

WRIA 1 Salmon Recovery 3-Year Work Plan 2013-2015

Context

Provide a brief overview of the characteristics of your Chinook Salmon Recovery area.¹ Refer to the checklists and other content developed for the 2012 Salmon Recovery Council conference and work with your PSP liaison to summarize this information. These are posted at the website below or available from PSP staff:

http://www.mypugetsound.net/index.php?option=com_docman&task=cat_view&gid=584&Itemid=238

Water Resource Inventory Area No. 1 (WRIA 1) encompasses 1,400 square miles and includes the watersheds and estuaries of the Nooksack River, Lummi River, and independent coastal creeks, as well as Fraser River tributaries south of the Canadian border in Whatcom County. Most of WRIA 1 is located within Whatcom County although small portions extend into Skagit County and some streams, including Bertrand Creek and Fishtrap Creeks (tributaries to the Nooksack River) and Canyon Creek (tributary to the North Fork), originate in Canada and flow south into WRIA 1.

WRIA 1 includes the cities of Bellingham, Blaine, Everson, Ferndale, Lynden, Nooksack, and Sumas as well as the reservations and/or tribal trust lands of the Nooksack Indian Tribe and the Lummi Indian Nation. The forested upper watershed is under a mix of state, private, and federal ownership including Mt. Baker-Snoqualmie National Forest and North Cascades National Park. By 2022, Whatcom County's population is expected to grow to 261,084, an increase of 50.5%.

The streams and rivers of WRIA 1 fall within three regions: the Nooksack River and its tributaries, independent coastal streams, and Fraser River tributaries that flow into Canada. Of these, the Nooksack drains the greatest amount of land area (62%) in WRIA 1.

WRIA 1 hosts ten species of native salmonids – chinook, chum, coho, pink, and sockeye salmon/kokanee; steelhead/rainbow trout, bull trout, coastal cutthroat trout, Dolly Varden, and mountain whitefish. The WRIA 1 Salmonid Recovery Plan prioritizes and largely focuses on two populations, North Fork/Middle Fork early Chinook and South Fork early chinook, which are included in the Puget Sound Chinook ESU that is listed as threatened under the federal Endangered Species Act. Bull trout and steelhead have also been listed as threatened under ESA.

A total of 3814 miles of watercourse length (streams, rivers, lakes, ponds, wetlands) has been delineated in the WRIA, of which 37.7% either bear or could bear salmonids. Chinook are currently found in 308 miles of watercourses and historically/potentially could inhabit 397 miles. Native char, which include bull trout, are present in 739 miles of watercourses, and could inhabit up to 1113 miles.

Describe the process for developing your 3YWP narrative and project/activity list. Who are the stakeholders involved and what are their roles? Are harvest and hatchery managers involved in your planning group or have they had an opportunity to comment or consult on your 3YWP?

The annual update of the WRIA 1 3-Year Work Plan is coordinated through the WRIA 1 Salmon Recovery Board LEC and involves the WRIA 1 Salmon Recovery Staff Team that includes representation of the Co-Managers (Lummi Nation, Nooksack Tribe, and WDFW), local government (City of Bellingham and Whatcom County), and other Lead Entity salmon partners including Nooksack Salmon Enhancement Association, Whatcom Conservation District, Whatcom Land Trust, and US Forest Service. The 3-year habitat plan focuses on the process of implementing restoration projects where assessment and design indicate they will be most efficient in restoring critical habitat forming processes, and acquiring land for protection or future restoration potential. The updates that are made to the 3-year habitat plan is based on a technical workshop held in spring that reviews restoration strategies for reaches within each of the Nooksack Forks, which is the priority area for WRIA 1 restoration for Chinook. The workshop invitation is extended to potential sponsors and other interested parties, including members of the local project review team, in addition to the WRIA 1 Salmon Recovery Staff Team members. Foundation work for the workshop is based on WRIA 1 Salmonid Recovery Plan associated habitat assessments and restoration plans, and any new information available (e.g., project effectiveness monitoring results). The purpose of the workshop is to review salmon recovery strategies by geographic area prioritizing those strategies as high, moderate, or low based on benefits to early chinook. This work is used by sponsors to develop projects and proposals for salmon recovery funding; planning projects are reflected by phase in the WRIA 1 3-Year Work Plan.

The WRIA 1 Hatchery and Harvest plans derive from the regional Comprehensive Harvest Plan and Hatchery Genetic and Management Plans under NOAA Fisheries authorities. The harvest plan involves participation in the international Pacific Salmon Commission, and the domestic coast wide Pacific Fisheries Management Council planning process to set ocean fisheries that meet federal, state, and tribal requirements inside the federal waters by agreeing on projected fishing schedules that will meet spawning escapement objectives while allocating harvest impacts. The process is based upon forecast ocean run sizes and fisheries interceptions as projected in the Fisheries Regulatory Assessment Model using historical information. The whole process is based on fisheries and spawning ground surveys and analyses using coded wire tags, fin clips, Otolith marks, and DNA stock assignment to estimate stock components in the different areas. Annual reports on the results are developed. Hatchery actions are monitored as part of the local and regional Hatchery Genetic and Management Plans and results are factors in harvest planning.

The format of the WRIA 1 3-Year Work Plan includes an Excel spreadsheet with multiple worksheets. The projects that are the focus of the WRIA 1 Salmon Recovery Staff Team and that are the highest priority for salmon recovery funding are represented in the worksheet that is named "Habitat Action- Chinook Priority". The projects represented on this worksheet primarily include the high and moderate (Tier 1 and Tier 2) restoration strategies and reaches. There are also worksheets for non-chinook restoration projects (i.e., projects that are not in priority geographic areas for chinook), estuary and nearshore,

harvest/hatchery, and population monitoring. The Harvest/Hatchery and Population Monitoring worksheets were updated in 2012 by the Co-Managers (Nooksack Tribe, Lummi Nation, and WDFW). The Nooksack Tribe and Lummi Nation are very involved in the local recovery process and are members of the WRIA 1 Salmon Recovery Staff Team.

Background/Planning/Logic of the Recovery Plan (1 page):

1. *What are the recovery goals for your watershed for Chinook salmon? Include information on both population goals (VSP parameters) and habitat goals.*

The recovery goals for Chinook salmon are shown in the graph and table below:

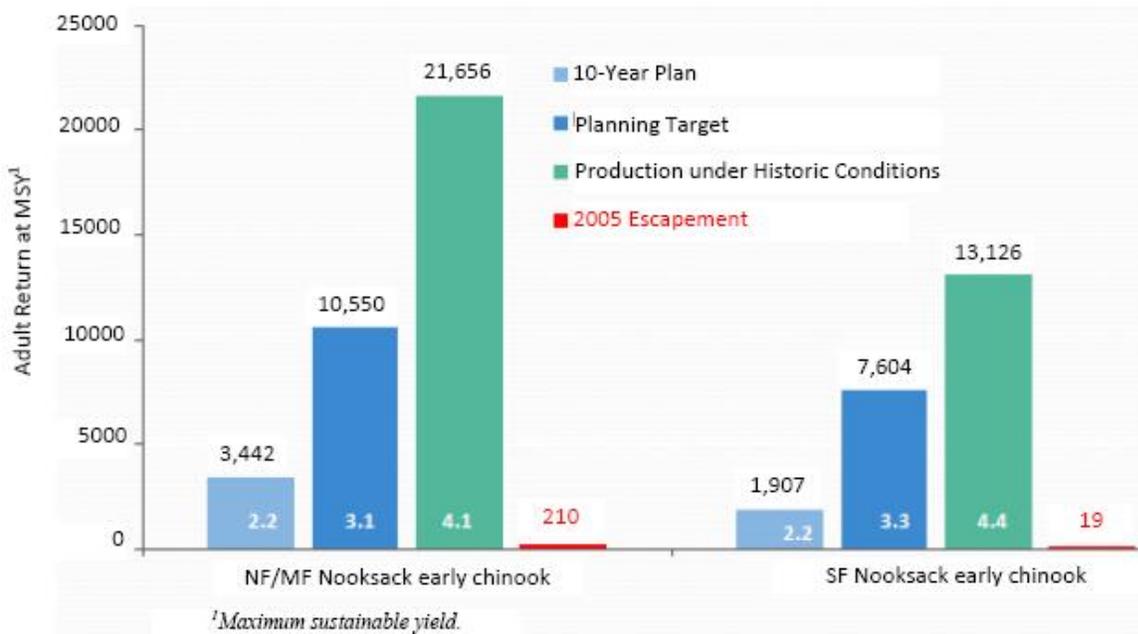


Table 1. Planning targets for Nooksack Early Chinook.

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

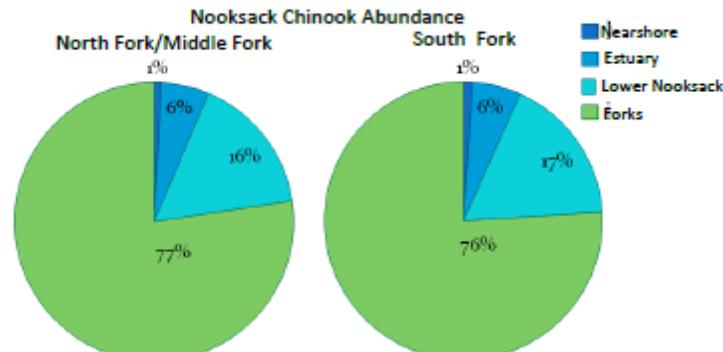
² Spawners at MSY

³ Productivity at MSY

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

Habitat goals generally include restoring properly functioning conditions in freshwater Chinook habitats and historic conditions in estuary and nearshore. The following pie chart demonstrates the expected contribution of each broad geographic area (if fully restored to meet habitat goals) to reaching chinook recovery goals for abundance, which supports the WRIA 1 focus of restoration actions in the Nooksack River Forks in the near term.

The WRIA 1 Salmon Recovery Staff Team has established a monitoring subcommittee that



will be updating the habitat targets as part of the development of the WRIA 1 Monitoring and Adaptive Management Plan. The current targets are represented in the bar graphs shown in Attachment A. The information presented in the graphs is current as of March 2011 when the presentation was prepared and delivered to the WRIA 1 Management Team, which administer and provide oversight of the WRIA 1 Salmon Recovery Board's policies for the WRIA 1 salmon recovery program.

In addition to the habitat goals, the WRIA 1 Salmonid Recovery Plan includes goals for harvest that include sustaining culturally and economically valuable harvest opportunities; achieving sustainable harvest on natural origin stocks; and harvest hatchery production in a manner that does not impede the recovery of stocks of concern. Hatchery goals are also identified that include implementing hatchery programs to rebuild spring chinook populations while properly functioning conditions are restored and providing for fishing opportunity with sustainable harvest that does not impede the recovery of listed species and maximizes the use of available habitat.

2. *What is the current strategy to accomplish the recovery goals and what assumption(s) is this strategy based on?*

The current strategy for achieving the WRIA 1 Chinook recovery goals is to focus habitat protection and restoration actions in the geographic areas that have been identified as priorities for benefitting Chinook, which are the Nooksack River Forks. Based on the Ecosystem Diagnosis and Treatment (EDT) model that quantified the expected contribution of each broad geographic area to reaching chinook recovery goals, restoration of the Nooksack Forks to properly functioning conditions would contribute over 75% of the Nooksack Chinook abundance recovery goal (see pie charts in question 1). The habitat program priorities in the Nooksack River and Forks is to implement strategies that will boost abundance and productivity in the near-term while efforts are undertaken to restore habitat-forming processes. As such restoration is focused on construction of stable log jams that directly address limiting factors i.e., channel instability and loss of side channels in the North and Middle Forks, and lack of pools and complex woody cover and high water temperatures in the South Fork. Another program priority is restoring passage at chinook barriers including the Middle Fork barrier and Canyon Creek, which is a

tributary to the North Fork Nooksack. Currently, fish passage at the Canyon Creek barrier is adequate, and habitat restoration to improve passage and habitat conditions in the longer term is also underway.

3. *What new knowledge or information has changed your strategy, assumptions or hypotheses?*

The WRIA 1 Salmonid Recovery Plan hypothesis is that restoration of chinook habitat and habitat-forming processes to properly functioning conditions in addition to continued management of harvest and hatcheries to not impede chinook recovery will recover Nooksack spring chinook populations. It is hypothesized that Nooksack chinook are most limited: 1) in the North and Middle Forks by the Middle Fork diversion dam that blocks access to almost 16 miles of habitat, by the loss of stable, side channel habitat, by channel instability in the mainstem that scours redds; 2) in the South Fork by lack of holding pools with cover, low habitat diversity, low instream flows by the loss of floodplain rearing habitat, and high temperatures; and 3) in the lower Nooksack River by the loss of floodplain rearing habitat.

Since the WRIA 1 Salmonid Recovery Plan was published in 2005, habitat assessments and restoration planning have been completed in the Nooksack Forks that provides a more detailed characterization of limiting habitat conditions and watershed processes and presents and prioritizes restoration actions (what to implement and where). Additionally, technical workshops are held annually to support project development and the South Fork log jam effectiveness monitoring report prepared by the Nooksack Tribe, helps inform where and how the WRIA 1 project sponsors propose their projects including placement, design, and construction of ELJs.

Harvest and hatchery strategies have also been adapted based on information and knowledge gained. The harvest rates are within limits established by 2010 Comprehensive Management Plan for Puget Sound Chinook. Critical exploitation rate ceiling for Nooksack Management Unit is $\leq 7\%$ except that it may be exceeded in 1 out of 5 years but not exceed 9%. Annual southern U.S. harvest rates have averaged $<4\%$ (range 2.5-5.3%). The South Fork Nooksack chinook population rebuilding program was established in 2006. The captive brood progeny released in South Fork Nooksack has been increasing: 1900, 32,000, and approximately 150,000 in 2011, 2012, and 2013, respectively. Ongoing implementation and adaptive management of the North Fork/Middle Fork Nooksack chinook program and other hatchery programs has included adjusting release numbers and locations to minimize impacts to Nooksack spring chinook and test response to different release strategies.

4. *How is the sequencing and timing of actions or projects done in such a way as to implement the strategy as effectively as possible?*

Focusing salmon funding on habitat restoration projects in the geographic areas expected to have the greatest increase in abundance and productivity based on the EDT model supports effective implementation of the WRIA 1 strategy. As previously mentioned, the projects represented in the WRIA 1 3-Year Plan focus on implementing habitat projects where assessment and design indicate they will be most efficient in restoring critical habitat forming processes. This is done by sequencing or phasing projects so that reach assessments are completed first, then acquisition (if needed), reach scale design, and finally phased implementation. Although the phasing of habitat projects can create some delays in implementation, it improves efficiency of funding and certainty of benefit. Habitat projects funded through SRFB or PSAR are conditioned locally requiring the sponsor to include the WRIA 1 Salmon Recovery Staff Team and the local review team in the design review process, which helps improve the certainty of benefit. Finally, there is a concerted effort to incorporate other efforts into habitat project planning that may affect the project. Hatchery projects are prioritized to improve efficiencies of hatchery operation and mark hatchery production for later identification in fisheries and in spawning grounds and support the most effective supplementation processes. Harvest projects sample the harvest to identify stock composition and origin. Stock assessment, which is a combined hatchery and harvest project prioritizes identification of spawning abundances by stock and the abundance of the resulting migration of progeny from the river to the ocean.

5. *How are habitat, harvest, and hatchery actions coordinated to achieve the recovery goals? Are harvest management actions likely to be effective given the projected condition of habitat? Are habitat actions likely to be effective given the projected rate of harvest? Are hatchery actions likely to be effective given the projected habitat and harvest actions?*

- a) *How are habitat, harvest, and hatchery actions coordinated to achieve the recovery goals?*

The Lead Entity is composed of the entities with jurisdiction over harvest management, hatchery management, and land use. The Salmon Recovery Staff Team, which focuses on habitat issues, contains participants with experience and coordinating responsibilities in harvest management and hatchery operations. Information sharing occurs regularly, such that the status and technical information from each component are carried into the planning and management efforts for each other components. Hatcheries are managed to support harvest on non-listed stocks without impacting listed stocks. Harvest on listed stocks is managed to respond to population productivity. Details are included in annual co-manager harvest plans that implement a co-manager 5 year harvest management plan, which is reviewed and approved by NOAA. Hatchery Genetic and Management Plans are

developed for each hatchery salmon and steelhead program, and these are also being reviewed by NOAA. Hatchery and Harvest actions are heavily monitored, analyzed, scrutinized and regulated. The metrics are reviewed by NOAA on a regular basis. Habitat protection actions depend on land use regulations dependent on political will, the economy and funding. Habitat restoration actions are dependent on willing land owners, the regulatory environment and funding. The effectiveness of regulations on habitat protection and restoration has not been monitored relative to the ecosystem processes and habitat metrics identifying properly functioning Chinook habitat.

Both Chinook populations have population rebuilding programs intended to increase abundances on spawning grounds to boost population abundances of wild Chinook by fully seeding available habitat. While there have been limited increases in wild abundances in the Middle Fork, increases have been modest at best for the North Fork and the population overall, strongly suggesting habitat capacity constraints on population productivity. If, or as, habitat conditions improve, these programs help assure that Chinook abundances will adequately seed the habitat. If productivity improves for the populations due to habitat improvements, wild abundances should increase. All Chinook hatchery releases in the local area are marked either by adipose fin clip, otoliths, or coded wire tags (or a combination) so that hatchery performance and wild Chinook abundances and productivity can be measured

b) Are harvest management actions likely to be effective given the projected condition of habitat?

The projected condition of the habitat is static or deteriorating. Harvest management is poised to place additional Chinook on the spawning ground when productivity and habitat capacity have improved to the state where an investment in larger escapements will result in increased future production. Monitoring of coast wide fisheries indicates that they significantly impact the abundance of Chinook returning to the river. Monitoring of the Chinook on the spawning grounds, and the harvest of Chinook in coast wide fisheries, allow a calculation of the productivity of natural origin stocks. To date, this analysis has demonstrated that the productivity is less than the replacement rate. This finding is consistent with the results of the EDT exercise which shows a limited productivity and capacity under current conditions.

c) Are habitat actions likely to be effective given the projected rate of harvest?

At present, the effectiveness of habitat actions is problematic and not associated with harvest rates or hatchery production, but rather at the mercy of the regulatory agencies. Monitoring of habitat conditions and actions

required to protect and restore the processes responsible for creating and maintaining habitat show a decline from the status quo ante. The increased abundances of natural origin spawners for the North/Middle Fork population from the hatchery population rebuilding program have not dramatically increased the number of spawners in the next generation. This indicates that impaired habitats are constraining recovery, not the lack of spawners.

d) Are hatchery actions likely to be effective given the projected habitat and harvest actions?

The projected condition of the habitat is static or deteriorating under current conditions and harvest actions are poised to place additional Chinook on the spawning grounds when habitat capacity and productivity improve. Hatchery actions in the plan have two objectives, recovery of listed stocks and production to support harvest. Hatchery actions will not be effective without an increase in habitat capacity and if the productivity of listed Chinook does not increase after the severe reductions in hatchery production of fall Chinook and Coho, the fisheries will have suffered for no result. Neither of the expected outcomes has materialized.

Plan and Gaps (1 page):

1. What are the obstacles or barriers for implementing monitoring and adaptive management? Where could you use support for development of your M&AM plans?

The WRIA 1 Plan has a monitoring and adaptive management program in operation. The WRIA 1 Plan screened potential limiting factors associated with Chinook declines using expert opinion and the EDT model, which prioritizes processes requiring protection or restoration by reach. Initial results were followed by detailed objective habitat assessment and more detailed prescriptions or conceptual plans. Habitat protection and restoration strategies are reviewed annually by the WRIA 1 Combined Review Team (CRT) and adjustments required, reviewed, and modified or adopted by the WRIA 1 Joint Board, which is the WRIA 1 Lead Entity. There is intensive monitoring and sampling of harvest and hatchery operations to evaluate stock productivity and monitoring of outgoing migrants allow evaluation of fresh water and marine survival.

A clear understanding from the PSP staff on the elements they are seeking to roll up in a regional monitoring and adaptive management plan would assist WRIA 1 in assisting them. Support from the PSP staff to begin interpretation of the WRIA 1 Plan and its EDT basis into the RITT framework and open standards that can be reviewed for applicability by the WRIA 1 Staff Team.

Capacity for the local process to fill data gaps and implement the MAMP is another area where support is beneficial.

2. *Considering all actions affecting salmon recovery in the watershed, is the Chinook salmon resource likely to be closer to, or further from, the recovery goals ten years from now as it is today?*

There are significant barriers and obstacles to implementing the Chinook Recovery Plan in WRIA 1. This creates some doubt that WRIA 1 will be able to be closer to Chinook recovery goals in 10 years, and some fear that we will be further from those goals. Barriers include funding, enforcement of regulations, permitting, and political will. These barriers are often outside the control of the local salmon recovery teams or do not have clear pathways to resolution. Existing land uses, policies, and community and environmental well-being (e.g., economic and environmental health) present challenging scenarios for finding solutions that restore critical habitat forming processes while maintaining resource-based industries that are important to the local economy including but not limited to agriculture and forestry. The FEMA policies on zero rise have severely impacted the implementation of effective instream structure placement. *With the* WDFW HPA process, concern over the short-term impacts can limit the long term benefits that may accrue from restoration activities. Local SMPs provide exemption for restoration, but the requirement for SEPA adds time to permitting that could delay implementation. A change in regulatory attitude is necessary with more participation of permitting agencies in the development of the restoration projects. Exemptions to the Growth Management Act, Critical Areas Ordinances, Shoreline Management Programs, and Hydraulic Project Approval programs reduce incentives to protect and restore critical habitat forming processes.

Funding is needed to build the local institutional knowledge and capacity and to support monitoring and the filling of data gaps. Often investigations and assessment work is needed to justify land use modifications that will protect and restore critical habitat in light of development pressure. The capacity of local technical staff dedicated to implementing and participating in salmon recovery work plans is limited.

It is difficult to predict whether the Nooksack Chinook recovery will be closer or further in 10 years than it is today. Loss of habitat is hypothesized in the WRIA 1 Recovery Plan as a leading cause of chinook decline. Although restoration actions will continue to focus on restoring critical processes in priority geographic areas, the regional and local barriers to fully implementing all of the actions in the WRIA 1 Plan will need to be addressed in order to meet Chinook recovery goals.

Attachment A Habitat Targets and Indicators Presentation

The information in this attachment was prepared by Treva Coe, Nooksack Tribe Natural Resources Department for presentation to the WRIA 1 Combined Review Team and WRIA 1 Salmon Recovery Staff Team on May 3, 2013. The original presentation of habitat targets was prepared and delivered to the WRIA 1 Management Team in March 2011. The information presented is current as of March 2011.