	TBD
Upper Mainstem													
Assessment	Upper Mainstem Reach Assessment and Restoration Planning	habitat assessment and restoration planning for the Nooksack River from the SF confluence to Everson	n/a	Nooksack			Instream	restoration plan	Chinook	Coho, Pink, Chum, Sockeye, Bull Trout, Steelhead, Cutthroat	conceptual		
~~**Estuary/Nearshore**~~													

Project Planning					Project Cost and Sources		
2012		2013		Beyond 2013	Total Project Cost	Est. 2011-2013 Budget	Existing funds (grants and local)
task	est cost	task	est cost				
implement sites RCO 10-1842	$80,000	implement sites RCO 10-1842	$70,000	yes	$230,000	$230,000	$230,000
		grant ends 12/31/2013		yes	$105,750	$105,750	$105,750
prescriptions for 25 miles of orphaned road	$50,000	prescriptions for 25 miles of orphaned road	$50,000	yes	$150,000	$150,000	
revisit	TBD	revisit	TBD	yes			
Landowner contacts; PSA; acquisition	$750,000	Landowner contacts; PSA; acquisition	$750,000	yes	$1,778,935	$1,778,935	$278,935
						$951,915	$142,788
TBD	TBD						
Review				yes			

Project Planning					Project Cost and Sources		
2012		2013		Beyond 2013	Total Project Cost	Est. 2011-2013 Budget	Existing funds (grants and local)
Monitor Potter bridge, work with landowners and transportation interests to scope speciific project concepts for other sites	TBD	implement specific projects	TBD	yes	TBD; dependent on project specifics	TBD	TBD
No activity planned		No activity planned		yes			
					$757,000		
		Construction	$350,000	monitoring	$433,540	$418,540	$ 68,540
Monitoring	$5,000	Monitoring	$5,000	yes	$301,765	$296,765	$286,765
Construction	$250,000	Monitoring	$5,000	yes	$322,600	$312,600	$57,600
		Design	$50,000	yes	$365,000	$50,000	
landowner contact to explore opportunities		determine landowner interest & restoration options	TBD	Yes	TBD		

Project Planning					Project Cost and Sources		
2012		2013		Beyond 2013	Total Project Cost	Est. 2011-2013 Budget	Existing funds (grants and local)
riparian planting					$1,463,818		$1,463,818
maintenance	covered in #09-1671	maintenance	covered in #09 1671	yes (2013)	$143,856		$143,856
monitoring	$5,000				$422,000 (Phase 1 included)	$5,000	
Phase 2 construction	$400,000	Phase 3 construction	$300,000	yes	$993,540	$768,540	$ 68,540
post project monitoring		post project monitoring		yes (monitoring)	$1,650,405	$1,300,000	$1,300,000
Monitoring	$12,500	Monitoring	$12,500		$1,180,386	$25,000	$1,180,386
construction	$634,614	monitoring	TBD	yes	$718,818	$718,818	$84,204
funding and design feasibility	$5,000	funding, design, and permitting	$100,000	2016	$600,000	$105,000	

Project Planning					Project Cost and Sources		
2012		2013		Beyond 2013	Total Project Cost	Est. 2011-2013 Budget	Existing funds (grants and local)
Monitoring	$25,000	monitoring			913,414	$835,436	$913,414
Design	$60,650						
develop scope; final designs	TBD			yes			$20,000
TBD	TBD	TBD	TBD	TBD			
construction	$500,000	monitoring		yes	$565,000	$565,000	$65,000
design; feasibility					$ 60,000	$ 60,000	
					$379,880	$379,880	$379,880
proposed construction					$140,000	$140,000	

Project Planning					Project Cost and Sources		
2012		2013		Beyond 2013	Total Project Cost	Est. 2011-2013 Budget	Existing funds (grants and local)
		Construction	$500,000	post-project monitoring		$726,475	$176,475
post-project monitoring	$10,000					$20,000	$20,000
Phase 2 construction	$450,000	Phase 3 construction	$400,000	monitoring	$1,847,929	$1,797,929	$1,007,929
construction funding (RCO 10-1481)	$973,750 in-hand; additional funding needs TBD in design process	final planting; post project monitoring	$35,000	yes	$1,248,500	$124,8500 + Costs TBD	$1,213,623
					$186,487		$186,487 ($149,487 PSAR; $37,000 other grants)

Project Planning					Project Cost and Sources		
2012		2013		Beyond 2013	Total Project Cost	Est. 2011-2013 Budget	Existing funds (grants and local)
					TBD		
Habitat assessment	$75,000	Restoration Planning, conceptual designs for 2 projects	$100,000	yes	$175,000	$175,000	

2011-2013 WRIA 1 3-year Program Plan

a) The 2011-2013 3-Year Program Plan is organized to relate to the 10-year actions, or near term actions, in the *WRIA 1 Salmon Recovery Plan*.

b) The Nooksack River Forks and associated chinook tributaries are the priority for WRIA 1 salmon recovery efforts because of the ESA listing of North Fork/Middle Fork Chinook and South Fork Chinook. In the context of that priority near-term action, a technical workshop held on March 17, 2011 was convened for the purpose of identifying level of importance of project strategies by reach. In addition to level of importance, the opportunities available was identified. The outcome of the workshop is three tiers of project importance, which is identified under the column "2011 Restoration Priority" on the *NearTerm Habitat Action-Chinook* worksheet.

c) Restoration actions that do not have chinook as their primary species benefitting are listed on the worksheet labeled *Near Term Habitat Action-Other*. A strategy for identifying level of importance for other species has not been prepared.

d) The *Hatchery-Harvest* worksheet represents actions and programs the Salmon Co-Managers are implementing in WRIA 1.

e) The *Population Monitoring-Research* worksheet does not include preparing the WRIA 1 Salmon Recovery Monitoring and Adaptive Management Plan (MAMP) that will be used for habitat monitoring. The development of the WRIA 1 MAMP is under the worksheet labeled *Programs*

f) The programs and actions that the WRIA 1 Salmon Reocvery Staff Team implement that are associated with the Lead Entity operational grant, WRIA 1 Salmon Recovery Plan actions, and other salmon recovery actions are identified in the Salmon Staff Team's 2011 Annual Work Plan. The Program worksheet includes a line item that references implementing that annual work plan. The referenced 2011 Annual Work Plan is attached to the WRIA 1 2011-2013 3-Year Work Plan.

Category	10-year goal	50-year goal (?)	Hypothesis (reference)	Strategy	Sub-Strategy	Measurable Objectives	
Habitat							
				1) Protect habitat through programmatic actions			
	Protect and restore freshwater, estuarine, and nearshore marine habitat, including water quantity and water quality conditions, in WRIA 1 sufficient to meet recovery goals for WRIA 1 salmonid populations, prioritizing as follows: 1. South Fork Nooksack early chinook and North Fork/Middle Fork Nooksack early chinook. 2. WRIA 1 bull trout 3. WRIA 1 wild late-timed chinook 4. WRIA 1 wild-spawning coho salmon 5. Other WRIA 1 salmonid populations (pg 176)				General strategies: 1) implement land use regulations, permits, policies, or programs to maintain/prevent further degradation, and restore to target levels the habitat parameters identified through reach-specific strategies; 2) empahasize voluntary and incentive-based actions in salmon recovery efforts, but use regulatory actions if non-regulatory actions are not being taken or are insufficent to acheive recovery; 3) Use the hiearchy identified on pg 199 in undertaking actions that impact salmonid habitat; 4) Implement, adapt and enforce compliance of existing regulations for the protection and restoration of salmonid habitat. Integrate incentives and other non-regulatory approaches within existing regulatory programs may improve compliance; 5) Develop non-regulatory strategies to motivate landowners and developers to engage in salmonid habitat protection and restoration; 6) coordinate salmon recovery planning efforts with other planning processes, including Growth Management, Shoreline Management, and flood control; 7) Identify, develop, review, revise, and implement bmps that limit impacts to salmonid habitats of forestry, ag., construction, road maintenace, etc.; (pg 202)	Nooksack early chinook freshwater habitat - Access: No migration obstruction for fish access, or existing obstructions allow full upstream and downstream passage of juveniles and adults (pg 218)	
	Identify and prioritize the sequencing and location of habitat protection and restoration efforts using the WRIA 1 Salmonid Habitat Restoration Strategy. (pg 176)				General Strategies, continued: 8) manage growth wisely; 9) us education/outreach to increase awareness of human impacts to salmonids, foster land stewardship, and encourage behavior changes to reduce impacts; 10) develop and propose rule changes or legislative changes as needed to improve likelihood of success of salmon recovery; 11) evaluate new regulations, permits, or programs for the potential to lead to conservation of salmon habitat by avoiding, minimizing, or mitigating human impacts on salmoh habitat; 12) identify/minimize inconsistencies b/n and w/in current and new policies that relate to salmonid habitat protection and restoration; 13) develop an organizational structure that can facilitate the technical review of policies, programs, projects, permits that affect salmonid habitat by local experts; 14) create tax breaks and/or market incentives to encourage the development and implementation of economically and ecologically sustainable land use practices that maximize positive and/or minimize adverse impacts to WRIA 1 salmonids and habitats; 15) amend zoning regulations to minimize development in and near salmonid habitats, esp. priority habitats; and 16) ensure that permitting departments have sufficient levels of staff, expertise, and training to effectively implement regulations (pg 209)	Nooksack early chinook freshwater habitat - Channel Conditions: 1) fine sediment: riffles = < 11% ; 2) embeddedness: riffle and tailout habitat units (where cobble, gravel, sustrates occure = < 25% covered by fine sediment ; 3) wood debris: complex array of large wood pieces (> 50 cm diameter) but fewer cross channel bars and fewer pieces of sound large wood due to less recruitment than historic conditions, large wood, james are as prevalent influence on channel morphology + lwd of cw < 25 = 2-3 / lwd cw 25-50 ft = 2-4 / lwd cw 50-150 ft = 3-7 / lwd cw 150 400 ft = 10 to 20 plus log james where accumulation occur / lwd cw >400 ft = 8 to 15 plus large jams where accumulations occur + bed scour = spawning areas = frequent scour depth of < 10 cm ; pool frequency + quantity/quality of pools = width 5' = 184 / width 10' = 95 / width 15' = 20 / width 20' = 56 / width 50' = 26 / width 75' = 23 / width 100' = 18 (pg 210)	
	Protect and restore the natural watershed processes that form and maintain the habitat to which WRIA 1 salmonid stocks are adapted (pg 176).				Protect and restore freshwater, estuarine, and nearshore marine habitat, including water quantity and water quality conditions in WRIA 1 sufficient to meet recovery goals for WRIA 1 salmonid populations, prioritizing in terms of: 1) South Fork Nooksack early Chinook and North Fork/Middle Fork Nooksack early chinook; 2) WRia 1 bull trout; 3) WRIA 1 wild late-timed chinook; 4) WRIA 1 late spawning coho salmon; 5) Other WRIA 1 salmonid populations (pg 167)	Nooksack early chinook freshwater habitat - Floodplain condition - 1) hydromodification = stream channel is fully connected to floodplain although very minor structures may exist that do not result in flow restrictions or constriction (pg 210)	
	Maintain or increase the quality and quantity of habitat necessary to sustain healthy, self-sustaining runs of other WRIA 1 salmonids to provide for harvest, as well as cultural and social values.(pg 176)						
	Retain or provide adequate quantity and quality of water in streams for salmonids. (pg 176)						
	Restore access to isolated habitat. (pg 176)						
	Forest practice goals: 1) support harvestable levels of salmonids; 2) support the long-term viability of covered species; or 3) meet or exceed water quality standards (protection of designated uses, narrative and numeric criteria, and anti-degradation) (pg 171)				Implement forest practices, including addressing: riparian buffers, road maintenance, and unstable slopes (pg 171)		
	Additional "Objectives": Ensure programs and actions are consistent with Endangered Species Act and Clean Water Act requirements. • Maintain viable forestry, agricultural, and other industries and provide long-term regulatory certainty. • Ensure that citizens and stakeholders are actively engaged in salmon conservation efforts. • Uphold existing federal, state, tribal, and local laws and implementation authorities (pg 176)				DNR HCP protection measures: riparian protection, unstable slopes protection, road network management, hydrologic maturity in rain on snow zones, and wetlands (pg 173)		
					CAO?? (pg 176)		
					SM?? (pg 178)		
					10-year actions -- Lower North Fork actions: riparian planting of the channel migration area for wood recruitment, riparian planting for shading benefits, construction of stable in-stream wood structures, protection of existing in-stream wood, monitoring of forest practice activities, and relocation of stream adjacent roads and infrastructure (pg 178)		
					10-year actions -- Upper North Fork actions: large-scale lwd placement, riparian restoration to improve wood delivery to the channel, riparian restoration to improve channel shading, and set back infrastructure from the channel (pg 181)		
					10-year actions -- North Fork Tributaries: riparian restoration to improve wood delivery to the channel, riparian restoration to improve channel, canyon creek fish passage improvement, and canyon creek habitat restoration (pg 181)		
					10-year actions -- Lower Middle Fork actions: upland forest management, riparian timber managed lands, riparian planting of the channel migration area for wood recruitment, and riparian planting for shading benefits (pg 183)		
					Upper Middle Fork: restore passage at middle fork diversion dam, establish and manage for sufficient instream flow at the middle fork diversion, upland forest management, and riparian timber managed lands (pg 185)		
					Middle Fork Tributaries: riparian timber managed lands, and monitoring of forest practice activities (pg 186)		
					Lower South Fork actions: upland forest management through forest and fish, northwest forest plan, including forest road maintenance and monitoring, riparian management, and avoidance of unstable slopes, protect existing function through CAO/SMP, acquisition of priority habitats, large-scale lwd placement, restoration of channel migration area, riparian restoration to improve wood delivery, riparian restoration to improve riparian shading, set back infrastructure from the channel, and wetland restoraiton to improve baseflow, temperature maintenance (pg 186)		
					Upper South Fork: upland forest management through forest and fish, northwest forest plan, including forest road maintenance and monitoring, riparian management, and avoidance of unstable slopes, priority habitat acquisition, large-scale wood placement, decrease river-adjacent sediment inputs to south fork mainstem, and riparian restoration to improve channel shading and wood delivery to the channel (pg 189)		
					South Fork Tributaries: riparian restoration to improve wood delivery to the channel, riparian restoration to improve channel shading, and monitoring of forest practice activities (pg 191)		
					Upper Mainstem: riparian and floodplain habitat acquisition, riparian restoration for shading in the Upper Mainstem Area, riparian restoration for wood recruitment in the Upper Mainstem Area, levee setback and removal of bank protection along the Upper Mainstem Nooksack, large wood placement, and monitor shorelines and critical areas ordinance (pg 193)		

					Lower Mainstem: early action projects that integrate floodplain management with habitat recovery: Batrand Creek area + Whiskey-Schneider Creek area, implementation of BMP on urban and agricultural lands, restore mainstem channel complexity, systematically integrate flood planning with habitat recovery, and monitor shorelines and critical areas ordinance (pg 194)		
					Mainstem Tributaries: restoration of tributaries slough habitat to provide flood refuge for fry and overwintering juveniles in the lower mainstem, small-scale riparian restoration through CREP, voluntary stewardship or community-based programs that do not compete with early chinook projects, establish and manage for instream flows through watershed management project, implement bmp to maintain water quality for downstream habitats, restore fish passage using funding sources specifically targeted for fish passage improvements, and implement forest and fish rules (applies to Smith and Anderson Creek watersheds) (pg 195)		
					Estuary actions: restore riverine-tidal blind channel network - Marietta Slough, restore riverine-tidal blind channel network - Tennant Wetland, setback/remove levees on LB of river between slater road and ferndale, restore channel complexity, reconnect slough and floodplain habitat, and acquired/ restored key habitat (pg 197)		
					Bellingham Bay actions: prioritize and implement relevant recommandations from the Bellingham Bay Pilot Project and monitor shorelines and CAO (pg 198)		
					Other WRIA 1 Nearshore Areas action: restore beach habitat-forming processes and monitor shorelines and CAO (pg 199)		
					Access: 1) Enforce and monitor compliance of existing laws that mandate the maintenance or restoration of fish access and passage for man-made structures (pg 202); 2) Develop education and outreach programs to educate small forest and other private landowners regarding salmonid migration habits and passage issues (pg 202)	None, or existing obstructions allow full upstream and downstream passage of juveniles and adults (pg218)	
					Channel Conditions (Sediment Supply): 1) Evaluate and adapt land management policies, practices, and plans to prevent disturbances to natural rates of sediment supply, deposition, and routing (pg 203); II) Maintain and, where possibe restore, road densities within watersheds to target levels (i.e. develop incentives, retain roadless areas, avoid construction of new roads) (pg 203)	1) Riffles = < 11% (pg 218)	
					Channel Conditions (LWD): 1) Prevent removal of wood from rivers and streams (educate public/road/bridge maintenance crews, develop/enforce regulations to restrict removal, and where wood removal is unavoidable due to safety or risk to public or private infrastructure, relocate wood to other areas w/in the channel (pg 204)	CW <25 ft = 2 to 3 / CW 25-50 ft = 2 to 4 / CW 50 - 150 ft = 3 to 7 / CW 150 - 400 ft = 10 to 20 (excluding large jams), plus large jams where accumulations occur / CW > 400 ft = 8 to 15 (excluding large jams), plus large jams where accumulations occur (pg 218)	
					Floodplain Conditions: I) Develop a strategic Flood Hazard Management Plan for Nooksack River and Forks that integrates salmonid habitat and human needs and prioritizes projects that maximize mutual benefit (pg 206); II) Protect Nooksack River and other floodplain habitats in WRIA 1 by preventing further encroachment into floodplain (i.e. enact land use regualtions to prevent new development/determental activities, acquire undeveloped land , maintain/develop incentives, etc.) (pg 206-207)	1) Hydromodifications - Stream channel is fully connected to the floodplain although very minor structures may exist that do not result in flow restrictions or constrictions; 2) Flood connectivity - Off-channel areas are frequently hydrologically linked to main channel; overbank flows occur and maintain wetland functions, riparian vegetation and succession; 3) Habitat Type - Off Channel - like historic conditions as reference (pg 219)	
					Riparian Conditions: 1) Protect existing riparian areas and functions along WRIA 1 streams, rivers, and floodplain habitats, as well as recovering riparian areas (i.e. maintain array of existing riparian functions, develop/enforce land use regulations, establish buffers outside regulated 'no-touch' riparian areas, and develop/implement non-regulatory measures) (pg 208); II) If adequate vegetated riparian buffers are infeasible, emphasize activities/land uses that are compatible with or that minimize impacts to salmonids and their habitat (pg 209); Restrict livestock access to avoid/minimize adverse impacts to streams and riparian areas - 1) install fencing and stream crossings; 2) develop watering areas away from streams/riparian areas (pg 209); III) Encourage Army Corps to reverse its policy of requiring levee maintenance activities remove vegetation (pg 209); IV) Develop programs/zoning ordinances to prevent or discourage land conversations that degrade habitat conditions (pg 209); V) Avoid construction of roads/utility lines/stream crossings that encroach upon riparian areas (pg 209); VI) Limit recreation or design use areas to minimize degredation of riparian habitat (pg 210); VII) Develop/implement education and outreach materials to communicate to the public the importance of riparian habitat for salmonids (pg 210)	1) Riparian Function = > 70% of functional attributes present; 2) Riparian buffer width and composition = >150 ft or site potential tree height (whichever is greater) and dominated (>70%) by mature conifers unless hardwoods were dominated historically (pg 219)	

					Water Quality (General): 1) Employ regulatory and voluntary measures to maintain and restore properly functioning water quality conditions (pg 210); II) Seek rigorous enforcement of Clean Water Act (pg 210); III) Monitor/implement measures to ensure that irrigation return flows, water conveyance systems, and stormwater inputs meet applicable water quality standards (pg 210); IV) Deny, defer, or condition all permits that will adversely impact water quality in WRIA 1 salmonid streams (pg 210); V) Ensure BMP are employed to reduce nonpoint source pollution and other adverse impacts of land uses on water quality (pg 210)	[a] 1)General water quality = low levels of contamination from agricultural, industrial, and other sources; no excess nutrients; no 2022-listed reaches; 2) temperature-daily maximum = see pg 220 for chart; 3) tamperature - spatial variation = intermittent sites of groundwater discharge into surface waters and total quantity groundwater discharge not a major source of flow in reach; 4) dissolved oxygen = > 8 mg/L; 5) turbidity = SEV Index 6; Occasional episodes with low to moderate concentrations (<250 mg/L) of suspended sediment. Concentrations are sublethal, although slight behavioral modifications may occur; Pollutants = no toxicity expected due to dissolved heavy metals to salmonids under prolonged exposure (1 month exposure assumed) (pg 220)	
					Turbidity: 1) Control fine sediment sources (pg 211); II) Regulate in-channel activities that can suspend sediments (pg 211)		
					Toxic Contaminants: 1) Develop/enforce applicable laws and land use regulations to restrict application and runoff of chemicals that have known or likely deleterious effects to salmonids and stream habitat and productivity (pg 211); II) Use best available technology to maximize efficient use of chemicals and reduce overapplication; III) Minimize usaand potential for delivery to streams of materials used during road and bridge construction and repair (pg 212); IV) Support/facilitate state/federal efforts to fund/implement cleanup of toxic areas (pg 212)		
					Dissolved Oxygen: Manage land use practices to avoid nutrient concentrations in salmonid streams that increase biological oxygen demand and can lead to critically low dissolved levels (pg 212)		
					Water Quantity: I) Work through Watershed Management Project and Comprehensive Irrigation District and Management Plan process to manage water use to provide adequate instream flows to meet salmonid needs, as well as channel-formation and maintenance flows (pg 213); II) Reduce hydrologic effects of forest roads (pg 213); III) Minimize effective impervious surface area (pg 214); IV) Develop/implement BMP to minimize soil compaction and vegetation disturbance in forestry, agriculture, and grazing practices, especially proximal streams; V)Increase flood water storage capacity and groundwater recharge, esp. Nooksack River and Forks (pg 214); VI) Prevent channelization and ditching; restore historical channel, floodplain, and wetland morphologies where possible; VI) Develop stormwater management plans that minimize, to the maximum extent feasible, the effects of stormwater on the hydrologic regime (pg 214)	1) Annual variation in peak flow = peak annual flows typical of an undisturbed watershed of similar size, geology, orientation, topography, and geography; OR <20% change in Q2yr based on historical record; 2) storm runoff response (rates of change in flow) typical of undisturbed watershed of similar size, geology, orientation, topography, and geography; OR <5% reduction in average TQmean compared to the undeveloped watershed state; 3) Annual variation in low flow = average daily low flows expected to be comparable to an undisturbed watershed of similar size, geology, and flow regime (or the pristine state for the watershed of interest); OR <20% change in the 45 or 60-day consecutive lowest average daily flow (pg 219); 4) Diel variation in flow = slight to low variation in flow stage during an average 24 hr period during season/month. This pattern typical of routine slight to low ramping condition associated with flow regulations, averaging <2 inches change in stage per hour (pg 220)	
					Estuarine and Nearshore Marine Habitat: I) Ensure coordiantion and cooperation w/ and among various organizations and committees working within the estuarine and nearshore marine environments of WRIA 1 (pg 217); II) Work with Burlington Northern railroad to seek solutions to reduce impacts to WRIA 1 shorelines (pg 217); III) Reduce occurance of treated wood structures in nearshore (pg 217); IV) Evaluate, address, and avoid or minimize impacts of industrial/municipal discharges in cherry point to water and sediment quality (pg 217); V) Evaluate and remove creosote logs in WRIA 1 estuaries and nearshore marine habitats (pg 217); VI) Promote oil and hazardous substance spill prevention, contingency, and response planning to reduce risk, minimize exposure, remediate contaminated areas, and restore lost resource functions and services (pg 217); VII) Regularly monitor for presence of Spartina and other invasive species (esp. in Lummi Bay and Bellingham Bay) (pg 217); and VIII) Continue to address cleanup/disposal or appropriate capping of contaminated sediments in inner Bellingham Bay according to the prioritization by Bellingham Bay Demonstration Pilot (pg 217)		
				2) Protect habitat through capital improvements			
					Access: 1) Ensure that new stream crossings, fishways, and surface water diversions comply with WDFW design guidance and standards (pg 202);p 2) Ensure that new flood structures maintain passage into floodplain habitat (pg 202)	None, or existing obstructions allow full upstream and downstream passage of juveniles and adults (pg218)	
					Channel Conditions (Sediment Supply): 1) Employ BMP and implement activity limitations to limit surface erosion and fine sediment delivery to streams (pg 203); II) Reduce frequency and magnitude of anthropogenically-induced maass wasting events, including landslides and debris flows (i.e. minimize/avoid land-use activities on unstable slopes, inventory/upgrade or decommission roads that have potential to increase mass wasting. (pg 203;	1) Riffles = < 11% ; 2) Riffle and tailout habitat units (where cobble, gravel substrates occur) = < 25% covered by fine sediment (pg 218)	

				3) Restore habitat through programmatic actions			
	Protect and restore freshwater, estuarine, and nearshore marine habitat, including water quantity and water quality conditions, in WRIA 1 sufficient to meet recovery goals for WRIA 1 salmonid populations, prioritizing as follows: 1. South Fork Nooksack early chinook and North Fork/Middle Fork Nooksack early chinook. 2. WRIA 1 bull trout 3. WRIA 1 wild late-timed chinook 4. WRIA 1 wild-spawning coho salmon 5. Other WRIA 1 salmonid populations (pg 176)				*Access:* I) Systematically inventory, assess, prioritize, and correct: 1) fish passage barriers, which block access including tributary, floodplain, and estuarine habitat; and 2) surface water diversions, which have potential to entrain salmonids (pg 202); II) Manage impoundments to minimize the ponded area necessary for surface water diversion; III) Develop and implement regular and effective monitoring and maintenance programs to ensure that fish passage is maintained at stream crossings and fishways (pg 202); IV) When stream crossings are in place or unavoidable, provide technical assistance in design and construction of structures to facilitate passage (pg 203); V) Secure long term funding and develop incentive and cost-sharing programs to help defray and equitably distribute the costs of fish passage restoration (pg 203); VI) Integrate fish passage and screening needs into land and water use planning to reduce the opportunity for additional problems to develop (pg 203)	None, or existing obstructions allow full upstream and downstream passage of juveniles and adults (pg218)	
	Identify and prioritize the sequencing and location of habitat protection and restoration efforts using the WRIA 1 Salmonid Habitat Restoration Strategy. (pg 176)				*Channel Conditions (Channel):* I) Evaluate alternatives to channel dredging (i.e. need for continuous intensive channel dredging could be avoided or minimized by identifying/managing upstream and upslope sediment sources, etc.) (pg 205); II) Avoid gravel mining and dredging in Chinook and Bull Trout habitats; where unavoidable, minimize negative effects to salmonids and their habitat by limiting the intensity, location, and/or timing of dredging activities (pg 205); III) Remove/set back existing bank hardening that impedes channel migration. Avoid/minimize new channelization projects or encroachments (pg 205)	1) Embeddedness - Riffle and tailout habitat units (where cobble, gravel substrates occur) = < 25% covered by fine sediment ; 2) Bed Scour - Spawning areas (i.e. in pool tailouts and small cobble-gravel riffles = Frequent scour of depth < 10 cm ; 3) Quantity/Quality of Pools - Pool Frequency = Width 5' = 184 / Width 10' = 95 / Width 15' = 20 / Width 20' = 56 / Width 50' = 26 / Width 75' = 23 / Width 100' = 18 (pg 218/219)	
	Protect and restore the natural watershed processes that form and maintain the habitat to which WRIA 1 salmonid stocks are adapted (pg. 176).				*Floodplain Conditions:* I) Conduct comprehensive inventory of man-made structures that constrain the channel or restrict flood flow access to floodplain and carry out feasibility analysis for their removal or relocation (pg 205)	1) Hydromodifications - Stream channel is fully connected to the floodplain although very minor structures may exist that do not result in flow restrictions or constrictions; 2) Flood connectivity Off-channel areas are frequently hydrologically linked to main channel; overbank flows occur and maintain wetland functions, riparian vegetation and succession; 3) Habitat Type - Off Channel - Use historic conditions as reference (pg 219)	
	Maintain or increase the quality and quantity of habitat necessary to sustain healthy, self-sustaining runs of other WRIA 1 salmonids to provide for harvest, as well as cultural and social values.(pg 176)				*Water Quality:* Evaluate influence of insufficient instream flows on degraded water quality and incorporate into instream flow planning efforts (pg 211)	1) General water quality = low levels of contamination from agricultural, industrial, and other sources; no excess nutrients; no 202d-listed reaches; 2) temperature-daily maximum = see pg 220 for chart; 3) temperature - spatial variation = intermittent sites of groundwater discharge into surface waters and total quantity groundwater discharge not a major source of flow in reach; 4) dissolved oxygen = > 8 mg/L; 5) turbidity = SEV Index 6; Occasional episodes with low to moderate concentrations (<250 mg/L) of suspended sediment. Concentrations are sublethal, although slight behavioral modifications may occur; Pollutants = no toxicity expected due to dissolved heavy metals to salmonids under prolonged exposure (1 month exposure assumed) (pg 220)	
	Retain or provide adequate quantity and quality of water in streams for salmonids. (pg 176)						
	Restore access to isolated habitat. (pg 176)			*4) Restoration habitat through capital improvements*			
	Forest practice goals: 1) support harvestable levels of salmonids; 2) support the long-term viability of covered species; or 3) meet or exceed water quality standards (protection of designated uses, narrative and numeric criteria, and anti-degradation) (pg 173)				*Channel Conditions (LWD):* I) Add lwd to streams to increase channel complexity, cover, spawning gravel retention, channel stability, pool frequency and depth, and habitat diversity (pg 204); II) Maintain/restore natural lwd recruitment/routing processes by maintaining and restoring riparian buffers, avoiding and reducing artificial channel confinement, and ensuring that instream structures convey wood (pg 204)	CW <25 ft = 2 to 3 / CW 25-50 ft = 2 to 4 / CW 50 - 150 ft = 3 to 7 / CW 150 - 400 ft = 10 to 20 (excluding large jams), plus large jams where accumulations occur / CW > 400 ft = 8 to 15 (excluding large jams), plus large jams where accumulations occur (pg 218)	
	Additional "Objectives": Ensure programs and actions are consistent with Endangered Species Act and Clean Water Act requirements. • Maintain viable forestry, agricultural, and other industries and provide long-term regulatory certainty. • Ensure that citizens and stakeholders are actively engaged in salmon conservation efforts. • Uphold existing federal, state, tribal, and local laws and implementation authorities (pg 176)				*Channel Conditions (Channel):* I) Maintain/restore habitats and habitat elements needed by species and life history stages that use a reach (pg 204); II) Emphasize restoration of processes that form and maintain historic channel patterns. In highly managed systems, instream habitat enhancements may also be the only viable alternative (pg 204); III) Reduce fine sediment levels by improving channel complexity, natural bank stability, and channel/floodplain connectivity (pg 204)	1) Embeddedness - Riffle and tailout habitat units (where cobble, gravel substrates occur) = < 25% covered by fine sediment ; 2) Bed Scour - Spawning areas (i.e. in pool tailouts and small cobble-gravel riffles = Frequent scour of depth < 10 cm ; 3) Quantity/Quality of Pools - Pool Frequency = Width 5' = 184 / Width 10' = 95 / Width 15' = 20 / Width 20' = 56 / Width 50' = 26 / Width 75' = 23 / Width 100' = 18 (pg 218/219)	

					Floodplain Conditions: 1) Restore floodplain habitats/habitat-forming processes in WRIA 1 floodplains, esp. along the Nooksack River and Forks, using historic conditions as reference (pg 205); II) Remove or setback bank hardening, dikes and levees, stream-adjacent roads, bridges, buildings and other infrastructure that constrain channel/restrict flood flow access to floodplain (pg 205); III) Restore connectivity to floodplain habitats that are isolated by hydromodifications and bank stabilization (pg 205); IV) Add wood at upstream ends of overflow channels to meter flow and increase floodplain habitat stability; V) Restore riparian forests w/in channel migration zones (pg 205).	1) Hydromodifications - Stream channel is fully connected to the floodplain although very minor structures may exist that do not result in flow restrictions or constrictions; 2) Flood connectivity Off-channel areas are frequently hydrologically linked to main channel; overbank flows occur and maintain wetland functions, riparian vegetation and succession; 3) Habitat Type - Off Channel - like historic conditions as reference (pg 219).	
					Riparian Areas: 1) Restore degraded riparian areas where possible along streams, rivers, floodplain habitats, and wetlands throughout WRIA 1 (i.e. prioritize riparian restoration in floodplain areas available for channel migration, focus on restoring structural and functional integrity of riparian areas, allow for passive restoration of riparian areas, etc.) (pg 208-209); II) Develop program for early detection and monitoring of the distribution of non-native invading plant species andact aggressively to eliminate or prevent the spread of such species (pg 209).	1) Riparian Function = > 70% of functional attributes present; 2) Riparian buffer width and composition = >150 ft or site potential tree height (whicher is greater) and dominated (>70%) by mature conifers unless hardwoods were dominated historically (pg 219).	
					Water Quality: 1) Restore wetlands and riparian areas to enhance their capacity to moderate sediment, chemical, and nutrient delivery to streams (pg 210).	1) General water quality = low levels of contamination from agricultural, industrial, and other sources; no excess nutrients; no 202d-listed reaches; 2) temperature-daily maximum = see pg 220 for chart; 3) temperature - spatial variation = intermittent sites of groundwater discharge into surface waters and total quantity groundwater discharge not a major source of flow in reach; 4) dissolved oxygen = > 8 mg/L; 5) turbidity = SEV Index 6; Occasional episodes with low to moderate concentrations (<250 mg/L) of suspended sediment. Concentrations are sublethal, although slight behavioral modifications may occur; Pollutants = no toxicity expected due to dissolved heavy metals to salmonids under prolonged exposure (1 month exposure assumed) (pg 220).	
					Temparature: 1) Protect/restore vegetation along riparian areas of WRIA 1 to provide adequate shading (pg 211); II) Restore natural hydrologic regime, esp. conditions that support increased summer base flow (pg 211); III) Identify/protect/restore both unique cold water features and processes that support them (pg 211).		
					Toxic Contaminants: Clean up and remove dumped material from streams and riparian areas (pg 212).		
					Water Quantity: 1) Maintain/restore natural hydrologic regimes to properly functioning conditions for WRIA 1 salmonids (pg 213); II) Restore processes and conditions that support summer base flows for WRIA 1 salmonid streams (pg 213); III) Restore hydrologic maturity (pg 213).	1) General water quality = low levels of contamination from agricultural, industrial, and other sources; no excess nutrients; no 202d-listed reaches; 2) temperature-daily maximum = see pg 220 for chart; 3) temperature - spatial variation = intermittent sites of groundwater discharge into surface waters and total quantity groundwater discharge not a major source of flow in reach; 4) dissolved oxygen = > 8 mg/L; 5) turbidity = SEV Index 6; Occasional episodes with low to moderate concentrations (<250 mg/L) of suspended sediment. Concentrations are sublethal, although slight behavioral modifications may occur; Pollutants = no toxicity expected due to dissolved heavy metals to salmonids under prolonged exposure (1 month exposure assumed) (pg 220).	
					Water Quantity: Restore channel conditions and habitat elements that will buffer the negative effects of peak flows on salmonid habitat, esp. in Nooksack River and Forks (pg 214).	1) Annual variation in peak flow = peak annual flows typical of an undisturbed watershed of similar size, geology, orientation, topography, and geography; OR <20% change in Q2yr based on historical record; 2) storm runoff response (rates of change in flow) typical of undisturbed watershed of similar size, geology, orientation, topography, and geography; OR <5% reduction in average TQmean compared to the undeveloped watershed state; 3) Annual variation in low flow = average daily low flows expected to be comparable to an undisturbed watershed of similar size, geology, and flow regime (or the pristine state for the watershed of interest); OR <20% change in the 45 or 60-day consecutive lowest average daily flow (pg 219); 4) Dial variation in flow = slight to low variation in flow stage during an average 24 hr period during season/month. This pattern typical of routine slight to low ramping condition associated with flow regulations, averaging <2 inches change in stage per hour (pg 220).	
					Estuarine and Nearshore Marine Habitat: 1) Address water quality degredation in streams/rivers flowing into estuarine/nearshore marine waters (pg 215); II) Protect/restore estuaries associated with coastal independent tributaries (esp. Bellingham Bay) (pg 215); III) Protect/restore processes regulating the supply, transport, and deposition of sediment, water, large wood, and nutrients in the estuarine/nearshore marine environment (pg 215); IV) Protect/restore nearshore marine habitat structure/function (pg 215); V) Protect/restore shoreline conditions (pg 215); Protect/restore forage fish spawning areas (pg 216); VI) Improve migratory corridors in estuarine and nearshore marine environment (pg 216).		

Hatchery							
				1) Manage hatcheries for recovery through programmatic actions			
			Hatchery practices have moderate impact of limiting genetic diversity of South Fork early Chinook (pg 155)		Operate hatchery programs as either genetically integrated or segregated relative to naturally spawning populations (pg 254)		
			Hatchery practices have a moderate impact of limiting the genetic diversity of North/Middle Fork early Chinook (pg 157)		Operate hatcheries within the context of their ecosystems (pg 255)		
			Hathcery practices have a high impact of increasing the abundance of North Fork/Middle Fork early Chinook (pg 157)		Incorporate flexibility into hatchery design and operation (pg 256)		
			Genetic diversity of Nooksack late-timed chinook has been highly limited by past non-native releases and continues to be limited by hatchery practices (pg 158)		Evaluate and adaptively manage hatchery programs regularly to ensure success (pg 256)		
			Past releases of non-native brook trout have a low negative impact on bull trout and Dolly Varden genetic diversity (pg 160)		Locate and time releases of hatchery fish to minimize potential for interactions with naturally produced fish (pg 257)		
			Artificially propogated chinook compete with wild Chinook, resulting in negative impacts to both North Fork/Middle Fork and South Fork early Chinook productivity (pg 160)		Take eggs throughout the natural period of adult return (pg 257)		
			Yearling coho and steelhead may prey on native salmonids including chinook, resulting in a low negative impact to early chinook abundance (pg 162)		Develop spawning protocols to maximize effective population size (pg 257)		
			Larger brook trout, established from past releases may prey on native salmonids, resulting in a low negative impact to bull trout from competition and predation (pg 163)		Establish goals for education program releases and minimize numbers released (pg 258)		
					Operate hatcheries in compliance with the Salmonid Disease Control Policy of the Fisheries Co-Managers of Washington State (NWIFC and WDFW 1998) (pg 258)		
					Use hatchery fish as indicators of wild salmon populations for fisheries management purposes for listed and at risk species (pg 258)		
				2) Manage hatcheries for recovery through capital improvements			

Harvest							
				1) Manage runs for recovery through programmatic actions			
	Manage harvest to provide for exercies of treaty-reserved fishing rights while not impeding recovery of early chinook populations (pg 14)	25-100 year goal: expand fisheries further to sustainably harvest recovered, self-sustaining salmonid populations (pg 15)				Populations recover to the level where they would produce three recruits for each spawner, allowing a spawning population of 3,000 to produce a harvestable surplus 6,000 in each of the populations in the Nooksack Early Chinook management unit (pg 226).	
	Protect current harvest levels for late-timed chinook, sockeye, pink, coho, steelhead, and chum salmon (pg 14)						
	11-25 year goal: Expand harvest to early chinook to include more meaningful ceremonial and subsistence use and of other stocks (pg 15)						
				2) Manage runs for recovery through capital investments			Ensure that hydropower projects have no net adverse impacts on salmonids and salmonid habitat. Projects should ensure fish passage, maintain water quality, provide sufficient instream flows, provide tailrace protection, screen intake structures to prevent entrainment, and manage water releases using ramping, as well as mitigate fully for any habitat loss and degradation (pg 263)
Hydropower							
				1) Manage hydropower facilities for recovery through programmatic actions			
					New Hydropower Projects: 1) Contest the siting of any new hydropower projects within known, presumed or potential/historic distribution of anadromous or resident salmonids, as depicted in the most current version of the WRIA 1 Salmonid Distribution maps; 2) If a new project is sited within known salmonid-bearing waters, work with FERC, EPA, NOAA Fisheries, USFWS, WDOE, and WDFW to ensure adequate fish passage and intake screening, evaluate and set sufficient instream flows, and minimize and fully mitigate for any habitat loss (pg 163-64)		
					Existing Hydropower Projects: 1) Ensure that ramping rates are established consistent with criteria set forth in (Hunter, M.A. 1992. Hydropower Flow Fluctuations and Salmonids: A Review of the Biological Effects, Mechanical Causes, and Options for Mitigation. September 1992. State of Washington, Department of Fisheries, Habitat Management Division. Olympia, WA); 2) Ensure that instream flow needs are met for all species and life stages likely to be affected.; 3) Ensure that structures do not interrupt routing of sediment, wood and other organic matter.; 3) Monitor impacts of water release fluctuations (e.g. redd dewatering, juvenile stranding), establish communication pathways between facility operators and local biologists, and develop mechanism for timely adaptive management of water releases (pg 264)		
			Hydropower projects may impact anadromous salmon in a variety of ways, including alteration of flow regime and barrier to access (pg 163)		Address flow issues associated with Excelsior/Nooksack Falls hydropower Facility (pg 164)		
					Address flow issues associated with small hydroelectric facilities, including Snoqualmie Creek facility (pg 164)		
			The Middle Fork Diversion Dam, although not hydropower, may have many of the same impacts as hydropower developmnt (pg 163)		Address fish access issues and flow issues associatedw it hthe Middle Fork Diversion Dam (pg 165)		
				2) Manage hydropower facilities for recovery through capital investments			

VSP							
				1) Increase abundance of target runs			
	South Fork Nooksack Early Chinook: 1) spawner abundance planning range: 9,900 - 13,000 (1.0) ; 2) Outmigrant smolt abundance: low productivity = 410,000 and high productivity = 280,000 (pg 16)					Interium Benchmarks: South Fork Nooksack early chinook: Abundance: 1,562 (pg 18)	
	North Fork/Middle Fork Early Nooksack Chinook: 1) spawner abundance planning range: 14,000 - 22,000 (1.0) ; 2) Outmigrant smolt abundance: low productivity = 610,000 and high productivity = 410,000 (pg 16)					Interium Benchmarks: North/Middle Fork Nooksack early chinook: Abundance: 3,283 (pg 18)	
				2) Increase productivity			
	South Fork Nooksack Early Chinook: 1) spawner abundance: a) productivity for planning range of abundance = 1.0 ; b) low productivity = 1.0 ; and c) high productivity = 3.3 ; 2) Outmigrant smolt abundance: a) low productivity = not given ; b) high productivity = not given (pg 16)					Interium Benchmarks: South Fork Nooksack early chinook: Productivity: 2.9 (pg 18)	
	North Fork/Middle Fork Early Nooksack Chinook: 1) spawner abundance: a) productivity for planning range of abundance = 1.0; b) low productivity = 1.0 ; and c) high productivity = 3.1 ; 2) Outmigrant smolt abundance: a) low productivity = not given ; b) high productivity - not given (pg 16)					Interium Benchmarks: North/Middle Fork Nooksack early chinook: Productivity: 3.4 (pg 18)	
				3) Increase spatial structure			
	To be determined						
				4) Increase diversity			
						Interium Benchmarks: South Fork Nooksack early chinook: Diversity Index: 78% (pg 18)	
	To be determined					Interium Benchmarks: North/Middle Fork Nooksack early chinook: Diversity Index: 77% (pg 18)	
	Bull Trout Recovery Goal: Nooksack Population - Abundance = 2000 ; Distribution = Maintain or expand the current distribution ; Trend = Stable or increasing trends in abundance at or above the recovered abundance target level in each core area based on 10 - to 15-year time frame ; Connectivity = Restore connectivity by identifying and addressing specific existing and potential barriers to bull trout movement in each core area (pg xiv)						
	Bull Trout Recovery Goal: Chilliwack Population - Abundance = 600 ; Distribution = Maintain or expand the current distribution ; Trend = Stable or increasing trends in abundance at or above the recovered abundance target level in each core area based on 10						
Education and Outreach							
				1) Conduct education and outreach through programmatic actions			
					1) Increase understanding of recommendations in Recovery Plan; 2) Engage broader community on actions that are needed; and 3) Make individuals aware of voluntary actions they can take that will aid in recovery (pg 275)		
					General educational programs and topics should expand to include: 1) The opportunities for mutual benefit and balance between flood hazard management and salmon habitat restoration; 2) Stormwater management and incorporation of bast management practices into everyday behavior; 3) Estuarine/nearshore environment and their importance to the salmon lifecycle.; 4) The role of large woody debris in forming and maintaining salmon habitats. (pg 275)		
				2) Conduct education and outreach through capital actions			
Adaptive Management and Monitoring							
				1) Conduct research			
					1) identification and quantification of impairments to natural processes (i.e. sediment supply, transport, and deposition; hydrology; wood inputs; nutrient/chemical inputs; light/heat inputs); (2) inventory and characterization of habitat conditions (i.e. access, substrate, habitat structure/stability, flow regime, and water quality); (3) identification and characterization of biotic interactions (i.e. food webs, competition, predation, disease/parasitism); and (4) characterization of salmonid populations (i.e. abundance, productivity, diversity, and spatial structure). (pg 267)		
				2) Conduct monitoring			
					Development of a monitoring and evaluation plan. General questions to be addressed: How well does a specific project work? • Are the collective projects achieving the anticipated results? In the short-term, long-tarm? • Are the hypotheses for what is limiting recovery valid and is our strategy appropriate? • Are we achieving recovery of salmon in our watershed and across Puget Sound? (pg 271)		
					Conduct compliance monitoring, effectiveness monitoring, validation monitoring (pg 271,273)		
				3)Make decisions via adaptive management			
					Components of decision-making structure: 1) Tracking and guiding plan implementation; 2) Making technical assessments about effectiveness of hatchery, harvest and habitat actions; 3) Evaluating progress and making decisions about priorities within and across H's; 4) Communicating progress – County, City, nonprofits; 5) Managing data, describing plan effectiveness – co-managers; 6) Securing funds to support plan implementation – WRIA 1 SRB In developing the adaptive management framework, thresholds will be established to measure progress towards recovery and to determine possible courses of action (No action—if target thresholds are met or exceeded; Continue or expand monitoring—if significant progress is made towards a threshold but it is not met.; Modify strategy or action—if results fall far short of the target threshold or conditions worsen.) (pg 274)	Timeline identified: 1) 1st 2 years: develop detailed monitoring plan, initiate monitoring, reporting on implementation ; 2) year 3+: effectiveness assessments and continue implementation reporting; 3) year 5+: use info to evaluate progress and priorities for continued funding of projects, engage discussion with broader policy committee for these decisions (pg 274)	

WRIA 1 Salmon Recovery Staff Team
2011 Annual Work Program

Executive Summary

Purpose: This Executive Summary provides an overview of the actions described in detail in the 2011 Annual Work Program for the WRIA 1 Salmon Recovery Staff Team. The 2011 Work Program represent the Team's focus as a group for purposes of agenda planning to advance WRIA 1 Salmonid Recovery Plan implementation. It should not be interpreted as the priority of actions or tasks for recovery or the priority of the various sponsors and WRIA 1 Salmon Recovery Board entities.

Overall Goals: The overall goal of the 2011 Annual Work Program for the WRIA 1 Salmon Recovery Staff Team is to implement actions that support the long-term and near-term goals of the *WRIA 1 Salmonid Recovery Plan*, 2005. The long-term goal is healthy, self-sustaining runs of salmon at harvestable levels. The near-term goals are the 10-Year Actions described in the Plan's Appendix B.

Summary of 2011 WRIA 1 Work Program Actions:

WRIA 1 Salmon Recovery Staff Team Work Items

- WRIA 1 Salmon Recovery Monitoring and Adaptive Management Plan (MAMP)
- Priority Reach Strategies/Identify Data Gaps
- Identify/Update Salmon Recovery Program Funding and Capacity Needs
- WRIA 1 3-Year Salmon Recovery Work Plan Update
- Ongoing Salmon Recovery Project Review and Tracking

Lead Entity Functions

- Program Coordination and Support
- SRFB/PSAR Grant Cycle
- WRIA 1 3-year Salmon Recovery Work Plan Coordination
- WRIA 1 Annual Work Plan
- Habitat Work Schedule

Outreach to Support Salmon Recovery Elements

- Technical Workshops
- Website Maintenance
- Brown-Bag Sessions
- Speaker Events/Opportunities
- Project Site Tours

Agenda Planning for WRIA 1 Management Team

- Flood and Salmon Policy Topics
- Watershed and Salmon Integration/Coordination
- MAMP Policy Guidance/Feedback
- Capacity/Funding Policy Topics
- Other Work Item Approvals and Guidance

WRIA 1 Salmon Recovery Staff Team
2011 Annual Work Program

Background: The WRIA 1 Salmon Recovery Board (SRB) was established by Interlocal Agreement in 2004 to (1) facilitate completion and adoption of a recovery plan for Nooksack Chinook and Bull Trout in a form consistent with regional and federal entities, (2) facilitate cooperative and coordinated implementation of the adopted recovery plans, (3) provide final review, approval and submission of a habitat project list (RCW 77.85.050), (4) coordinating with entities of the WRIA 1 SRB and others on actions pertaining to programs designed for or affecting salmon recovery efforts, and (5) other activities agreed to by the WRIA 1 SRB.

Long-Term Goal: The long-term goal of the *WRIA 1 Salmonid Recovery Plan*, 2005 is healthy, self-sustaining runs of salmon at harvestable levels.

Near-Term Goals: The near-term goals of the *WRIA 1 Salmonid Recovery Plan*, 2005 are described in Appendix B, WRIA 1 Near-Term (10 Year) Actions

2011 Annual Work Program Purpose: The purpose of the 2011 Annual Work Program is to identify the actions and tasks that the WRIA 1 Salmon Recovery Staff Team will implement and advance in 2011 to support the *WRIA 1 Salmonid Recovery Plan* long term goal, and that can be used to measures progress on the Near-Term (10 Year) Action. The Annual Work Program is formatted to reflect the Recovery Plan Near-Term Actions and Programmatic and Administrative functions. Columns worthy of clarification and/or explanation of intent is as follows:

- **The priority given to the column labeled "SRST Work Priority" does not indicate the priority of the action for recovery or the priority of the activity for the sponsor or entities involved; it reflects the amount of SRST agenda coverage that is anticipated to be spent on the topic at SRST meetings**.
- The column labeled "Policy Discussion" is intended to identify the places where WRIA 1 Management Team discussion and guidance is anticipated. This column will be used as a strategic planning mechanism for framing and projecting WRIA 1 Management Team agendas.
- The column labeled "Sequencing Tier" is intended to indicate whether completing the objective/products listed is necessary in order for other Elements of the 2011 Annual Work Plan to move forward.
- The colored blocks under "Element" identify Work Plan elements that will involve significant focus of SRST agenda time, require capacity of SRST technical members or other technical support to complete, and are important in the sequencing order for other tasks in the 2011 SRST Work Plan or that provide benefit to other tasks that are not dependent on the highlighted tasks being completed. The blue blocks are high priority geographic areas for chinook recovery. The lavender blocks involve nearshore/estuary elements, are lower recovery priority than the blue blocks, but may have opportunities for leveraging other activities and/or helps fill a potential information gap. The green blocks are listed as medium priorities because they are not in high priority geographic areas for chinook but may be important in sequencing of other tasks. Capacity needs for completing the lavender and green highlighted tasks and a lead for implementing will be the defining factor for completing these tasks.

Action/ Program	Element	2011 Objectives and Products	Funding Source**	Lead*	Recovery Priority	Sequencing Tier	SRST Work Priority†	Policy Discussion	Q1 Progress	Q2 Progress	Q3 Progress	Q4 Progress
WRIA 1 Near-Term Action Work Plan Elements												
Restore Fish Passage	Middle Fork Passage	• Complete feasibility study for alternative withdrawals • Permitting for construction • Continue pursuing as Project of Regional Significance (*policy support September 2010*)	• COB; COE; Partners; TBD	COB	High	Low	Low	Status; other policy as identified	• 3/9 NHC modeling mtg			
	Lower Canyon Creek	• Complete/review alternative designs for Phase 2 implementation • Permitting and Construction (*RCO Grant Contracts*)	• PSAR; WCPW; FCZD; PSCS	WCPW	High	Low	Low		• 2/4 SRST plus stakeholders for design alternatives			
	Project Review/Feedback	• Sponsor involvement of SRST in project review and updates • Engagement of state agencies and others in project review and updates	• LE Operation	SRST	N/A	Low	Med		• 2/4 SRST review for Lower Canyon Cr			
Habitat Restoration in Forks, Mainstem, and Major Early Chinook Tributaries	South Fork Habitat Projects	• Complete 2009 grant funded projects • Initiate 2010 grant funded projects	• SRFB; PSAR; sponsors	Multiple Sponsors	High	High/ Medium	Low					
	North Fork Habitat Projects	• Complete 2009 grant funded projects • Initiate 2010 grant funded projects	• SRFB; PSAR; sponsors	Multiple Sponsors	High	High/ Medium	Low					
	Middle Fork Habitat Projects	• Complete 2009 grant funded projects	• PSAR	NSEA	High	Low	Low					
	Middle Fork Assessment	• Present/review draft Middle Fork Assessment • Final Assessment	• PSAR	LNR	High	High	High		• 2/4 status presented to SRST			
	North Fork Assessment	• Incorporate/Broaden fish section for/of North Fork Assessment • Incorporate North Fork Tributary Habitat Mapping completed in 2010 (*NSEA w/PSAR Capacity funds*) • Finalize additions	• Existing	NIT	High	High	High					

** Funding sources and leads are the best information available as of January 2011. Changes in funding sources and/or leads may influence the extent to which tasks can be completed or are initiated.

† SRST Priority is NOT synonymous with priority for recovery or priority of individual sponsors or WRIA 1 Salmon Recovery Board entities. It reflects the amount of agenda coverage at SRST meetings for working on tasks.

Action/ Program	Element	2011 Objectives and Products	Funding Source*	Lead*	Recovery Priority	Sequencing Tier	SRST Work Priority†	Policy Discussion	Q1 Progress	Q2 Progress	Q3 Progress	Q4 Progress
	Nooksack Mainstem Assessment	• Define scope/area for assessment (i.e., Upper Mainstem or Upper and Lower Mainstem) • Identify purpose statement, approach/process, and lead • Identify key milestones	•TBD	TBD	Med	Med	Med	scope; purpose				
	Reach-Level Restoration and Protection Strategies for Nooksack Forks	• Affirm/modify previous work to assimilate and synthesize assessment work where applicable • Incorporate habitat targets • Prepare a reach-level restoration and protection strategy for South, Middle, and North Forks • Technical workshop to review strategies and receive feedback • Finalize reach-level Nooksack Forks Restoration and Protection Strategies	•LE Operation	SRST	High	High	High	Scope; strategies/ options; recommendations; approvals	• draft reach level matrices for Forks with status, opportunities, constraints • March 17 workshop			
	Reach-Level Restoration and Protection Strategy for Mainstem Nooksack	• Use proposed Mainstem Nooksack Assessment to prepare reach-level restoration and protection strategy for Mainstem Nooksack	•TBD	TBD	Med	Med	Low	Scope; strategies/ options; recommendations; approvals				
	Habitat Targets	• Prepare habitat targets for South, Middle, and North Forks • Incorporate habitat targets into monitoring and adaptive management plan • Use habitat targets to establish quantifiable objectives for HWS • Incorporate habitat targets into reach-level strategies	•Existing (NNR)	NNR	High	High	High	Review/ feedback	• Draft prelim habitat targets developed; review at SRST 3/17 mtg for present to MT on 3/31			
	Project Review/Feedback	• Sponsor involvement of SRST in project review and updates • Engagement of state agencies and others in project review and updates	•LE Operation	SRST	N/A	Low	Med		• 2/4 Brown Bag updates on all projects; review participants included Jeff Kamps and Marc Duboiski • 3/17 project development workshop attended by sponsors, SRST, WDFW, RCO, CRT member			

Action/ Program	Element	2011 Objectives and Products	Funding Source*	Lead*	Recovery Priority	Sequencing Tier	SRST Work Priority†	Policy Discussion	Q1 Progress	Q2 Progress	Q3 Progress	Q4 Progress
Integrate Salmon Recovery Needs into Floodplain Management	Strategic Process for Implementing Salmon/Flood Program Action	• Identify and recommend process/approach for technical coordination between programs • Coordinate with ongoing flood projects • Conduct technical assessments necessary to identify or refine habitat restoration priorities by limiting factor, location, and opportunity and coordinate with updates or changes to the flood hazard reduction program • Integrate salmon recovery needs into floodplain management and begin implementing priority restoration projects. • Continue working with appropriate agencies, Management Team, and WRIA 1 SRB to frame and address zero-rise issue	• Existing (SRB entities, agencies, partners)	WCPW	High	Low	High	Approach(es) for technical coordination; discussion of policy issues as framed for resolution	• Subcommittee established; first meeting 3/14 • SRST mtg 3/17 to review topic for 3/31 MT • Topic overview scheduled for Management Team 3/31			
Estuarine and Nearshore Areas	Nearshore/Estuary Assessment	• Compile available nearshore data and identify data gaps • Engage regional and local experts to discuss regional data and its applicability to local conditions and salmon recovery restoration planning and priorities • Review and prepare supplemental assessment information	• TBD	COB	Med	Med	High	scope; purpose	• 3/4 discussion; feedback on COB RFP for nearshore data compilation			
	Nearshore Reach Restoration Strategy	• Use Nearshore/Estuary Assessment information to prepare a restoration and protection strategy that prioritizes and sequences projects benefitting salmon	•TBD	TBD	Low	Low	Low	scope; purpose				
Hatchery/Harvest	South Fork Nooksack Chinook Captive Brood Recovery Program	• Continue seining juvenile Chinook for a complete brood cycle, run DNA for best fit assignment to the three stock baselines.	•	Co-Managers	High	N/A	N/A					
	Skookum Creek Hatchery Water Supply	• Insure a steady supply of water appropriate to the rearing of native early chinook	•	Co-Managers	High	N/A	N/A					
	North/Middle Fork Chinook Population Rebuilding Program	• Increase population natural origin abundances by having hatchery returns spawn naturally in a manner that distributes them well within the spawning habitat for this population	•	Co-Managers	High	N/A	N/A					
	Shift former steelhead hatchery releases to Samish River to Whatcom Creek	• Have non-native steelhead returns recruit back to a hatchery rack, instead of spawning naturally with wild steelhead	•	Co-Managers	High	N/A	N/A					
	Monitor Southern US Chinook harvest	• Monitor and assess all sport, commercial, and ceremonial and subsistence fisheries to collect data essential to determining the exploitation rates on the Nooksack early Chinook management unit.	•	Co-Managers	High	N/A	N/A					

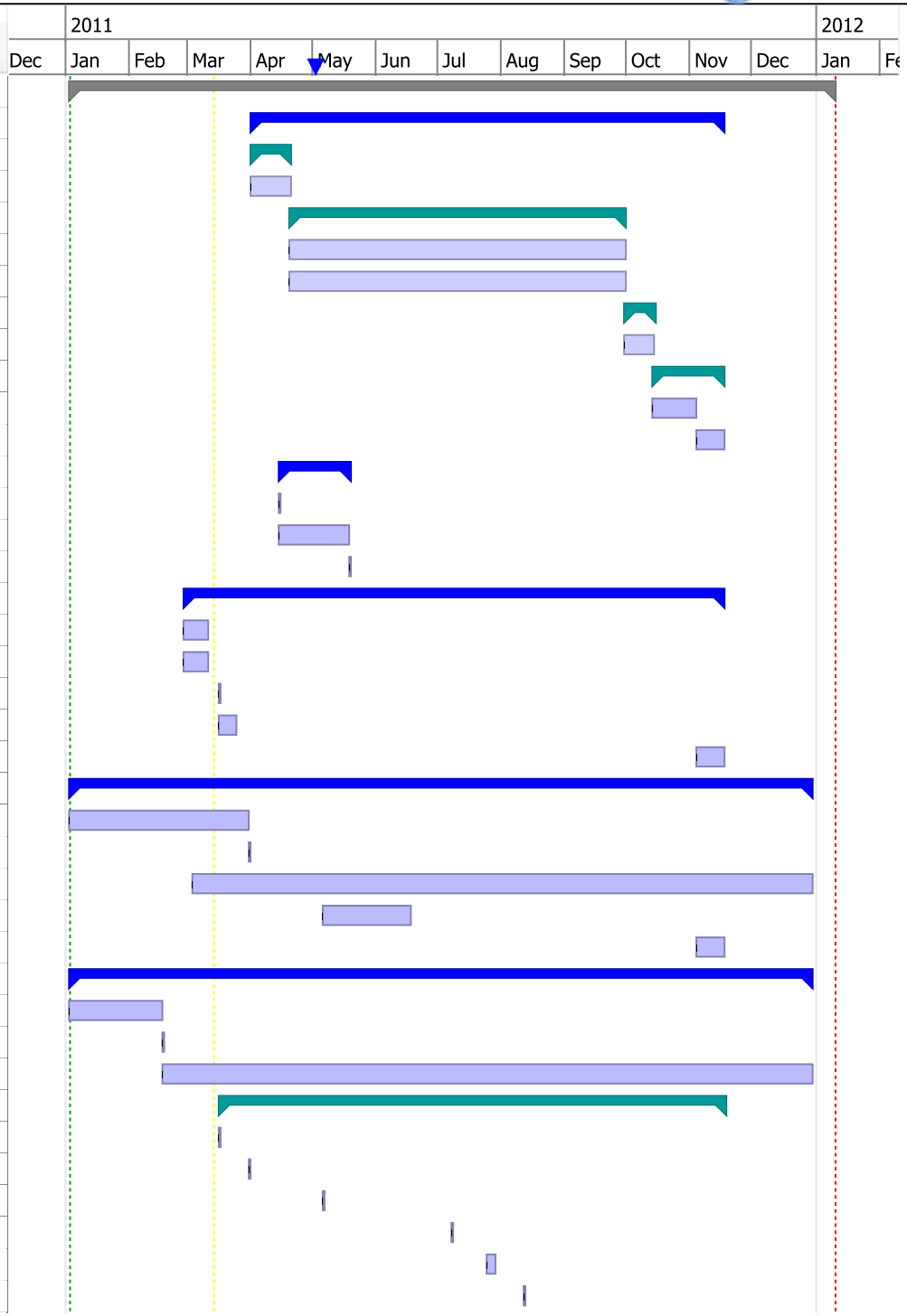
Action/ Program	Element	2011 Objectives and Products	Funding Source*	Lead*	Recovery Priority	Sequencing Tier	SRST Work Priority†	Policy Discussion	Q1 Progress	Q2 Progress	Q3 Progress	Q4 Progress
	Chinook pre-season fisheries planning	• Agree on Chinook preseason forecasts per Puget Sound Management Plan criteria, shape fisheries consistent with summer/fall chinook hatchery escapement needs, and the Southern US exploitation rate ceilings for Nooksack early Chinook.	•	Co-Managers	High	N/A	N/A					
	Monitor Nooksack wild steelhead harvests	• Monitor sport, commercial and subsistence fisheries adequately to estimate and report wild Nooksack steelhead harvest to show consistency with co-manager steelhead harvest plan commitments •	•	Co-Managers	High	N/A	N/A					
WRIA 1 Salmon Recovery Plan Elements												
Monitoring and Adaptive Management	WRIA 1 Salmon Recovery Monitoring and Adaptive Management Plan	• Prepare outline for monitoring/adaptive management plan (MAMP) • Participate/engage in/with RITT (regional) process for developing watershed monitoring plans • Flesh out sections of WRIA 1 MAMP • Consolidate sections for Draft MAMP	• SRB entities; •Capacity?	NNR (habitat/ hatcheries); LNR (harvest)	High	High	High	Scope; feedback; capacity for implementation	• 1/18 MAMP draft outline prepared and presented to SRST • Overview and key MAMP questions presented to MT on 1/27 •			
	Update Capacity Needs for Salmon Recovery Plan Implementation	• Review and update capacity needs and funding sources to implement actions in Salmon Recovery Plan • Present priorities, capacity, and funding needs to Management Team	•SRB entities	SRST members	High	High	Med	Capacity and funding				
Public Outreach	Speaker Series	• Present information on WRIA 1 Salmon Recovery Plan and related efforts to community groups, stakeholders, and others as requested • Coordinate/sponsor speaker for MRC/WWIN speaker series	• Other (SRST) •LE Operation	SRST; LEC	N/A	N/A	Low		• 2/9 SRST member presented SRP info at CCA meeting • SRST member planning for speaker 4/20			
	Website	• Redesign of Whatcom Salmon website GIS Maps, Photos, Content • Maintain and update site	•NEP •LE Operation •Other (SRST)	SRST; LEC	N/A	N/A	Low		• Continue modifying and transferring content from existing site to new site			

Action/ Program	Element	2011 Objectives and Products	Funding Source*	Lead*	Recovery Priority	Sequencing Tier	SRST Work Priority†	Policy Discussion	Q1 Progress	Q2 Progress	Q3 Progress	Q4 Progress
	Project Tour	• Coordinate with RCO Grant Manager for RCO/SRFB Review Panel project tour (*requested by RCO for 2011*) • Coordinate/plan project tour for Management Team, WRIA 1 SRB members, and other local policy, legislative, and administrative decision-makers	•LE Operation; •Other (SRST, Sponsors)	SRST; LEC	N/A	N/A	High		• Communicate w/RCO grant manager for scheduling event for RP			
	Technical Workshops	• Organize/coordinate technical workshops associated with reach-level restoration strategies (*refer to reach-level restoration and protection strategy description under "WRIA 1 Near-Term Action Work Plan Elements"*)	•LE Operation; •Other (SRST)	SRST; LEC	N/A	Med	Low		• Organize 3/17			
	Brown-Bag Sessions	• Coordinate monthly Brown-Bag topics and sessions for open invitation discussion on salmon-related topics • Designate one Brown-Bag Session per quarter for Project Review and Development	•LE Operation; •Other (SRST)	SRST; LEC	N/A	N/A	Low		• 2/4 review of project status • 2/17 Jim Helfield concept for study of salmon and climate			
Other Salmon Recovery Elements												
PSNERP	Lower Nooksack River Project	• SRB entity and partner participation in Lower Nooksack River Project advanced for preliminary consideration as PSNERP project. • Engage Management Team for policy guidance as/if project advances.	• PSNERP	SRB entities	N/A	N/A	Low	Status updates; other as identified				
Miscellaneous	Nooksack Recovery Team Project Map	• Update Nooksack Recovery Team Project Map (may need to consider adding "sponsor update by WRIA 1 SRB" to account for a current project map when NRT dissolved in 2009)	• TBD	TBD	N/A	N/A	Low					
	Culvert Inventory Maintenance Update	• Maintenance update of the 2006 culvert inventory	•TBD	TBD	Low	Med	Med					
	Mitigation/Restoration Opportunities Database	• Create database to match mitigation requirements with restoration opportunities	•TBD	TBD	Low	Low	Low					
Lead Entity Operation Elements												

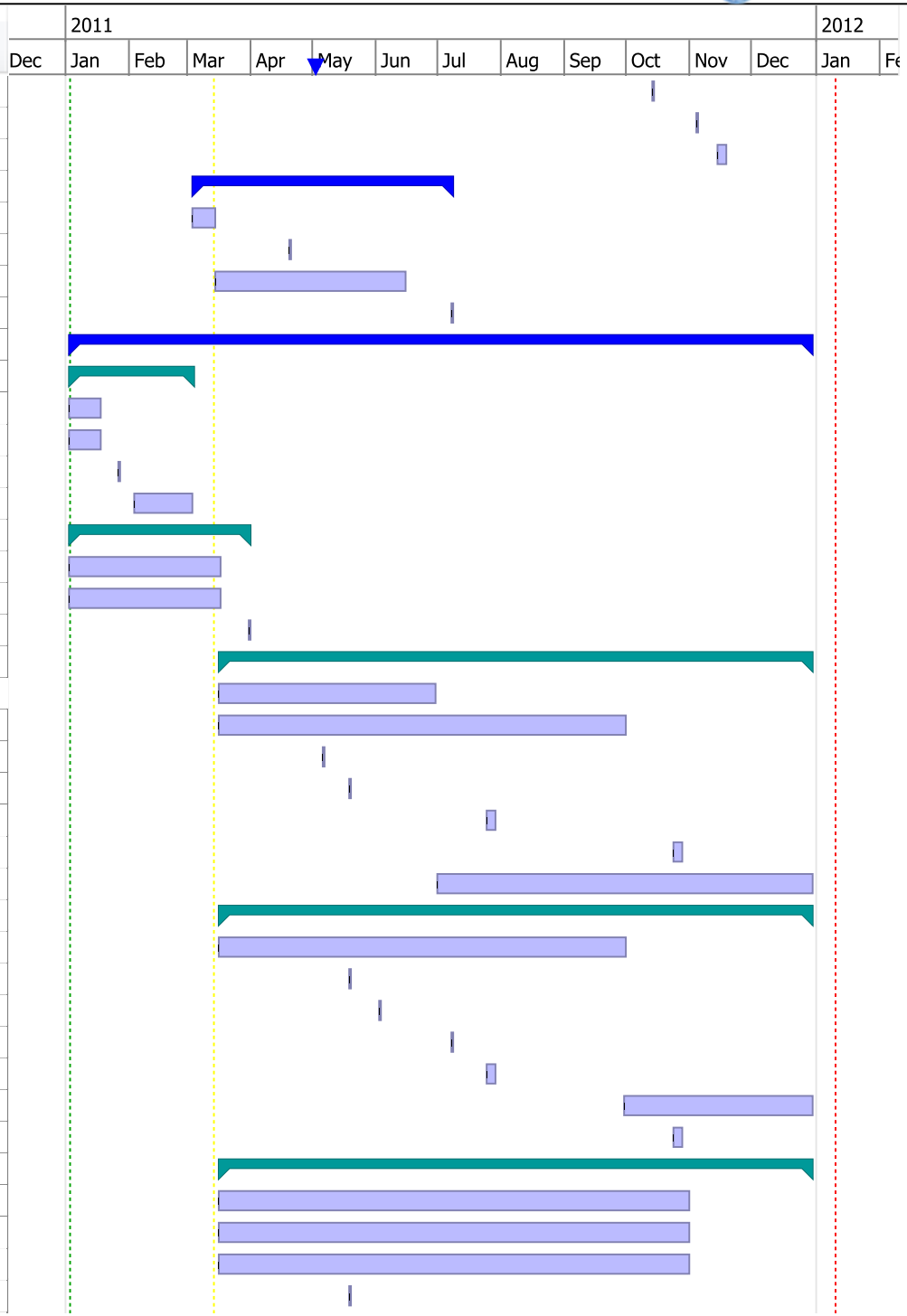
Action/ Program	Element	2011 Objectives and Products	Funding Source*	Lead*	Recovery Priority	Sequencing Tier	SRST Work Priority†	Policy Discussion	Q1 Progress	Q2 Progress	Q3 Progress	Q4 Progress
Administration and Lead Entity Operations	Program Coordination	• SRST Meeting Support and Facilitation • Management Team and SRB Support and Facilitation • Point of distribution of LE information, salmon-related information, partner information	• LE Operation	LEC	N/A	N/A	N/A		• Salmon Staff Team- 3 meetings, annual calendar, ongoing communication/ coordination • Management Team- 1 meeting, ongoing communication/ coordination			
	Regional Work Plan and Capital Project Updates	• Draft and Coordinate update of 3-year work plan • Coordinate RITT review questions with SRST • Draft and Coordinate update of annual capital project list • Submit updates to Puget Sound Partnership	•LE Operation	LEC	N/A	N/A	High	Approvals	• Adjust 2011-2013 capital list and resubmit 1/21 • 2/17 SRST approach for update • 3/17 project workshop			
	Annual Work Plan	• Draft and coordinate preparation of annual SRST work plan • Track implementation and progress of work plan actions	•LE Operation	LEC	N/A	N/A	Med	Approvals	• Prepare draft 2011 SRST work plan • 1/27 MT presented work plan and approve • Prepare timeline for tasks in approved plan			

Action/ Program	Element	2011 Objectives and Products	Funding Source*	Lead*	Recovery Priority	Sequencing Tier	SRST Work Priority†	Policy Discussion	Q1 Progress	Q2 Progress	Q3 Progress	Q4 Progress
	Project Tracking and Reporting	• Track progress on RCO grant restoration projects • Coordinate subcontract tasks with SRST • LE reports for operational funds	•LE Operation	LEC	N/A	N/A	Low		• Ongoing communication • South Fork Orphan Road Assessment- coordinate final work products • Ongoing communication with RCO and PSP • Regional meetings: 1 GSRO webinar; 1 LEAG conference call; 1 Watershed Leads Conference call			
	SRFB Grant Cycle	• Update materials for 2011 SRFB grant cycle • Coordinate Combined Review Team • Coordinate/organize pre-application site visits • Coordinate application process with sponsors • Submit draft CRT recommendation to Management Team/SRB • Complete submittal materials for final habitat project list	•LE Operation	LEC	N/A	N/A	High	Approvals	• Draft WRIA 1 grant schedule • Schedule site visits			
	Habitat Work Schedule	• Clean up projects pushed from PRISM into HWS • Finish entering 2010 funded projects • Sponsor training for HWS • HWS maintenance	•LE Operation	LEC; SRST; Sponsors	N/A	N/A	Med		• HWS maintenance- enter/complete 10 projects • Public portal- release 7 more projects • HWS training (LEC)- 3 sessions			

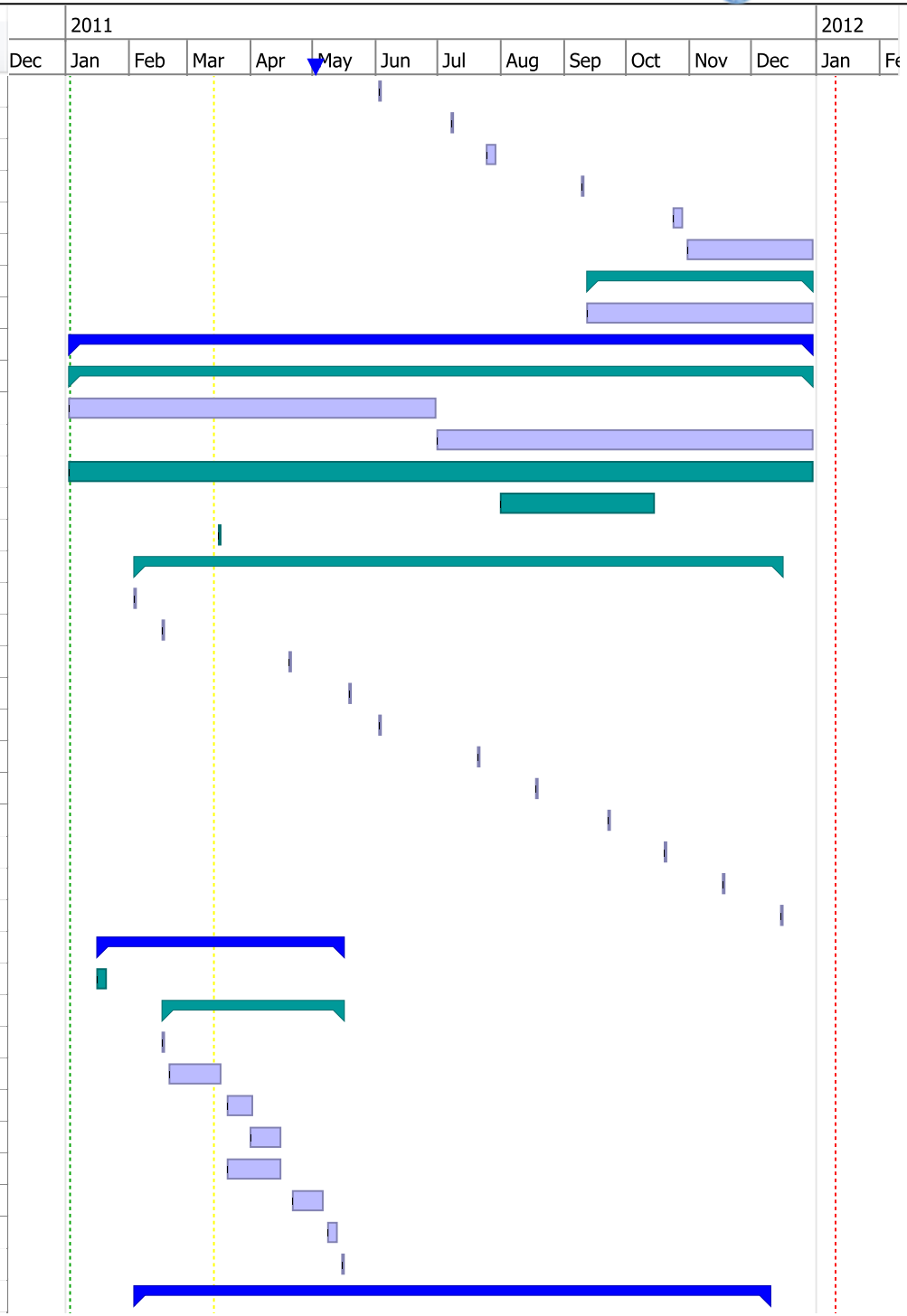
	Task Name
1	**2011 WRIA 1 Salmon Recovery Work Plan**
2	**North Fork Assessment**
3	**Identify sections for broadening**
4	SRST discussion
5	**draft sections**
6	fish section
7	other sections
8	**review draft sections**
9	SRST discussion
10	**finalize NF assessment**
11	incorporate comments
12	final review
13	**Nooksack Mainstem Assessment**
14	Initial SRST discussion-id purpose statement, scope, lead, and key milestones
15	Follow-up tasks
16	decide on next steps for assessment
17	**Nooksack Forks Reach-level Restoration and Protection Strategies**
18	assimilate and synthesize assessment work
19	prepare reach level strategy for SF, MF, NF
20	technical workshop to review strategy
21	finalize strategies for purposes of SRFB grants and 3-Year Project updates
22	review strategies to inc habitat targets
23	**Habitat Targets**
24	draft preliminary targets for Forks
25	present prelim draft targets to MT
26	incorporate targets into MAMP
27	incorporate targets into HWS reporting codes
28	incorporate targets into reach strategies (forks)
29	**Strategic Process for Salmon/Flood Action**
30	SRST discussion to initiate staff process
31	Establish subcommittee to work items prior to SRS
32	Subcommittee work on task
33	**Agenda Placement**
34	SRST discussion/feedback of Subcommittee work
35	MT agenda item
36	SRST discussion/feedback of subcommittee work
37	SRST discussion/feedback on subcommittee work
38	MT agenda item
39	SRST discussion/feedback on subcommittee work



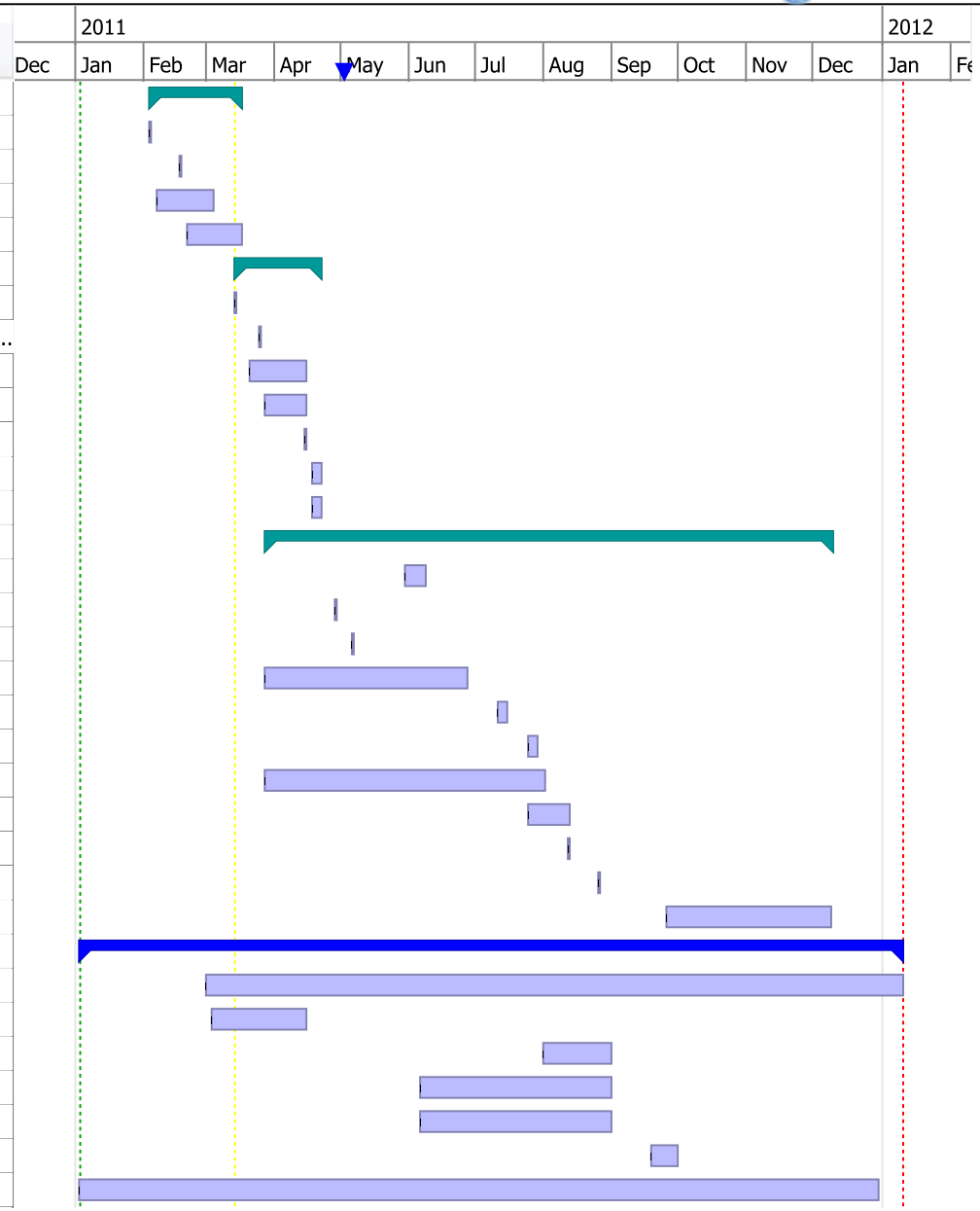
	Task Name
40	SRST discussion/feedback on subcommittee
41	SRST discussion/feedback on subcommittee work
42	MT agenda item
43	**Nearshore/Estuary Assessment**
44	RFP review
45	tentative presentation of work underway (Alan C/Eric B.)
46	track COB needs assessment and prioritization tool completed as tasks in RFI
47	identify next steps for SRST
48	**Monitoring and Adaptive Management**
49	**Planning**
50	develop/endorse key questions
51	develop MAMP outline
52	present to MT
53	develop work plan for MAMP completior
54	**Conceptual model**
55	summarize technical basis of SRP
56	establish prelim habitat targets
57	present to MT
58	**Monitoring**
59	identify indicators, approach for habitat, hatchery, harvest, coordination/ou...
60	identify indicators, approach for land use regs monitoring
61	Subcommittees report to SRST on progress
62	Subcommittees report to SRST on progress
63	check in point with MT
64	check in point with MT
65	draft monitoring plan
66	**Research**
67	identify, prioritize key research gaps, approach for filling gaps
68	SRST check-in/discussion
69	SRST check-in/discussion
70	SRST check-in/discussion
71	check in point with MT
72	draft research plan
73	check in point with MT
74	**Adaptive Management**
75	establish implementation targets in 5-yr increments
76	identify trigger points for action/recommendations for adaptation
77	establish accountability mechanisms
78	SRST check-in/discussion



	Task Name
79	SRST check-in/discussion
80	SRST check-in/discussion
81	check in point with MT
82	SRST check-in/discussion
83	check in point with MT
84	draft adaptive management plan
85	**Update SRP capacity needs for implementation**
86	review and update costs in SRP
87	**Outreach Oriented Actions**
88	**website**
89	redesign/enhancement
90	site maintenance
91	speak at events as requested
92	project tour plan and implement
93	technical workshop
94	**Brown-Bag Events**
95	project review/development
96	research project opportunty w/ WWU
97	host speaker for WWIN/MRC speaker series
98	TBD
99	project review/development
100	TBD
101	TBD
102	project review/development
103	TBD
104	project review/development
105	TBD
106	**Regional Work Plans**
107	Capital Project Modifications
108	**3-Year Plan Update**
109	SRST discussion for update approach
110	prep for 3/17 technical workshop for projects
111	modifications to 2010 3-yr document, distribute draft spreadsheet
112	review/modifications to sprdsheet and project narrative for SRST mtg
113	draft responses to update narrative
114	circulate final draft to SRST, partners, others
115	distribute to MT for approval
116	submit to PSP
117	**Habitat Project List (SRFB Grant Cycle)**



	Task Name
118	**Plan Process**
119	Initiate contact w/ sponsors for project status and development
120	Initiate discussion w/ SRST on 2011 approach
121	review 2010 process materials/draft 2011 schedule for SRST
122	Plan for workshop (see Technical Workshop Tasks)
123	**Initiate Process**
124	Workshop (see Technical Workshop Task)
125	Circulate final draft 3-Year Plan Update and 3/17 workshop strategy outcom...
126	modficiations to grant process documents
127	modifications to CRT materials
128	finalize schedule
129	notice to paper and radio of application cycle
130	notices to CRT members
131	**Application and Review Process**
132	organize site visits
133	letters of intent
134	SRST/Sponsor review of LOI
135	enter applications in PRISM (milestones est in calendar materials
136	sponsor presentation/CRT review and ranking
137	Management Team review of CRT recommendatior
138	support sponsor's completing applications
139	complete LE application related materials
140	Submit approved project list to PSP
141	Submit materials to RCO
142	Monitor regional and SRFB process through funding
143	**Habitat Work Schedule**
144	maintenance- continue completing projects partially entered by PRISM dum
145	finish entering and making public all 2010 project
146	adjust reporting codes and hierarchies to reflect MAMP targets
147	enter 2011 SRFB projects
148	enter 3-year project list
149	training for project sponsors
150	HWS webinars as scheduled



	RGB color
Importance- High/Opportunity- Yes	(R225:G0:B0)
Importance- High/Opportunity- Limited	(R255:G137:B137)
Importance- High/Opportunity- Unknown	(R255:G193:B193)
Importance- High/Opportunity- No	(R255:G217:B217)
Importance- Moderate/Opportunity- Yes	(R226:G183:B0)
Importance- Moderate/Opportunity- Limited	(R255:G212:B75)
Importance- Moderate/Opportunity- Unknown	(R255:G255:B137)
Importance- Moderate/Opportunity- No	(R255:G255:B185)
Importance- Low/Opportunity- Yes	(R143:G178:B72)
Importance- Low/Opportunity- Limited	(R185:G208:B140)
Importance- Low/Opportunity- Unknown	(R210:G225:B181)
Importance- Low/Opportunity- No	(R235:G242:B222)

006600Appendix B

RESTORATION STRATEGIES AND STATUS: MIDDLE FORK NOOKSACK RIVER

			Kulshan	Welcome
			1.5	3.1
			Canyon Lake	*None*
Middle Fork	Construct/augment log jams to protect, encourage formation and growth of forested islands (especially upstream of tributary confluences)	Importance[23]	**High**	High
		Status	0%	0% [1]
		Opportunity	**Yes**[22]	Unknown
	Log jams to reconnect back channels (provide for flows during spawning/incubation, prevent major avulsion)	Importance	**High**	High
		Status	0%	0%
		Opportunity	**Yes**	Unknown
	Install engineered wood structures to increase roughness, improve channel stability, and slow migration[24]	Importance	**High**	High
		Status	0%	13% [2]
		Opportunity	**Yes**	Unknown
	Increase woody cover along channel edges[25]	Importance	High	Moderate
		Status		13% [2]
		Opportunity	Limited	Unknown
	log jams to form deep complex pools	Importance	**High**	High
		Status	0%	0%
		Opportunity	**Yes**	Unknown
	Restore fish passage[26]	Importance	N/A	N/A
		Status		
		Opportunity		
	Improve low-flow connectivity with low gradient tributaries	Importance		
		Status		
		Opportunity		
	Reforest historic channel migration zone and 300' buffer	Importance	Moderate	Moderate
		Status	0%	0%
		Opportunity	Limited	Limited
	Promote channel-floodplain interaction to restore floodplain processes (e.g., wood recruitment, floodplain habitat formation)	Importance		
		Status		
		Opportunity		
	Forest road stabilization and assessment	Importance		
		Status		

		Opportunity		
	Reconnect and restore floodplain wetlands	Importance	Low	Low
		Status	0%	0%
		Opportunity	Unknown	Unknown
	Acquire properties necessary to facilitate restoration	Importance[18]	Moderate	Moderate
		Status[19]	0%	0%
		Opportunity	No	Limited
	Acquire properties at risk of degradation to protect high quality habitat, habitat-forming processes	Importance[20]	Low	Low
		Status[19]	0%	0%
		Opportunity	No	Limited
Early chinook tribs (upstream to chinook extent)	Restore riparian areas	Importance[21]	Low	N/A
		Status	0%	
		Opportunity	Limited [16]	
	Restore habitat (diversity, stability)	Importance[21]	Low	N/A
		Status	0%	
		Opportunity	Yes	
	Restore fish passage	Importance	N/A	N/A
		Status		
		Opportunity		
	Acquire properties at risk of degradation to protect high quality habitat, habitat-forming processes	Importance[20]	Low	N/A
		Status[19]		
		Opportunity		
Watershed	Assess, treat orphaned roads	Importance		
		Status		
		Opportunity		
	Address chronic sediment sources	Importance		
		Status		
		Opportunity		

Reach Name (upstream RM, early chinook tributaries indicated below reach name)					
Porter	MF Canyon	Clearwater	Galbraith	Warm	Rankin
5.2	7.2	9.4	11.7	14.5	17.4
Porter, Peat Bog	*None*	*Clearwater*	*Galbraith*	*Wallace, Warm, Sisters*	*Ridley*
High	Low	Low	Low	Low	Low
32% [4]	0%	0%	0%	0%	0%
Yes	Unknown	Yes	Yes	Yes	No
High	N/A	N/A	Moderate	Moderate	Low
32% [5]			0%	0%	0%
Yes			Yes	Yes	Yes
High	N/A	N/A	Moderate	Low	Low
63%			0%	0%	0%
Yes			Yes	Yes	Limited
Moderate	N/A	Low	Moderate	Low [13]	Low
0%		0%	0%	0%	0%
Yes		Yes	Yes	Yes	Yes
High	N/A	N/A	Moderate [11]	Low	N/A
32%			0%	0%	
Yes			Yes	Yes	
High	**High** [8]	N/A	N/A	N/A	N/A
0%	0%				
Yes	**Yes**				

Strategy Not Applicable

Moderate	Moderate	N/A	N/A	N/A	N/A
5% [7]	0%				
Yes	Yes				

Strategy Not Applicable

Strategy Not Applicable

Low	Low	Low	Low	Low	Low
0%	0%	0%	0%	0%	0%
Yes	No[9]	No	No	No	No
Low	Low	Low	Low	Low	N/A
0%	0%	0%	0%	0%	
No	No	No	No	No	
Low	Low	Low	Low	Low	N/A
0%	0%	0%	0%	0%	
No	No	No	No	No	
Low	N/A	Moderate	N/A	Low	Low
0%		0%		0%	0%
Yes		Yes		Yes	
Low	N/A	Moderate	N/A	Low	Low
0%		0%		0%	0%
Yes		Yes		Yes	
N/A	N/A	N/A	N/A	N/A	N/A
Moderate (Peat Bog), Low (Porter)	N/A	Low	Low	Low	N/A

Strategy Not Applicable

Strategy Not Applicable

RESTORATION STRATEGIES AND STATUS: NORTH FORK NOOKSACK RIVER

			Reach Name (upstream RM, early chinook tributaries indicated below reach name)															
			Pipeline	Rutsatz	Bell/ Kenny	Big Rock Canyon	Hatchery	Farmhouse	Maple Canyon	Maple Creek	Mahaffey Canyon	Below Boulder	Lone Tree	Wildcat/ Warnick	Canyon	Cornell	Horseshoe	Deadhorse
			38.3	40.6	42.9	43.7	46.7	49.4	49.8	50.6	51.1	52.3	53.3	54.8	55.8	57.8	61.9	65
			None	*None*	*None*	*None*	*Racehorse*	*None*	*None*	*Maple*	*None*	*Boulder*	*None*	*McDonald*	*Canyon*	*Cornell, Thompson, Hedrick*	*None*	*Boyd, Deadhorse*
North Fork	Construct/augment log jams to protect, encourage formation and growth of forested islands (especially upstream of tributary confluences)	Importance	Moderate[4]	Moderate[4]	Moderate[4]	Low[2]	**High**	**High**	Low[2]	**High**	low	High	**High**	**High**	Moderate	Moderate	Low[2]	**High**
		Status[20]	0%	0%	0%	0%	20%	20%[10]	0%	0%	0%	0%	60%	0%[10]	0%	0%	0%	10%[11]
		Opportunity	Unknown	Limited	Limited	Unknown	**Yes**	**Yes**	Yes	**Yes**	Unknown	Unknown	**Yes**	**Yes**	Unknown	Limited	Yes	**Yes**
	Log jams to reconnect back channels (provide for flows during spawning/incubation, prevent major avulsion)	Importance	Low[1]	Low[1]	Low[1]	Low[2]	**High**[7]	**High**	Low[2]	**High**	low	High	**High**	**High**	Moderate	Moderate	Low[2]	**High**
		Status	0%	0%	0%	0%	0%	0%[10]	0%	0%	0%	0%	90%	0%[10]	0%	0%	0%	10%[11]
		Opportunity	Unknown	Limited	Limited	Unknown	**Yes**	**Yes**	Yes	**Yes**	Unknown	Unknown	**Yes**	**Yes**	Unknown	Limited	Yes	**Yes**
	Logs/log jams to increase habitat quality in braids and back channels.	Importance	Low	Moderate[5]	Moderate[5]	Low[2]	Moderate[6]	Moderate[6]	Low[2]	Low	Low	Moderate	Moderate	Moderate	Low	Low	Low[2]	Moderate
		Status	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	10%	0%	0%	0%	0%	10%[11]
		Opportunity	Unknown	Limited	Limited	Unknown	Yes	Yes	Yes	Yes	Unknown	Unknown	Yes	Yes	Unknown	Limited	Yes	Yes
	Reforest historic channel migration zone and 300' buffer	Importance	Moderate	Moderate	Moderate	Low[2]	Moderate	Moderate	Low[2]	Moderate	Low	Moderate	Moderate	Moderate	Moderate	Moderate	Low[2]	Moderate
		Status																
		Opportunity	Unknown	Limited	Limited	Unknown	Yes	Yes	Yes	Yes	Unknown	Unknown	Yes	Yes	Unknown	Limited	Yes	Yes
	Promote floodplain forest encroachment on active channel area.	Importance	Moderate[4]	Moderate[4]	Moderate[4]	Low[2]	Moderate	**High**[8]	Low[2]	Moderate	Low	Moderate	**High**[8]	Moderate	Moderate	Moderate	Low[2]	Moderate
		Status	0%	0%	0%	0%	20%	20%	0%	0%	0%	0%	60%	0%	0%	0%	0%	0%
		Opportunity	Unknown	Limited	Limited	Unknown	Yes	**Yes**	Yes	Yes	Unknown	Unknown	**Yes**	Yes	Unknown	Limited	Yes	Yes
	Promote channel-floodplain interaction to restore floodplain processes (e.g.wood recruitment, floodplain habitat formation)	Importance	Low[5]	Low[5]	Low[5]	Low[2]	Low[5]	moderate	Low[2]	Moderate[6]	Low[2]	Low[2]	Low[2]	Low[2]	Low	Low	Low[2]	Low
		Status	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
		Opportunity	Unknown	Limited	Limited	Unknown	Yes	Yes	Yes	Yes	Unknown	Unknown	Yes	Yes	Unknown	Limited	Yes	Yes
	Acquire properties necessary to facilitate restoration	Importance[21]	Low	Low	Moderate	Low	Low	Low	Low	Low	Low	Low	Low	**High**	Low	Low	N/A	N/A
		Status[22]	10%	20%	40%	0%	50%	90%	0%	50%	0%	40%	60%	75%	60%	40%		
		Opportunity	No	No	Yes	No	Limited	No	No	Limited[18]	No	No	No	**Yes**[19]	Limited	Limited		
	Acquire properties at risk of degradation to protect high quality habitat, habitat-forming processes	Importance[23]	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	High	High	High	Moderate	Moderate	High	High		
		Status[22]	10	20	40	0	50	90	0	50	0	40	60	75	60	40		
		Opportunity	No	No	Yes[17]	No	Limited	No	No	Limited	No	No	No	Yes	No	Limited		
Early chinook tribs (upstream to chinook extent)	Restore riparian areas	Importance[24]	N/A	N/A	N/A	N/A	Moderate	N/A	N/A	Moderate	N/A	Low	N/A	Low	Moderate	Low	N/A	Low
		Status					100%[15]			100%[14]		0%		0%	0%	0%		0%
		Opportunity								Yes								
	Restore habitat (diversity, stability)	Importance[24]	N/A	N/A	N/A	N/A	Moderate	N/A	N/A	Moderate	N/A	Low	N/A	Low	Moderate	Low	N/A	Low
		Status					0%			100%[14]		0%		0%	30%	0%		0%
		Opportunity					Yes			Yes								
	Restore fish passage	Importance	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**High**	Moderate (Hedrick)	N/A	N/A
		Status													30%[12]	0%		
		Opportunity													**Yes**			
	Acquire properties at risk of degradation to protect high quality habitat, habitat-forming processes or to facilitate restoration	Importance[25]	N/A	N/A	N/A	N/A	Moderate	N/A	N/A	Low	N/A	Low	N/A	Low	high	Low (Thompson High)	N/A	N/A
		Status[22]																
		Opportunity																
Watershed	Assess, treat orphaned roads	Importance	Moderate															
		Status	50%[16]															
		Opportunity	Yes															
	Address chronic sediment sources	Importance	Moderate															
		Status	0%															
		Opportunity	Yes															

006600Appendix B

Fork	Ref#
NF	1
NF	2
NF	3
NF	4
NF	5
NF	6
NF	7
NF	8
NF	9
NF	10
NF	11
NF	12
NF	13
NF	14
NF	15
NF	16
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NF	18
NF	19
NF	20
NF	21
NF	22
NF	23
NF	24
NF	25
SF	1
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MF	21
MF	22
MF	23
MF	24
MF	25
MF	26

Comment
Identifed as a low priority by Hyatt 2007 based on low documented spawning use
Confinement limits secondary channel opportunities and LWD function
Very low migration rate reduces LWD recruitment potential
Wide active channel area, assumes extensive rearing use of the lower NF.
Floodplain already well-connected
Reaches have extensive backchannel habitat for LWD placement
Significant spawning assocaited with the hatchery
Among the most active and volatile reaches (Hyatt 07)
Levee along field to the north
Project design work in progress
USFS constructed project focused on most confined portions of reach, not directly addressing strategies.
Canyon Creek passage is in the design phase; some instream work and levee setback has been done to improve pa
Tim identified a project just above the canyon within this reach.
Maple Creek upstream to where it is subsurface (.5 mi) has been treated.
Kendall Creek riparian treated, instream restoration above hatchery rack. Racehorse riparian interplant completed
Orphan road assessment done as part of RMAPs on schedule for completion 2016. Specific sediment reduction ass
Miller willing seller, appraisal complete (2011 grant)
discussions with Diamond Creek landowner in 2010, future project
Wildcat reach, appraisal spring 2011 (possible 2011 grant)
Percentage taken as an area rather than length since the active channel area is so wide
low importance everywhere, except moderate importance where private ownership extends into the visual and qualitative from GIS [FED, STATE, COUNTY, TRIBAL, & WLT]
Based on EDT ratings, except moderate for Wildcat and Lone Tree since conditions not appreciably different from downstream reaches; doesn't incorporate risk of degradation - that needs to be
Generally low, but moderate for higher use early chinook tributaries (based on Ned Currence's judgment).
low importance everywhere, except moderate importance Canyon Creek, high importance Thompson Creek; doesn't incorporate risk of degradation - that needs to be considered during review of specific
Groundwater inflow zone
Perennial cool water tributary
Assumes most of the population spawns downstream
Confinement limits LWD function- pools formed by bedrock
Channel confined- historically single-thread
No sigificant riprap
Reaches where forest islands occur and can provide sheltered spawning
Neilson, McKay levees
Riverfarm Levee
BNSF RR Fill
City of Bellingham Pipeline Levee
Potter Road (Bridge Span), BNSF RR
BNSF RR, Hwy 9
Mosquito Lake Road, Williams Pipeline
C.O.B. Pipeline
Saxon Road
Forest Road 160 (Larson's Bridge Span)
Hutchinson Creek knotweed
Neilson side channel
Nesset's, Rothenbuhler side channels

Differentiated from tributary channels
Old Hutchinson Channel
Short length of accessible habitat
Treated length compared to groundwater inflow length w/i reach
Some knotweed treatment scheduled associated with VanZandt Project
Treated length compared to non-groundwater inflow length w/i reach
Treated length compared to potential or historic anastomosing channel length
~.65 mi groundwater discharge area w/i reach, ~.5 mi treated in VanZandt Project
lower .5 mi probably not multichannel
Black Slough (NNR) project is in the design phase and may include these elements
Potter Bridge project (WCPW) is in the design phase
~.35 mi groundwater discharge area w/i reach, all treated in the Todd/ Sygitowicz projects
Some knotweed treatment scheduled associated with Todd and Sygitowicz projects
~1 mi groundwater discharge area w/i reach (uppermost mile), ~0.55 mi treated as a part of the Kalsbeek Project
Hardscrabble Project draft design completed
Kalsbeek project focused on stabilizing only forested island
Some knotweed treatment scheduled associated with the Kalsbeek Project
Entire reach is groundwater discharge zone
Lower .4 mi is a groundwater discharge zone, ~.1mi treated as a part of the Acme Project
Acme Project objective of reconnecting side channel
Hutchinson Creek project addressed reconnection of coolwater tributary
100 ft removed as a part of the Van Zandt Projet
100 ft removed as a part of the Sygitowicz Projet
840 ft removed as a part of the Acme Project
600 feet removed as a part of the Hutchinson Project
Knotweed treated in Hutchison and Roos floodplain areas
No groundwater discharge or perennial cool water tribs identified
Nesset's Project complete, Saxon Project in design to cover the remain portion
Skookum Reach project addressed habitat in a coolwater tributary confluence
Cavanaugh Project in Design, may address these strategies
RM 30 Project adressed .12 mi of channel
Fobes project addressed coolwater confluence of Fobes Creek, Larson's Br. Project addressed reconnection of Deer
Fobes and Larson's Br designs covered entire reach.
Whatcom County assessed and treated knotweed in the reach
Mosquito Lake Road functions as a levee
Elk Flats acquisition includes future removal of all strucutres within the EHZ in this reach.
Upstream of knotweed distribution
Orphan road assessment done as part of RMAPs on schedule for completion 2016. Specific sediment reduction ass
Orphan road assessment done as part of RMAPs on schedule for completion 2016. Specific sediment reduction ass
310m of streamside landslides mapped, 255 m treated by Larson'sProject
840m of streamside landslides mapped
1985m of streamside landslides mapped, 130m treated in RM 30 Project
55m of streamside landslides
300m of streamside landslides
Jones Creek for sale; asking $890k
Saxon Riparian appraisal 6/10 - ongoing negotiation
Christie Creek appraisal 7/10 - owner rejected value; potential for reoffer
high importance in reaches to Saxon bridge, moderate importance to Skookum, low importance upstream
visual and qualitative from GIS [FED, STATE, COUNTY, TRIBAL, & WLT]

Based on EDT ratings; doesn't incorporate risk of degradation - that needs to be considered during review
Generally low, but moderate for higher use early chinook tributaries (based on Ned Currence's
Salmon and Steelhead Limiting Factors in WRIA 1, the Nooksack Basin
High priority areas are currently being treated under a SRFB grant. Concern raised was in rating areas
less than 1/15 of project reach treated for island formation
Treated by NSEA in 2010
Treated by NSEA in 2010; only small portion functioning for pool habitat
islands projected by NSEA in past few years (time unknown)
back channel work constructed but did not live up to expectations
Work done at Porter Ck. Confluence by NSEA capturing some trib flow but not in its entirety during low flow
NSEA planted 3.6 acres in Porter reach CMZ
Diverion dam obstruction at upstream end of this reach
Areas without need for habitat improvement will be given a "NO" score hereafter
Galbraith and Seymour have high road density per Middle Fork Assessment findings
Lack of existing fish passage, gradient, and low existing pools impacts success improving pool habitat
Personal communication sources indicate that tributaries historical abundance of anadromous spawners
Low pool habitat may be helped with edge habitat from LWD installation
Very low pool count (1) & too fast habitat
Low road density and no empirical data suggesting road failure problems
Private ownership downstream of RM 3.1 will impact riparian work
Canyon Lake Creek design to reconnect tributary to Middle Fork mainstem will improve chinook use in lower MF
low importance everywhere, except moderate importance where private ownership extends into the
visual and qualitative from GIS [FED, STATE, COUNTY, TRIBAL, & WLT]
Based on EDT ratings; doesn't incorporate risk of degradation - that needs to be considered during review
Generally low, but moderate for higher use early chinook tributaries (based on Ned Currence's
Limitation is landowner and land use
Importance rating is relevant to fish use
Intent to reduce channel migration
Intent is for adult use
Does not include culverts

ıssage

downstream of NF Rd.
ɜessment not completed.

r and Roaring Creeks.

sessment not completed.
sessment completed for Stewart Mtn.

✓ of specific projects.

✓ of specific projects; "not applicable" upstream of USFS boundary.

Attribute	Description	Values
Importance	potential magnitude of benefit of implementing strategy in that reach to overall Chinook	high, moderate, low
Status	status of implementation of that strategy in that reach	estimated % complete
Opportunity	how much opportunity exists to implement that strategy in 3-year time frame given existing constraints	yes, limited, no, unknown

Any notes are captured in "Notes" spreadsheet with number added to cell as superscript, e.g.

		Reach
		Hypothetical
		99.9
		None
Construct/augment log jams to protect, encourage formation and growth of forested islands (especially upstream of tributary confluences)	Importance	High
	Status	25%
	Opportunity	Low[1]

RESTORATION STRATEGIES AND STATUS: SOUTH FORK NOOKSACK RIVER

			Reach Name (upstream RM, early chinook tributaries indicated below reach name)														
			VanZandt	Todd	Hardscrabble	Standard	BNSF	Acme	Hutchinson	Saxon	Skookum	Dye's Canyon	Cavanaugh	Larson's Bridge	Lyman Pass	Elk Flats	Howard
			1.8	3.7	5.1	7.2	8.6	9.6	10.9	12.8	14.3	16.1	18	20.6	22	25.4	31
			None	*None*	*None*	*None*	*None*	*None*	*Hutchinson*	*None*	*Skookum*	*None*	*Cavanaugh*	*Fobes, Deer, Roaring, Plumbago*	*None*	*None*	*None*
South Fork	Log jams to form deep complex pools: cool-water inflow areas	Importance	High[1]	High[1]	High[1]	High[1]	High[1]	High[1]	High[2]		High[1,2]		High[2]	High[2]	Moderate[3]	Moderate[3]	Moderate[3]
		Status[24]	75%[28]	0%[30]	100%[32]	55%[34]	0%	25%[39]	100%[41]	N/A[47]	100%[49]	N/A[4]	0%[50]	100%[52]	0%	0%	0%
		Opportunity	Limited	Limited	Limited	Limited	Unknown	Limited	Limited		Limited		Yes	Yes	Yes	Yes	Yes
	Log jams to form deep complex pools: other areas	Importance	High	High	High	High	N/A[38]	High	High	High	High	N/A[4]	High	High	Moderate[3]	Moderate[3]	Moderate[3]
		Status[26]	0%	0%[30]	0%	0%[35]		0%	0%	63%[48]	0%		0%[50]	100%[53]	0%	0%	2%[51]
		Opportunity	Limited	Limited	Limited	Limited		Limited	Limited	Limited	Limited		Yes	Yes	Yes	Yes	Yes
	Replace riprap with wood bank structures	Importance	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Low	Moderate	N/A[6]	N/A[6]	N/A[6]	N/A[6]	N/A[6]	N/A[6]
		Status	5%	0%[30]	2%	0%[35]	0%	0%	0%	0%	0%						
		Opportunity	Limited	Limited	Limited	Limited	Unknown	Limited	Limited	Limited	Limited						
	Reconnect and restore side-channels and restore historic channel pattern	Importance	Moderate	Low	Low	Moderate	Low	Moderate	Moderate	Moderate[7]	Low	Moderate[7]	Low	Moderate[7]	Low	Low	Low
		Status	0%	0%	0%	100%[36]	0%	100%[40]	0%	0%	0%	0%	0%[50]	100%	0%	0%	0%
		Opportunity	Limited	Limited	Limited	Limited	Unknown	Limited	Limited	Limited	Limited	Yes	Yes	Yes	Yes	Yes	Yes
	Setback or remove riprap embankments	Importance	High	High	High	High	High	High	High	Low	Moderate	N/A[6]	N/A[6]	N/A[6]	N/A[6]	N/A[6]	N/A[6]
		Status	5%[42]	0%[30]	2%[33]	0%	0%	17%[44]	13%[45]	0%	0%						
		Opportunity	Limited	Limited	Limited	Limited	Unknown	Limited	Limited	Limited	Limited						
	Lower artificial levees to native bank/floodplain elevations	Importance	Moderate[8]	N/A	N/A	Moderate[9]	High[10]	Moderate[55]	Moderate[11]	N/A	N/A	N/A[6]	N/A[6]	N/A[6]	N/A[6]	N/A[6]	N/A[6]
		Status	0%			0%	0%	0%	24%[45]								
		Opportunity	Limited			Limited	Unknown	Limited	Limited								
	Relocate river-adjacent infrastructure outside the 100-year erosion hazard area	Importance	Moderate[12]	Moderate	Modderate	Moderate	High[13]	Moderate[14]	Moderate[15]	Moderate[16]	Moderate[16]	N/A	N/A	Low[17]	N/A	Moderate	Low
		Status	0%[31]	0%	0%	0%	0%	0%	0%	0%	46%			0%		0%[56]	100%
		Opportunity	Limited	Limited	Limited	Limited	Unknown	Limited	Limited	Limited	Limited			Yes		Yes	Yes
	Reforest historic channel migration zone and 300' buffer	Importance	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Low	Moderate	Moderate	Moderate	Low	Low
		Status															
		Opportunity	Limited	Limited	Limited	Limited	Unknown	Limited	Limited	Limited	Limited	Yes	Yes	Yes	Yes	Yes	Yes
	Remove invasive species (knotweed and reed canarygrass)	Importance[73]	Low	Low	Low	Low	Low	Low	Moderate[18]	moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
		Status	0%[25]	0%	0%[33]	0%[37]	0%	0%	23%[46]	0%	0%	0%	0%	100%[54]	0%	0%	0%
		Opportunity	Limited	Limited	Limited	Limited	Unknown	Limited	Limited	Limited	Limited	Yes	Yes	Yes	Yes	Yes	Yes
	Reconnect floodplain channels[21]	Importance	Moderate[19]	Low	Low	Low	Low	Low	Moderate[22]	Moderate[20]	Low	Low	Low	Low	Low	Low	Low
		Status	0%	0%	0%	100%	0%	100%	0%	0%	0%	0%	0%[50]	0%	0%	0%	0%
		Opportunity	Limited	Limited	Limited	Limited	Unknown	Limited	Limited	Limited	Limited	Yes	Yes	Yes	Yes	Yes	Yes
	Improve in-channel woody debris loading in floodplain channels[21]	Importance	Moderate[19]	Low	Low	Low	Low	Low	Moderate[22]	Moderate[20]	Low	Low	Low	Low	Low	Low	Low
		Status	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%[50]	0%	0%	0%	0%
		Opportunity	Limited	Limited	Limited	Limited	Unknown	Limited	Limited	Limited	Limited	Yes	Yes	Yes	Yes	Yes	Yes
	Improve riparian conditions along floodplain channels (outside HMZ and 300')[21]	Importance	Moderate[19]	Low	Low	Low	Low	Low	Moderate[22]	Moderate[20]	Low	Low	Low	Low	Low	Low	Low
		Status															
		Opportunity	Limited	Limited	Limited	Limited	Unknown	Limited	Limited	Limited	Limited	Yes	Yes	Yes	Yes	Yes	Yes
	Acquire properties necessary to facilitate restoration	Importance[68]	High	High	High	High	High	High	High	High	Moderate	Low	Low	Low	Low	Low	Low
		Status[69]	0%	0%	0%	0%	0%	20%	75%	50%	60%					50%	
		Opportunity	No	No	Limited	Yes[85]	Limited	No	No	Limited[86]	Limited[87]					No	
	Acquire properties at risk of degradation to protect high quality habitat, habitat-forming processes	Importance[70]	Moderate	Moderate	Moderate	Moderate	Moderate	High	High	High	High	High	High	High	Moderate	Moderate	Moderate
		Status[69]	0%	0%	0%	0%	0%	0%	75%	75%	60%	0%	0%	0%	0%	50%	0%
		Opportunity	No	No	Limited	No	Limited	No	No	Yes	Limited	Limited	Limited	Limited	Limited	Limited	Limited
Early chinook tribs (upstream to chinook extent)	Restore riparian areas	Importance[71]	N/A	N/A	N/A	N/A	N/A	N/A	Moderate	N/A	Moderate	N/A	Moderate	Moderate	N/A	N/A	N/A
		Status							5%		0%		0%	0%			
		Opportunity							Yes		Yes		Yes	Yes			
	Restore habitat (diversity, stability)	Importance[71]	N/A	N/A	N/A	N/A	N/A	N/A	Moderate	N/A	Low[23]	N/A	Low[23]	Low[23]	N/A	N/A	N/A
		Status							0%		0%		0%	0%			
		Opportunity							Yes		Yes		Yes	Yes			
	Restore fish passage	Importance	N/A	N/A	N/A	N/A	N/A	N/A	Low	N/A	low	N/A	N/A	N/A	N/A	N/A	N/A
		Status							0%		yes						
		Opportunity															
	Acquire properties at risk of degradation to protect high quality habitat, habitat-forming processes	Importance[70]	N/A	N/A	N/A	N/A	N/A	N/A	Low	N/A	High	N/A	High	High	N/A	N/A	N/A
		Status[69]									0						
		Opportunity									No						
Watershed	Assess, treat orphaned roads	Importance	Moderate					Moderate									
		Status	70%[59]					50%[58]									
		Opportunity	Yes					Yes									
	Address chronic sediment sources	Importance	N/A	N/A	N/A	Moderate	N/A	N/A	N/A	N/A	Low	N/A	N/A	Moderate	N/A	Moderate	Moderate
		Status				0%[64]					0%[65]			80%[60]		0%[61]	6%[62]
		Opportunity				Yes					Yes			Yes		Yes	Yes

WRIA 1 Salmon Recovery Board

2011 SRFB Project Strategy Matrices- Explanation

Tier 1: High importance ratings are Tier 1

-Tier 1a are strategies and reaches where "opportunities"= yes. The assumption is that if the opportunity is known (i.e., yes) then a project is ready to proceed or it has greater certainty of proceeding than projects with "limited" or "unknown" opportunities.

-Tier 1b are strategies and reaches where "opportunities"= limited. The assumption is that there are likely projects but there is less certainty in readiness to proceed.

-Tier 1c are strategies and reaches where "opportunities" are unknown.

Tier 2: Moderate importance ratings are Tier 2

-Tier 2a are strategies and reaches where "opportunities"= yes. The assumption is that if the opportunity is known (i.e., yes) then a project is ready to proceed or it has greater certainty of proceeding than projects with "limited" or "unknown" opportunities.

-Tier 2b are strategies and reaches where "opportunities"= limited. The assumption is that there are likely projects but may have less certainty in being ready to proceed.

-Tier 1c are strategies and reaches where "opportunities" are unknown.

Attribute	Description	Values
Importance	potential magnitude of benefit of implementing strategy in that reach to overall Chinook	high, moderate, low
Opportunity	how much opportunity exists to implement that strategy in 3-year time frame given existing constraints	yes, limited, no, unknown

Importance- High/Opportunity- Yes	Tier 1a
Importance- High/Opportunity- Limited	Tier 1b
Importance- High/Opportunity- Unknown	Tier 1c

Importance- Moderate/Opportunity- Yes	Tier 2a
Importance- Moderate/Opportunity- Limited	Tier 2b
Importance- Moderate/Opportunity- Unknown	Tier 2c

RESTORATION STRATEGIES AND LEVEL OF IMPORTANCE: NORTH FORK NOOKSACK RIVER

	North Fork Reach Name (upstream RM)											
	Pipeline	**Rutsatz**	**Bell/ Kenny**	**Hatchery**	**Farmhouse**	**Maple Creek**	**Below Boulder**	**Lone Tree**	**Wildcat/ Warnick**	**Canyon**	**Cornell**	**Deadhorse**
	38.3 RM	40.6 RM	42.9 RM	46.7 RM	49.4 RM	50.6 RM	52.3 RM	53.3 RM	54.8 RM	55.8 RM	57.8	65
North Fork Mainstem												
Construct/augment log jams to protect, encourage formation and growth of forested islands (especially upstream of tributary confluences)	Tier 2c	Tier 2b	Tier 2b	Tier 1a	Tier 1a	Tier 1a	Tier 1c	Tier 1a	Tier 1a	Tier 2c	Tier 2b	Tier 1a
Log jams to reconnect back channels (provide for flows during spawning/incubation, prevent major avulsion)				Tier 1a	Tier 1a	Tier 1a	Tier 1c	Tier 1a	Tier 1a	Tier 2c	Tier 2b	Tier 1a
Logs/log jams to increase habitat quality in braids and back channels.		Tier 2b	Tier 2b	Tier 2a	Tier 2a		Tier 2c	Tier 2a	Tier 2a			Tier 2a
Reforest historic channel migration zone and 300' buffer	Tier 2c	Tier 2b	Tier 2b	Tier 2a	Tier 2a	Tier 2a	Tier 2c	Tier 2a	Tier 2a	Tier 2c	Tier 2b	Tier 2a
Promote floodplain forest encroachment on active channel area.	Tier 2c	Tier 2b	Tier 2b	Tier 2a	Tier 1a	Tier 2a	Tier 2c	Tier 1a	Tier 2a	Tier 2c	Tier 2b	Tier 2a
Promote channel-floodplain interaction to restore floodplain processes (e.g.wood recruitment, floodplain habitat formation)					Tier 2a	Tier 2a						
Acquire properties necessary to facilitate restoration			Tier 2a						Tier 1a			
Acquire properties at risk of degradation to protect high quality habitat, habitat-forming processes			Tier 2a	Tier 2b		Tier 1b			Tier 2a		Tier 1b	
Early Chinook Tribs	***None***	***None***	***None***	***Racehorse***	***None***	***Maple***		***None***	***McDonald***	***Canyon***	***Cornell, Thompson, Hedrick***	***Boyd, Deadhorse***
Restore riparian areas				Tier 2c		Tier 2a				Tier 2c		
Restore habitat (diversity, stability)				Tier 2a		Tier 2a				Tier 2c		
Restore fish passage										Tier 1a	Tier 2c for Hedrick	
Acquire properties at risk of degradation to protect high quality habitat, habitat-forming processes or to facilitate restoration				Tier 2c						Tier 1c	Tier 1c for Thompson	
Watershed												
assess, treat orphaned roads	Tier 2a **ALL** North Fork Reaches including those not shown in this table.											
address chronic sediment sources	Tier 2a **ALL** North Fork Reaches including those not shown in this table.											

Importance- High/Opportunity- Yes	Tier 1a
Importance- High/Opportunity- Limited	Tier 1b
Importance- High/Opportunity- Unknown	Tier 1c

Importance- Moderate/Opportunity- Yes	Tier 2a
Importance- Moderate/Opportunity- Limited	Tier 2b
Importance- Moderate/Opportunity- Unknown	Tier 2c

RESTORATION STRATEGIES AND LEVEL OF IMPORTANCE: MIDDLE FORK NOOKSACK RIVER

Middle Fork Reach Name (upstream RM)

	Kulshan	Welcome	Porter	MF Canyon	Clearwater	Galbraith	Warm
	1.5 RM	3.1 RM	5.2 RM	7.2 RM	9.4 RM	11.7 RM	14.5 RM
Middle Fork Mainstem							
Construct/augment log jams to protect, encourage formation and growth of forested islands (especially upstream of tributary confluences)	Tier 1a	Tier 1b	Tier 1a				
Log jams to reconnect back channels (provide for flows during spawning/incubation, prevent major avulsion)	Tier 1a	Tier 1b	Tier 1a			Tier 2a	Tier 2a
Install engineered wood structures to increase roughness, improve channel stability, and slow migration24	Tier 1a	Tier 1b	Tier 1a			Tier 2a	
Increase woody cover along channel edges25	Tier 1b	Tier 2c	Tier 2a			Tier 2a	
log jams to form deep complex pools	Tier 1a	Tier 1b	Tier 1a			Tier 2a	
Restore fish passage26			Tier 1a	Tier 1a			
Reforest historic channel migration zone and 300' buffer	Tier 2b	Tier 2b	Tier 2a	Tier 2a			
Acquire properties necessary to facilitate restoration		Tier 2b					
Early Chinook Tribs	***Canyon Lake***	***None***	***Porter, Peat Bog***	***None***	***Clearwater***	***Galbraith***	***Wallace, Warm, Sisters***
Restore riparian areas					Tier 2a		
Restore habitat (diversity, stability)					Tier 2a		
Acquire properties at risk of degradation to protect high quality habitat, habitat-forming processes			Tier 2c- Peat Bog				

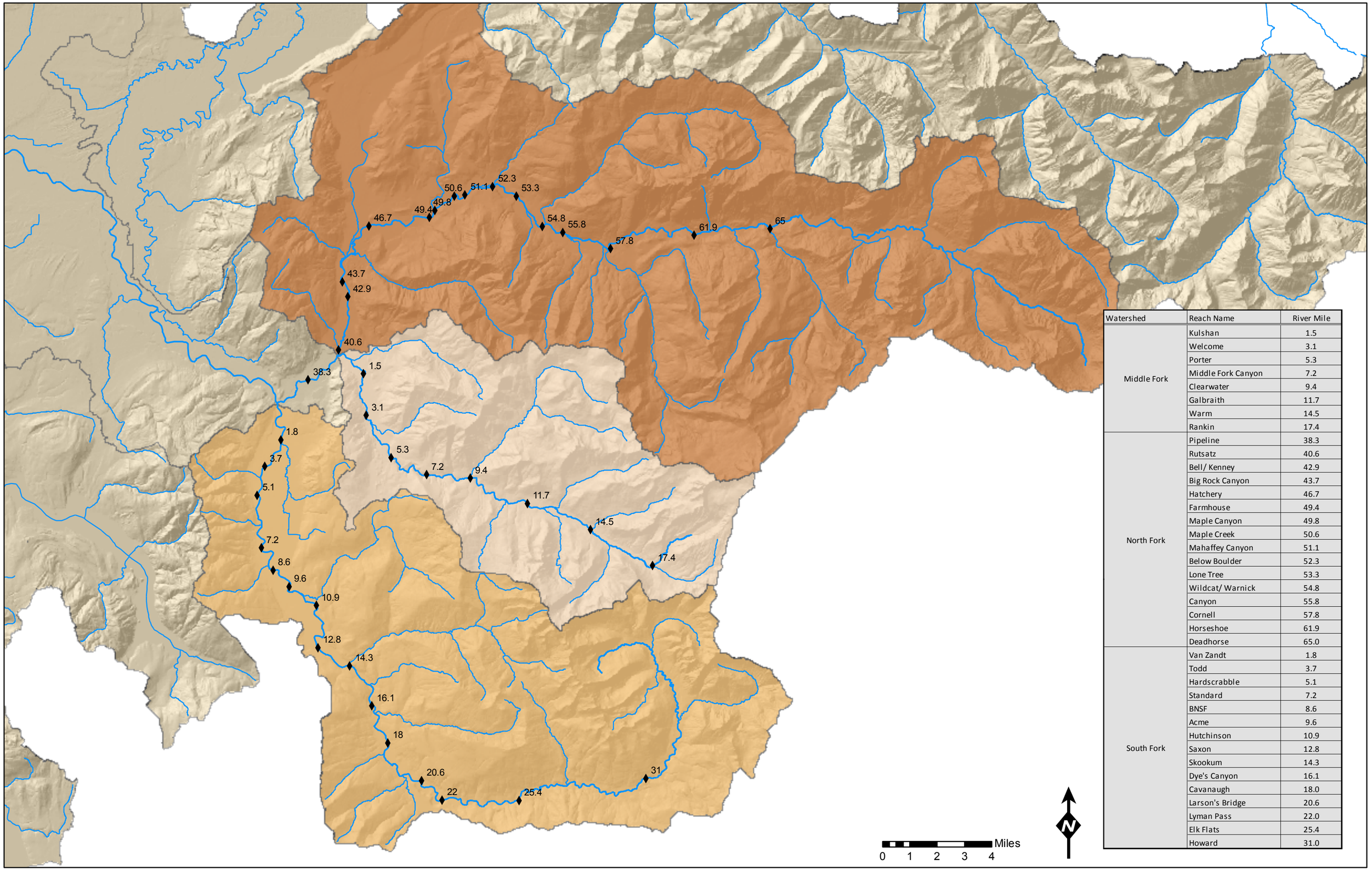
Importance- High/Opportunity- Yes	Tier 1a
Importance- High/Opportunity- Limited	Tier 1b
Importance- High/Opportunity- Unknown	Tier 1c

Importance- Moderate/Opportunity- Yes	Tier 2a
Importance- Moderate/Opportunity- Limited	Tier 2b
Importance- Moderate/Opportunity- Unknown	Tier 2c

RESTORATION STRATEGIES AND LEVEL OF IMPORTANCE: SOUTH FORK NOOKSACK RIVER

South Fork Reach Name (upstream RM)

	VanZandt	Todd	Hardscrabble	Standard	BNSF	Acme	Hutchinson	Saxon	Skookum	Dye's Canyon	Cavanaugh	Larson's Bridge	Lyman Pass	Elk Flats	Howard
	1.8 RM	3.7 RM	5.1 RM	7.2 RM	8.6 RM	9.6 RM	10.9 RM	12.8 RM	14.3 RM	16.1 RM	18 RM	20.6 RM	22 RM	25.4 RM	31 RM
South Fork Mainstem															
Log jams to form deep complex pools: cool-water inflow areas	Tier 1b	Tier 1b	Tier 1b	Tier 1b	Tier 1c	Tier 1b	Tier 1b		Tier 1b		Tier 1a	Tier 1a	Tier 2a	Tier 2a	Tier 2a
Log jams to form deep complex pools: other areas	Tier 1b	Tier 1b	Tier 1b	Tier 1b		Tier 1b	Tier 1b	Tier 1b	Tier 1b		Tier 1a	Tier 1a	Tier 2a	Tier 2a	Tier 2a
Replace riprap with wood bank structures	Tier 2b	Tier 2b	Tier 2b	Tier 2b	Tier 2c	Tier 2b	Tier 2b		Tier 2b						
Reconnect and restore side-channels and restore historic channel pattern	Tier 2b			Tier 2b		Tier 2b	Tier 2b	Tier 2b		Tier 2a		Tier 2a			
Setback or remove riprap embankments	Tier 1b	Tier 1b	Tier 1b	Tier 1b	Tier 1c	Tier 1b	Tier 1b		Tier 2b						
Lower artificial levees to native bank/floodplain elevations	Tier 2b			Tier 2b	Tier 1c	Tier 2b	Tier 2b								
Relocate river-adjacent infrastructure outside the 100-year erosion hazard area	Tier 2b	Tier 2b	Tier 2b	Tier 2b	Tier 1c	Tier 2b	Tier 2b	Tier 2b	Tier 2b					Tier 2a	
Reforest historic channel migration zone and 300' buffer	Tier 2b	Tier 2b	Tier 2b	Tier 2b	Tier 2c	Tier 2b	Tier 2b	Tier 2b	Tier 2b		Tier 2a	Tier 2a	Tier 2a		
Remove invasive species (knotweed and reed canarygrass)							Tier 2b	Tier 2b	Tier 2b	Tier 2a	Tier 2a	Tier 2a	Tier 2a	Tier 2a	Tier 2a
Reconnect floodplain channels21	Tier 2b						Tier 2b	Tier 2b							
Improve in-channel woody debris loading in floodplain channels21	Tier 2b						Tier 2b	Tier 2b							
Improve riparian conditions along floodplain channels (outside HMZ and 300')21	Tier 2b						Tier 2b	Tier 2b							
Acquire properties necessary to facilitate restoration			Tier 1b	Tier 1a	Tier 1b			Tier 1b	Tier 2b						
Acquire properties at risk of degradation to protect high quality habitat, habitat-forming processes			Tier 2b		Tier 2b			Tier 1a	Tier 1b	Tier 1b	Tier 1b	Tier 1b	Tier 2b	Tier 2b	Tier 2b
Early Chinook Tribs	***None***	***None***	***None***	***None***	***None***	***None***	***Hutchinson***	***None***	***Skookum***	***None***	***Cavanaugh***	***Fobes, Deer, Roaring, Plumbago***	***None***	***None***	***None***
Restore riparian areas							Tier 2a		Tier 2a		Tier 2a	Tier 2a			
Restore habitat (diversity, stability)							Tier 2a								
Acquire properties at risk of degradation to protect high quality habitat, habitat-forming processes											Tier 1c	Tier 1c			
Watershed															
Assess, treat orphaned roads	Tier 2a **ALL** South Fork Reaches including those not shown in this table.														
Address chronic sediment sources				Tier 2a								Tier 2a		Tier 2a	Tier 2a



Watershed	Reach Name	River Mile
Middle Fork	Kulshan	1.5
	Welcome	3.1
	Porter	5.3
	Middle Fork Canyon	7.2
	Clearwater	9.4
	Galbraith	11.7
	Warm	14.5
	Rankin	17.4
North Fork	Pipeline	38.3
	Rutsatz	40.6
	Bell/ Kenney	42.9
	Big Rock Canyon	43.7
	Hatchery	46.7
	Farmhouse	49.4
	Maple Canyon	49.8
	Maple Creek	50.6
	Mahaffey Canyon	51.1
	Below Boulder	52.3
	Lone Tree	53.3
	Wildcat/ Warnick	54.8
	Canyon	55.8
	Cornell	57.8
	Horseshoe	61.9
	Deadhorse	65.0
South Fork	Van Zandt	1.8
	Todd	3.7
	Hardscrabble	5.1
	Standard	7.2
	BNSF	8.6
	Acme	9.6
	Hutchinson	10.9
	Saxon	12.8
	Skookum	14.3
	Dye's Canyon	16.1
	Cavanaugh	18.0
	Larson's Bridge	20.6
	Lyman Pass	22.0
	Elk Flats	25.4
	Howard	31.0