Puget Sound Partnership
and Recovery Implementation Technical Team (RITT)

2013 Three Year Work Plan Review

for the

Skagit Watershed

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Overview

The 2013 Three-Year Work Plan Update is the eighth year of implementation since the Recovery Plan was submitted to NOAA/NMFS in 2005. The Puget Sound Partnership, as the regional organization for salmon recovery, along with the Recovery Implementation Technical Team (RITT), as the regional technical team for salmon recovery, perform an assessment of the development and review of these work Plans in order to be as effective as possible in the coming years. These work plans are intended to provide a road map for implementation of the salmon recovery plans and to help establish a recovery trajectory for three years of implementation. *Given that watershed chapter areas are focusing efforts on development of monitoring and adaptive management (M&AM) plans over the next two years, the 3YWP process has been significantly scaled down for 2013. It is anticipated that the M&AM work will eventually replace much, if not all, of this process.*

The feedback below is intended to assist the watershed recovery plan implementation team as it continues to address actions and implementation of their salmon recovery plan. The feedback is also used by the Recovery Council, the Puget Sound Partnership and the RITT to inform the continued development and implementation of the regional work plan. This includes advancing issues such as adaptive management, all H integration, and capacity within the watershed teams. The feedback will also stimulate further discussion of recovery objectives to determine what the best investments are for salmon recovery over the next three years.

Guidance for the 2013 work plan update reviews

Watersheds were asked to respond to the following questions:

I. Context:

1. Provide a brief overview of the characteristics of your Chinook Salmon Recovery area. 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?

II. Background/Planning/Logic of the Recovery Chapter:

1. What are the recovery goals for your watershed for Chinook salmon? Include information on both population goals (VSP parameters) and habitat goals.
2. What is the current strategy to accomplish the recovery goals and what assumption(s) is this strategy based on?
3. What new knowledge or information has changed your strategy, assumptions or hypotheses since your recovery chapter was written?
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?

III. Plan and Gaps:

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?
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?

Factors to be considered by the RITT in performing its technical review of the workplan update included:

I. Consistency:

1. Is the plan's current strategy either substantially the same as documented in the Recovery Plan (Volume I and II of the Puget Sound Chinook Recovery Plan plus NOAA supplement) or well supported by additional data and analysis?
2. Is the sequence of actions identified in the 3YWP consistent with the current hypotheses and strategies?

II. Sequence/Timing:

1. Are actions sequenced and timed appropriately for the current stage of implementation?

Review Process

The following review consists of the following components:

1. a regional technical review that identifies and discusses technical topics of regional concern
2. a watershed-specific technical review focusing on the specific above-mentioned technical questions and the work being done in the watershed as reflected by the three year work plan
3. a watershed-specific recovery plan consistency review of projects submitted to the SRFB for funding

Puget Sound Recovery Implementation Technical Team Review

The RITT reviewed each of the salmon recovery three-year work plan updates in May-July 2012. The RITT evaluated each individual watershed according to the four questions provided above. In the review, the RITT identified a common set of regional review comments for technical feedback that are applicable to all watersheds, as well as watershed specific feedback using the four questions. The regional technical review and watershed specific technical review comments are included below.

Regional Technical Review: Common Themes

We Are Not On Pace to Meet Recovery Goals

Our review of the progress, challenges, and opportunities for salmon recovery compiled in the three-year work plans and supporting documents indicates that progress towards Chinook salmon recovery across the region has been uneven and, on the whole, implementation of salmon recovery plans is failing to meet the pace identified in the 10 yr work plans. This slower pace, which has been a common theme since we began reviewing progress, is having a compounding impact that ultimately lessens our ability to recover Chinook salmon in the ESU. The work plans and project proposals document that the cost of implementing projects and protecting habitat continues to grow, yet the resources to do the work have not kept pace. At the same time, Chinook salmon populations in the ESU are declining. The gap between current status, recovery goals, and what it will take to get to recovery goals is growing even larger. In the last decade, nine of the 22 Chinook salmon populations continued to decline and these declines included populations in four of the five regions of Puget Sound (PSP 2012). Based on our review, the region needs to make progress on the issues below to reverse this trend.

Identify and Learn From What Is Working and What Is Not

The partners in the Puget Sound Salmon Recovery Plan lack a coordinated system for tracking progress, detailing accountability, and making decisions to improve salmon recovery strategies and actions based on information of the effectiveness of what has been implemented. The National Marine Fisheries Service (NMFS) in adopting the Puget Sound Chinook Salmon Recovery Plan identified the lack of monitoring and adaptive management plans as a critical piece that needed to be added (NMFS 2006). The monitoring and adaptive management that is occurring exists as a patchwork of different programs at local and regional scales based on the regulatory needs of different authorities, local priorities, the availability of different sources of funding and technical expertise, and often uses different scientific approaches. At the local scale, this work focuses primarily on site-specific monitoring of habitat restoration projects and salmon. In some watersheds, it also includes monitoring and adaptive management frameworks.

To address this issue the RITT has developed a framework to support the development of systematic, coordinated monitoring and decision making. The framework provides a single classification of different salmon habitats synthesized from many scientific publications to promote sharing of information among different projects; it identifies and defines suites of pressures and stressors acting on salmon and salmon ecosystems; it promotes a transparent approach that illustrates how different recovery strategies are expected to reduce pressures; it

describes logical sequences of actions and outcomes; it identifies measurable objectives for the outcomes, the sources of uncertainty associated with them, and indicators to judge progress towards meeting salmon recovery goals. The use of this consistent approach across watersheds will provide more powerful information to decision makers while still retaining the individual characteristics and priorities of the individual watershed recovery plans. For example, this approach provides a means to test similar assumptions across multiple watersheds and connect local and regional scale monitoring information to track progress across the region.

With the support of the Puget Sound Partnership, fourteen individual watershed recovery groups are applying the framework by translating sixteen recovery plans into that format and using it to assess monitoring needs and priorities. They plan on completing an initial assessment using the Framework by mid-2014. The purpose is to help salmon recovery planners in different watersheds consistently describe assumptions stated in their watershed recovery plans and to incorporate new information to evaluate these assumptions. For watersheds that have not yet developed monitoring and adaptive management plans, these assessments are expected to form the technical basis from which watersheds will be able to develop or refine individual monitoring and adaptive management plans. All watersheds are considering three basic questions to set monitoring priorities:

1) Will the information gathered from monitoring efforts affect future decisions regarding land, water, and resource management and Chinook salmon recovery?
2) Where and to what degree is there uncertainty, and how will this uncertainty affect decision making by resource managers? and
3) How will the uncertainty be reduced or resolved over time through successful implementation of the Monitoring and Adaptive Management Plan?

Making this system work will not be possible without strong policy-level leadership, support, and participation. This approach will support broader participation by all parties necessary for salmon recovery, which was lacking in the development of the existing Plan. We anticipate that further engagement of policy makers will be needed to identify the short-term and long-term measurable objectives for habitat restoration and protection, hatchery management, and harvest, as well as better integration of the different management sectors ("H"-Integration) within and across watersheds. This broad, active participation will be necessary for success.

Finally, no policy body or agency appears to have assumed responsibility for transparently documenting and integrating changes to salmon recovery plans. Changes in some strategies, such as for harvest and hatcheries, are documented in ESA consultations with the National Marine Fisheries Service, but changes in most habitat strategies in the Watersheds Recovery Plans are not. We anticipate that the updating of Watershed Plans using the framework will meet this need. It will also provide a mechanism and process to include information that is currently being collected by diverse groups. In this way, all relevant monitoring information should become part of the knowledge base of all participants in watershed recovery plan implementation and the subsequent adaptive management of implementation.

Protection of Ecosystem Functions and Habitat

Protection of existing marine and freshwater habitats is essential for salmon recovery in Puget Sound. Protection, as used here, means the conservation of habitat and the functions it provides through passive actions (e.g. habitat acquisition) and the application of land use regulatory measures. Adequate protection of salmon habitat in Puget Sound continues to be an issue in all watersheds. Our reviews noted that the continued degradation of habitat is a concern throughout the region. Some watersheds continue to lose forest cover and riparian functions within the Urban Growth Boundary (Pierce 2011, Vanderhoof *et al*. 2011).

Habitat improvements or acquisition are easier to implement by individual watershed groups, given funding, but meaningful protection of existing habitat quality relies on local regulations and their enforcement. One of the premises of the Puget Sound Chinook Recovery Plan approved by NOAA in 2005 was that habitats throughout Puget Sound would improve with the implementation of watershed strategies in the Plan and not continue to degrade. The plan identified a variety of regulatory tools that afforded protection. These included the Shoreline Management Act (SMA), Growth Management Act (GMA), Critical Area Ordinances (CAO), state Hydraulic Permit Approvals (HPA), NMFS's reviews of federal actions under Section 7 of the ESA, and other federal actions (i.e. the Army Corps of Engineers' levee vegetation management policy and others). Despite this, some watersheds noted that the current rate of habitat loss may be offsetting any gains the salmon recovery groups are making through restoration projects. The effectiveness of these regulatory processes is not documented in any cumulative, comprehensive manner. However, these regulatory actions must be effective in protecting and maintaining the current biological integrity of these areas or the implementation of projects alone will not recover Puget Sound Chinook salmon.

We note with interest that the Salmon Recovery Council did not ask for a policy review of progress in the 2013 three-year work plans. We repeat our recommendation from last year that Salmon Recovery Council (SRC), responsible agencies, watershed groups, and the RITT and other experts need to develop ways to provide technical input for integrating to a much greater extent the actions that promote salmon recovery within these local and regional decisions and regulations affecting salmon habitat. Alone none of these processes are sufficiently integrated with the Puget Sound Salmon Recovery Plan for the RITT or the SRC to provide specific guidance regarding how habitat protection should be implemented to support salmon recovery. Therefore, although some of the RITT's watershed-specific comments suggest ways that individual watershed groups could better integrate habitat protection into their recovery plan implementation, we also recognize that much of the solution to this problem lies in revising the underlying planning processes, which is not a scientific enterprise.

References:

Fresh, K.. and E. Beamer. 2012 (draft manuscript). Juvenile salmon and forage fish presence and abundance in shoreline habitats of the San Juan Islands, 2008-2009: Map applications for selected fish species.

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Pierce, K. 2011. Final Report on High Resolution Change Detection Project. Washington Department of Fish and Wildlife, Olympia, WA. Available at: http://wdfw.wa.gov/publications/01454/wdfw01454.pdf

Puget Sound Partnership. 2012. State of the Sound: A Biennual Report on the Recovery of Puget Sound.Tacoma, Washington. Available at: http://www.psp.wa.gov/sos.php

Vanderhoof, J., S. Stolnack, K. Rauscher, and K. Higgins. 2011. Lake Washington/ Cedar/ Sammamish Watershed (WRIA 8) Land Cover Change Analysis. Prepared for WRIA8 Technical Committee by King County Water and Land Resources Division, Department of Natural Resources and Parks. Seattle, Washington. Available at: http://www.govlink.org/watersheds/8/reports/W8LandcoverChangeReport7-19-2011.pdf

H Integration

In their 2003 guidance to the local watersheds, the Puget Sound Technical Recovery Team (TRT) identified the need for an integrated All-H strategy to recover Puget Sound Chinook salmon. This message was emphasized again in the Puget Sound Salmon Recovery Plan (2005) and the NOAA supplement (2006): all of these documents clearly state that actions in Habitat, Hatchery, and Harvest management (the "Hs") must be coordinated towards recovery of Puget Sound Chinook salmon. H-Integration is defined as a coordinated combination of actions among all H-Sectors - harvest, hatchery, and habitat – that together work to achieve the goal of recovering self-sustaining, harvestable salmon runs.

Although actions are taking place in all three of these "Hs" the three-year work plans do not yet reflect a coordination or integration of the "Hs. The goal of the H-Integration process within a watershed, which the RITT included under adaptive management, should be to develop integrated strategies and suites of actions among all the H-sectors that are consistent with predictions of moving salmon populations towards short, moderate, and long-term recovery goals. The overall objective of H-Integration is to summarize how the H's work together, identify actions within each H, predict the outcomes and identify performance measures in terms of VSP, track progress on the implementation of actions, and report progress on performance measures.

Six steps have been identified with the intent of advancing H-Integration with the watersheds. These six steps were developed to meet the overall goals and objectives identified above and include:

1) Identify the people that need to participate and how to involve them.
2) Gain a common understanding of how the system works—habitat conditions and fish populations this includes: habitat conditions and priority limiting factors, harvest rates, hatchery management, fish population status (e.g. VSP parameters), and community needs.
3) Agree upon common goals and a set of outcomes across the H-sectors that describe what will be achieved related to those goals in measurable terms.
4) Examine, evaluate and select a suite of complementary actions across the H-s to achieve the outcomes and determine what evaluation tools to use.
5) Document rationale, implementation steps (specific complementary actions in hatcheries, harvest, and habitat), expected outcomes (including effects on VSP), and benchmarks.
6) Build and implement a Verification, Effectiveness and Accountability system. Implement actions, monitor results, prepare annual performance reports, and adjust over time.

A couple of watersheds have expressed some frustration that all the necessary participants are not consistently participating to integrate the Hs effectively or that neither side has the capability to make changes to the others processes that drive the management of all the individual "Hs". Under this situation it is not possible to evaluate the three-year work plans or the progress towards recovery adequately unless the watersheds include significant details of the actions in all of the H's as well as how they could be integrated. Part of H-integration is assuring that all parties have a common understanding of the status of the salmon resource (All –Hs) as well as what actions are needed to move that resource to a recovered status. The understanding of the status and trends of Chinook salmon depends on information on the populations' viability characteristics, such as time series of spawning escapement, juvenile outmigrant numbers, and recruits per spawner. Some three-year work plans include this information; most do not. We recommend that watershed planning groups include this information in all watershed three-year work plans. One benefit is that the process of gathering basic status-and-trend information often results in improving communication between watershed recovery planners, fishery resource managers, and other management sectors. Likewise, it is just as important to have clearly defined habitat goals that are understood by fishery resource managers and others.

The RITT continues to urge the Salmon Recovery Council, whose members include the key parties in salmon recovery, to provide clear policy direction that all H's must work together through the adaptive management process outlined in the "Framework" for salmon recovery to progress. We believe that both effectiveness and efficiency of management and recovery dollars will be increased if habitat restoration, habitat protection, harvest management, and hatchery management (including hatchery "reform") are all part of the same salmon recovery plan.

Importance of Nearshore Marine Ecosystems to All PS Chinook Populations

Salmon recovery plans focus on issues for salmon in freshwater and estuarine habitats. With newer information regarding Chinook salmon use of nearshore habitats we recognize an emerging regional priority of increased emphasis on nearshore protection and restoration. The nearshore is an important migration corridor to and from freshwater and marine ecosystems (Fresh and Beamer 2012; Morley et al. 2012, Toft et al. 2007). These are the habitats that are crucial during the transition from freshwater to marine Chinook salmon life stages. For example, growth during a juvenile's first summer in the nearshore is an important determinant of its overall survival to returning as an adult and an essential element in estimates of population viability parameters such as productivity. What we must recognize is that our knowledge of early marine migrant life histories and requirements in the nearshore environments of Puget Sound is limited, particularly in regards to viability of individual populations, and is only broadly conceptualized in life cycle models of Chinook life history and viability.

Recovery planning for Chinook salmon on an individual watershed basis has focused on efforts to reduce ecosystem pressures and improve ecosystem processes for distinct natal populations in their freshwater and estuarine habitats. However, each salmon watershed is uniquely connected to nearshore marine habitats. Chinook recovery actions are challenged by the differences in approach that are apparent between those "watersheds" with natal and non-natal populations of Puget Sound Chinook salmon. For example, the San Juan and Island watersheds and their landscapes consist almost entirely of nearshore habitats which are utilized by migratory juvenile

and adult Chinook salmon originating in other watersheds. Similarly, the South Puget Sound and West Sound watersheds provide extensive habitats for the southernmost independent populations of Puget Sound Chinook salmon, i.e., originating in Nisqually and Puyallup/White rivers. Other non-Puget Sound salmon populations, including Canadian ones, have also been found throughout the Puget Sound nearshore environments. Designing nearshore strategies for salmon recovery and integrating them with freshwater and estuarine strategies has to address several key challenges:

1) Nearshore habitats are likely to be shared by salmon populations which originate from multiple watersheds.
2) Nearshore ecosystem processes occur at broader geographic scales than the individual watershed scale that comprises the freshwater ecosystem processes.
3) Scientific approaches and tools for nearshore protection and recovery have emphasized broader ecosystem objectives rather than objectives specific to salmon recovery (e.g., protection of forage fish spawning sites, multispecies focus, extent and density of eelgrass beds, nearshore riparian vegetation, shoreline armoring, etc.).

Thus research (e.g., assessments and learning) and monitoring (e.g., status and trends, effectiveness of implemented projects, etc.) of salmonid populations in nearshore marine habitats is likely to exceed the management scale and scope of any individual watershed. The research questions and projects need to be designed over larger (subregional and/or regional) scales. A variety of tools exist which may help integrate marine and watershed (i.e., freshwater) ecosystem planning. Genetic tools now allow researchers to estimate the proportions of individual salmon populations present in specific habitats at different times. Conceptual and qualitative models can link general nearshore ecosystem processes and pressures with their importance for salmonid use. Combined with well-designed monitoring and research programs, information regarding specific Chinook salmon populations may be gained in specific nearshore areas and/or habitats. Thus, increasing our knowledge of Chinook salmon life histories in marine environments is essential. This will require coordination and collaboration between individual watersheds, and ultimately this knowledge will be integrated and complement recovery efforts in freshwater ecosystems to achieve, in particular, a more comprehensive understanding of the diversity and spatial distribution of Puget Sound Chinook salmon populations, as well as, abundance and productivity parameters.

Resources:

Fresh, K.. and E. Beamer. 2012. Juvenile salmon and forage fish presence and abundance in shoreline habitats of the San Juan Islands, 2008-2009: Map applications for selected fish species. (http://www.skagitcoop.org/documents/Beamer_Fresh_2012_Final.pdf)

Morley, S. A., J. D. Toft, and K.M. Hanson. 2012. Ecological effects of shoreline armoring on intertidal habitats of a Puget Sound urban estuary. Estuaries and Coasts 35:774-784.

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Developing Recovery Projects and Social Capital

The *Puget Sound Salmon Recovery Plan* (2005) noted that strategic approaches to develop proposals for restoration and protection were needed in some watersheds; however, lack of public support would hinder implementation of those projects. The Plan identified the need to build public support using incentives and education. In the last eight years, most watersheds have developed technical processes for identifying priority projects based on their hypothesized benefits to salmon. Each year, the RITT has reviewed the projects proposed for implementation and noted that in some cases opportunities associated with landowner willingness and/or participation have constrained choices identified by scientific analyses. This sometimes drove actual prioritization, sequencing, and implementation of projects, which clouds the transparency of how projects were chosen, prioritized, and sequenced. Watershed recovery planners make the best choices they can in their local areas, but the region has made little progress in implementing and testing strategies for building public support.

The RITT suspects that in local areas where recovery planners are balancing the demands to implement the most effective projects with the need to build more public support, the choices of suites of projects may represent the tradeoff between the long-term effectiveness of salmon recovery by building social capital and short term effectiveness of selecting projects that may not be the most effective. Awareness of the importance of social capital strategies in conservation is increasing (e.g. Pretty and Smith 2004, Mandarano 2007). These kinds of decisions at the watershed level, however, are being made on an ad hoc basis without consideration for their wider application or knowledge of what has worked in other places. The benefits are hard to quantify.

The RITT notes that the region has a significant opportunity to address both the overarching strategy to build public support in the Plan and the uncertainty of project selection at the local level by incorporating specific, intentional adaptive strategies to build social capita through the choice and implementation of restoration projects. Monitoring the results across the Puget Sound region could provide significant opportunities to learn and improve salmon recovery actions. The strategy and design of this would likely be different than for monitoring biological strategies. As described by Anderson et al. (2003), this might be an appropriate problem for "evolutionary problem solving" rather the more typical active or adaptive management approaches. In evolutionary problem solving, learning occurs when managers share the results of adapting many, independent prototype actions (e.g. explicit decision to build social capital through project implementation). The focus is on innovation (trying different approaches), diffusion (documenting the results and sharing them so others can try them), and adaptation. Monitoring of success is essential, but the strategy might rely less on statistical analysis and monitoring standardized variables and more on narrative sharing of experiences.

Resources:
Anderson, J.L., R. W. Hilborn, R.T. Lackey, and D. Ludwig. 2003. Watershed restoration – adaptive decision making in the face of uncertainty. Pages 203-332 in Strategies for Restoring River Ecosystems: Sources of Variability and Uncertainty in Natural and Managed Systems (R.C. Wissmar and P.A. Bisson, eds.). American Fisheries Society, Bethesda.

Mandarano, L. A. 2009. Social network analysis of social capital in collaborative planning. Society & Natural Resources 22:245-260.

Pretty, J., and D. Smith. 2004. Social capital in biodiversity conservation and management. Conservation Biology 18:631-638.

Watershed Specific Technical Review: Skagit Watershed

I. Consistency

1. *Is the plan's current strategy either substantially the same as documented in the Recovery Plan (Volume I and II of the Puget Sound Chinook Recovery Plan plus NOAA supplement) or well supported by additional data and analysis?*

Yes, but with some exceptions. The plan's current strategy is consistent with the goals and actions identified and described in the 2005 Puget Sound Chinook Recovery Plan and the Skagit Watershed Council's Year 2010 Strategic Approach. The 2013 update for the Three Year Workplan (3YWP) submitted by the Skagit Watershed Council (SWC) for WRIAs 3 & 4 is a summarized update of the 2012 workplan review. The 2005 recovery plan chapter for the Skagit Watershed states the key hypothesis that the scarcity of juvenile rearing habitat in the Skagit estuary, freshwater tidal delta, and along mainstem river floodplains is the main factor limiting the six independent Chinook populations in the Skagit Basin. The greatest losses in rearing habitat have occurred in the estuary and freshwater delta area, with the latter undergoing a 73% loss in habitat area from historic pre-development conditions. The construction of an extensive network of dikes and levees starting in the late 1880s is one of the main reasons for the present scarcity of rearing habitat for juvenile Chinook in the estuary and freshwater tidal delta. Major areas of distributary and blind slough channels were isolated from tidal and riverine hydrological, sediment transport, and organic matter transport processes due to these structures. The Skagit estuary and freshwater tidal delta were designated as the highest priority habitat areas in the original 2005 chapter of the recovery plan. The degradation and elimination of pocket estuaries along the nearshore areas of the Skagit was also identified as a limiting factor to juvenile Chinook salmon, primarily to fry migrants that are too small in size to survive in the open waters of the Puget Sound and North Pacific Ocean.

The 2013 3YWP update follows the same strategies for habitat restoration identified in the 2005 chapter of the Chinook Recovery Plan and 2010 SWC Strategic Plan update, focusing on the scarcity of juvenile rearing habitat in the estuary, freshwater tidal delta, and riverine floodplain areas that has occurred due to hydromodications (levee, dikes, bank armoring), agricultural and forestry land management practices, and land development. The 2005 chapter of the recovery plan also addressed impacts to hydrological and sediment transport processes caused by forestry, agricultural, and rural land use practices, and identified a number of priority subbasins for restoration that are currently considered degraded as the result of historic land use practices. The 3YWP, like the original recovery plan chapter, prioritizes major subbasins within the watershed based upon the number of independent Chinook populations using each subbasin. The strategy focuses first on those areas of the watershed that support juvenile rearing and migration for all six Chinook populations found in the Skagit, and all life history forms of juvenile Chinook. The

highest priority areas (Tier 1) include the estuary, freshwater tidal delta, and the mainstem Skagit River below the confluence of the Sauk River, which are used for rearing habitat and migration by all six Chinook populations. Next in priority (Tier 2) are those areas that support two or three Chinook populations, including the upper Skagit River above the Sauk River confluence, and the lower Sauk River downstream of the Suiattle River. Under the current strategic approach, major tributaries that support a single population of Chinook salmon are also included as Tier 2 priority areas. Major tributaries such as Bacon Creek, Illabot Creek, Finney Creek, and Day Creek provide unique spawning and rearing areas for both ocean-type and stream-type Chinook life history forms, and are important for sustaining the genetic, life history, and spatial diversity (three of the four VSP parameters) of Chinook salmon, steelhead, and bull trout in the Skagit.

Unlike the 2005 chapter of the recovery plan, the Skagit 3YWP does not include any actions that address the effects of harvest and hatchery programs on the six independent Chinook populations in the Skagit. The role of the Skagit Watershed Council in salmon recovery is limited by their status as a non-profit and non-governmental organizational. The SWC restricts recovery actions to voluntary habitat projects and mainly follows the role of a lead entity as defined by the state salmon recovery funding process. This limits, but does not preclude, the development of an H-integration (habitat, harvest, and hatcheries) approach for the Skagit. The SWC should attempt to better address H-integration in the future workplans, especially when considering habitat restoration projects in those areas of the watershed where populations are most influenced by hatchery and harvest practices (e.g., lower Cascade River).

A substantial amount of additional data on the habitat utilization, densities, and size of juvenile Chinook salmon has been collected in the Skagit River Basin since the recovery plan chapter was completed in 2005. The 2013 3YWP list update includes a comprehensive list of research and monitoring projects that have either been completed, or are currently active, since the Chinook recovery plan was completed. The updated research and monitoring list includes projects being conducted by the Skagit River System Cooperative (SRSC), the Upper Skagit Indian Tribe, Washington Department of Fish and Wildlife (WDFW), Seattle City Light, and other local organizations. This list is extensive compared to other WRIAs in the Puget Sound, and reflects the emphasis on the development of recovery strategies that are based on data rather than models and "expert knowledge".

Data on habitat utilization and densities of juvenile Chinook salmon has been collected by SRSC in the Skagit estuary, including the lower delta, Skagit Bay, and Swinomish Channel through the Intensively Monitored Watershed (IMW) program. Data and analysis from a comprehensive study conducted by SRSC and NWFSC on the habitat use and seasonal densities of juvenile Chinook salmon, and other estuary fish, were also made available in a report to the Army Corps of Engineers in 2007. A substantial amount of new data on estuary, tidal delta, pocket estuary, and nearshore use of juvenile Chinook salmon has also been collected from monitoring work conducted for restoration projects, including post-project monitoring for the Wiley Slough estuary restoration project, the Deepwater Slough, Fisher Slough, and Edgewater Park tidal delta restoration projects, and for a number of pocket estuaries situated along Skagit Bay. The Skagit Watershed Council completed a comprehensive analysis of juvenile Chinook mainstem and floodplain habitat conditions for prioritizing restoration and land acquisition projects in the middle Skagit (Highway 9 Bridge to Sauk River confluence) in 2011. The University of

Washington (under contract with the Upper Skagit Indian Tribe) completed a draft report in 2012 that provides comprehensive baseline data on the distribution and use of juvenile Chinook throughout the Skagit watershed, including seasonal use and densities of ocean-type and stream-type life history forms. SRSC completed a comprehensive mapping of riverine habitat types for the Chinook salmon distribution in the Skagit Basin as part of the Phase I report for this project in 2010. WDFW has released a number of reports on the Skagit smolt trapping program since 2005 and a draft manuscript for journal publication completed in 2013. These reports provide updated information on the number, size distribution, and timing of juvenile Chinook salmon migrating out of the Skagit River.

Given the substantial amount of data that has been acquired since 2005 in the Skagit, the SWC should strongly consider using this new information for updating their Strategic Approach and 3YWP prioritization list and for validating or modifying the key hypotheses that form the basis of their recovery approach. The current Strategic Approach prioritizes projects based on rather broad ecosystem types (estuaries, pocket estuaries, freshwater delta, riverine floodplain), with riverine floodplains being further divided into major subbasins based upon the number of Chinook populations present. A great deal of new information is now available for key areas of the Skagit, including baseline fish population and habitat assessments in nearshore pocket estuaries, the Skagit River estuary, mainstem river areas, and major tributaries. In addition, comprehensive project development studies have been completed since 2005 including the Middle Skagit Initiative study, as well as ongoing habitat restoration assessment studies in the delta. The new data and analysis provided by these projects offer SWC a strong foundation for improving their Strategic Approach. The amount of data available for this purpose is substantial, and SWC should consider requesting capacity funding for this effort.

2. *Is the sequence of actions identified in the 3YWP consistent with the current hypotheses and strategies?*

Yes, though both the strategy and list of projects could be improved. The current sequence of actions identified in the 3YWP is consistent with the hypotheses and strategies described in the most recent update of the Strategic Approach developed by the Skagit Watershed Council. In 2010, the SWC revised the Strategic Approach in consultation with the authors of the original 2005 chapter (SRSC and WDFW), habitat scientists with the NOAA Northwest Fisheries Science Center, and local salmonid ecology and habitat restoration experts. This update expanded the Tier 1 Target Areas for project prioritization to include mainstem river floodplain areas used by multiple independent populations of Chinook salmon, including the lower and middle Skagit River (up to the confluence of the Sauk River), the upper Skagit River below the confluence with the Cascade River, and the lower Sauk River below the confluence with the Suiattle River. The Skagit Basin has lost approximately 37% of historic side channel habitat that provides important rearing and flood refuge habitats for juvenile Chinook salmon. Upstream of the delta, 61 miles of mainstem channel edge has been modified by flood control and road protection structures including riprap and hardened dikes. This has resulted in a major loss of the low velocity habitats required by Chinook salmon for juvenile rearing along the mainstem river. The 2010 Strategic Approach development team recognized the importance of sustaining and improving habitat for a diversity of juvenile life history types in the Skagit, including estuary rearing juveniles, freshwater delta juveniles, and riverine rearing juveniles. The 2010 update to

the Strategic Approach also includes nearshore pocket estuaries and major tributaries that support a single independent Chinook population as Tier 2 Target Areas. Impaired subbasins where protection and recovery efforts could improve hydrological and sediment processes (e.g. reducing landslides and increasing sediment storage capacity) are listed as Tier 3 Target Areas.

All of the capital projects on SWC's updated 3YWP list are found in the three target areas and are consistent with the SWC's Strategic Approach. The SWC's Technical Working Group (TWiG) has reviewed all of the projects on the current list for consistency with the Strategic Approach and visited the majority of the project sites. The current list of projects on the list is appropriate for a 3YWP for a large watershed that supports multiple independent Chinook populations. Most the projects on the capital project list are located within the Tier 1 target area, which is consistent with the strategy. Proportionately more projects are found in the riverine floodplain target area than the estuary/tidal delta target area, though more funding is going to estuary projects because many of these projects are appropriately large in scope and more complex from an engineering standpoint. The list of projects in tributary floodplain areas (Tier 2) is relatively short. More effort should be made to expanding the Tier 2 list of projects given that tributaries are a significant and widespread habitat type used by Chinook salmon, especially important for the more threatened spring-run populations. The list of Tier 3 projects is very short; there are only three projects on the Tier 3 list. Sediment and peak flows originating from impaired watersheds were identified as a major constraint to the egg-to-smolt survival in the Skagit recovery plan, and these impacts will likely increase in response to climate change in the future. The SWC should consider updating the status of sediment and peak flow risks among the major watershed units in the Skagit, and then use this analysis to encourage the development of projects that reduce these risks. There is an intrinsic sequencing problem in the current approach for projects in Tier 1 and Tier 2 areas that are impacted (or constrained in terms of fish and ecological benefits) by impaired hydrological and sediment processes originated from Tier 3 areas.

II. Sequence/Timing

1. Are actions sequenced and timed appropriately for the current stage of implementation?

Yes, though the sequencing and timing of actions could be improved for some projects. The list of capital habitat projects included on the current 3YWP includes eight restoration projects in the estuary/freshwater delta priority area. There are currently no habitat protection (land acquisition) projects included on the list. Almost all of the restoration projects are being conducted on state lands (WDFW ownership). This is consistent with the SWC's strategy of completing estuary restoration projects first on public lands before expanding work to private lands, which include highly productive agricultural areas that are threatened from land development. The possibility of acquisitions in this priority area should still be considered, especially for lands that are not in agricultural production or are low in agricultural value. The development of restoration projects in this area is currently constrained by available project sites. Five of the eight projects in the estuary/freshwater delta priority area are feasibility studies, construction designs, or post-project monitoring. The sequencing of some of the projects is not clear, and is counter-intuitive in some cases. For example, one project is proceeding from 60% design to "additional modeling",

implying that it is undergoing additional feasibility evaluation. Another project is moving from feasibility to construction without an intermediate design phase.

The Tier 1 riverine floodplain target area has a total of 17 projects on the 2013 list; 5 are land acquisition projects and 14 are habitat restoration projects. The land acquisition program in this priority area appears to be much further ahead than that of the other priority areas, with a significant number of properties being acquired that will serve as potential habitat restoration project sites. The sequencing of projects in this section of the list, starting at conceptual, then moving to acquisition (in some cases ending here for protection projects), design, and finally to construction is in correct order and appears to be appropriately timed.

There are a total of three projects on the Tier 2 list of nearshore projects. Two of the projects are restoration project, while one is a major acquisition project that has been completed. The completed acquisition project should be removed from the 3YWP list, since no further actions are being proposed for this project. The sequencing of the two restoration projects in the nearshore priority area is difficult to understand. The Tier 2 tributary floodplain priority area includes six restoration projects, and one combination project (i.e. acquisition followed by restoration). There are very few acquisition projects in this priority area, with most of the projects being conducted on federal lands. The Tier 3 sediment and hydrology impaired watershed priority area includes three projects, all of which are restoration projects. These three projects are all in the conceptual phase of sequencing, with the timing of the design and construction phases of these projects uncertain.

PSAR and SRFB Project Consistency Review

Review of Regular Round Projects for the Skagit Watershed:

The Skagit Watershed Council is proposing ten projects for funding in the 2013 combined SRFB and PSAR funding round. The total SRF Board funding request is $1,239,922, while the total PSAR funding request is $3,045,610. To determine the consistency of these projects with the Chinook recovery strategies for WRIA's 3&4, the Recovery Implementation Technical Team (RITT) reviewed the Skagit chapter of the Puget Sound Salmon Recovery Plan (SRSC and WDFW 2005), the Skagit Watershed Council's Year 2010 Strategic Approach, the three-year work plan for the watershed, and the project proposal information available in the PRISM database (http://www.rco.wa.gov).

Based on this review, the RITT concluded that these projects are consistent with the Skagit Chinook recovery plan and the 2010 update of the Skagit Watershed Council's strategic approach. All these projects except one are included in the 2013 update of the WRIA 3/4 Three-Year Work Plan. The one exception is Project 13-1425, the Skagit Protection Strategy Update, which was originally part of another project on the three-year work plan (Project 13-1056, Skagit Watershed Habitat Protection block grant) but was designated as its own project at the recommendation of the Skagit Watershed Council's Board of Directors. This "split-off" project is fully consistent with the Skagit Watershed Council's strategic approach for Chinook salmon recovery.

The projects on the Skagit Watershed Council's PSAR and SRFB Project list include three Tier 1 projects in the Skagit estuary and tidal delta, four Tier 1 projects in the Skagit River floodplain (multiple Chinook populations), and one Tier 2 project in the floodplain (single Chinook population rearing areas). Tier 1 and Tier 2 projects have the highest priority for funding following the 2010 update of the SWC's strategic approach. The current list includes projects in all Tier 1 and Tier 2 target areas, including restoration projects in the estuary and freshwater tidal delta areas, and juvenile rearing areas used by multiple Chinook populations in the middle and upper mainstem sections of the Skagit River. The project list also includes a single nearshore pocket estuary project (Tier 2), and a single major tributary floodplain project (Tier 2). The list of project includes project feasibility studies, restoration projects, and protection (land conservation) projects. The list includes a $1.1 million block grant for conservation land acquisition, which is consistent with the Skagit Watershed Council's strategic approach.
In this watershed, as well as all the others in the Puget Sound, whether these projects will in turn contribute to moving Puget Sound salmon populations towards their recovery goals will also depend upon further funding to implement additional projects, and whether other actions across all watershed chapters are being implemented, including appropriate harvest management, hatchery management, and habitat protection actions.

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