# **Compiled 2014 RITT and NOAA Reviews of Watershed M&AM Reports and 3YWPs**

*In 2014, the Puget Sound Recovery Implementation Technical Team (RITT) performed technical reviews of the Puget Sound watersheds’ Three Year Workplan (3YWP) and Monitoring and Adaptive Management Phase I Framework Reports, providing regional technical themes and watershed-specific reviews. NOAA conducted a policy review to identify regional themes of the M&AM reports and 3YWP project lists.*

Note: Each watershed should receive a single document that includes: 1. Regional Technical and Policy Review; 2. Watershed Specific Technical Review; 3. Watershed Specific Policy Review

**2014 Chinook Monitoring and Adaptive Management Report and**

**Three Year Workplan Project List Review: Regional Technical Themes**

Recovery Implementation Technical Team

RITT Reviewers:

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*For the 2014 Regional Technical Review, RITT members reviewed the M&AM reports and 3YWPs for regional themes. Each lead reviewer was asked to include answers to these questions regarding the themes that were identified, and discussed them as a group : 1) What is the technical issue or challenge? 2) Which watersheds identified this as an issue/need? 3) Why is this issue of regional concern? 4) Recommendations for correction?*

**Watershed Capacity Support Needs**

A major challenge to implementing monitoring and adaptive management (M&AM) for salmon recovery in many Puget Sound watersheds is incorporating new information that has been collected since the completion of the Puget Sound Salmon Recovery Plan in late 2005, and subsequently adopted by the National Marine Fisheries Service (NMFS) in early 2007. This lack of incorporation has created disconnect between the most current science and decision making, or adaptive management. We now have up to nine years of additional (and often disaggregated) data that has been collected in the watersheds. In many cases, a considerable amount of additional analysis and modeling has been completed since the recovery plan chapters were completed in 2005. Moreover, there is a considerable amount of historical data that has been acquired since 2005 in some watersheds that would be valuable to their respective M&AM programs. These data, are available in various forms, which vary from raw data to published reports. This information needs to be compiled, in order for it to be useful for policy and management decisions. Most watersheds do not have the capacity, in terms of technical staff and financial resources, to distill all available data for use in decision making and adaptive management.

The types of data, analyses, and modeling results that are now available at the watershed and regional scale may include the following:

* Updated Chinook/chum/steelhead escapement and spawner distribution data
* Outmigrant data collected at smolt traps
* Marine survival studies in Puget Sound and North Pacific
* Updated freshwater, ocean, and stock productivity values
* Harvest records and management reports
* Freshwater, estuary, and nearshore habitat surveys and assessments
* Juvenile fish surveys and sampling (freshwater, estuary, nearshore)
* Streamflow records
* Water quality records
* Contaminant monitoring and aquatic impact assessments
* Effectiveness monitoring data and reports
* Freshwater benthic macroinvertebrate surveys
* Nearshore and offshore biological surveys
* Land development trend and impact assessments
* Updated GIS data layers for fish distribution, habitat conditions, land-use, etc.
* Research studies on fish abundance, distribution, and life-history variability
* Hatchery assessments
* Genetic analysis
* Results of fish and habitat modeling, including life-cycle, EDT, and SHIRAZ modeling
* Climate change research findings

This information can serve a number of useful purposes with respect to the M&AM projects being implemented for salmon recovery, including: 1) establishing historical baseline conditions for the Key Ecosystem Attributes (KEAs) and their indicators for viability assessments; 2) providing monitoring data for indicators; 3) validating the hypotheses employed in the recovery chapters upon which recovery strategies are currently based; 4) providing measures of effectiveness for specific strategies and actions; 5) updating recovery strategies; 6) updating the status and trends of fish populations and habitat conditions in each watershed; and 7) addressing data gaps.

While there is a substantial amount of data, analysis, and modeling results available for use by the watersheds in implementing their M&AM programs a number of watersheds have a limited technical capacity to process this information. In many watersheds, there is a disconnect between the technical organizations (including local, state, federal, and tribal scientists) and the policy and planning bodies (including lead entities). In some cases, research and monitoring reports that have been completed by the technical organizations are unknown to the policy and planning bodies, or are not available in a form which is useful for decision making. In other cases, research and monitoring efforts are conducted over many years before results are made available to the decision making.

This is of regional concern because there is good information available that is not being used to inform the management and decision making processes, especially in the context of the M&AM programs currently being implemented by the watersheds under regional funding. Data related to spawning, escapement, harvest and habitat condition are being evaluated by diverse, but often separate, groups of researchers. What’s needed is an integrated analysis approach that is centered on specific goals and hypotheses that support Chinook recovery. To correct this problem, the RITT recommends the development of sustainable capacity to compile and make available the data, as well as monitor and model results, into a suitable format for informing policy and management decisions regarding salmon recovery. This capacity could be used to convert this information into a format useful for decision making, and by the watershed organizations to acquire, summarize, and utilize this information for policy and management purposes. The goal is not to integrate the data into a single database, rather the results of data analysis need to be integrated. Data would be organized to answer specific questions relevant to watershed recovery as required or needed by each watershed to complete their M&AM projects and programs. Data collection should be designed to answer specific questions about Chinook recovery.

## Coordination of Nearshore Efforts

The Puget Sound nearshore environment is critical to salmon recovery, but 9 years have passed since recovery plans were developed and the region has yet to define what and how much should/must be done in the estuary and nearshore marine environments in order to recover the multiple populations that use these areas. The RITT strongly believes that all watersheds included in the Puget Sound ESU have some responsibility for actions in estuary and nearshore habitats. While some watersheds have extensive estuary and nearshore habitats, others have no natal estuaries but instead have extensive nearshore habitat zones. These marine habitats are utilized by all populations of Puget Sound Chinook salmon, as well as other salmonid species.

The applicability of VSP parameters (abundance, productivity, spatial structure, and diversity) to the nearshore also must be considered and understood in some fashion. Research in the past 10 years has greatly improved our understanding of habitat use and survival in estuary and nearshore habitats, and these studies need to continue. In time, effectiveness of restoration efforts may additionally inform VSP parameters such as improved survival, extended habitat utilization over time and space, etc. However, it is not likely that each individual watershed entity will have substantial impact on salmon recovery unless efforts are coordinated and assessed across the region.

There are several efforts underway with the intent to understand the scope of this issue. NOAA’s NW Fisheries Science Center is in the process of developing a monitoring plan which will inform managers of ESU-scale status and trends of delta and nearshore habitats for inclusion in their required five-year status reviews. Puget Sound Ecosystem Monitoring Program (PSEMP) initiated a very coarse broad scale effort of monitoring nearshore environments and reporting ‘vital signs’ beginning in 2010. And Puget Sound Nearshore Ecosystem Restoration Program (PSNERP) has taken a broad-scale comprehensive approach over more than 13 years to build a plan which assesses, restores and manages the Puget Sound nearshore habitats. Local watersheds (those with extensive nearshore habitats) have formed a nearshore working group to identify commonalities across indicators and strategies developed during the M&AM project. In addition, the PSP is working with PSEMP and representatives from watersheds to identify a common set of indicators for both the marine and freshwater environments that will support the ability for the region to tell a regional story of recovery in the different environments. Coordination and cohesion amongst these efforts is important for future success. However, there is not likely a single means of tackling the issues of environmental quality of nearshore and estuary habitats in Puget Sound. Efforts to monitor actions on each spatial scale, (i.e., local, regional, and ESU-wide) should be nested in a consistent structure which accounts for biological and physical processes of the habitats and the species of concern. Also, monitoring of status and trends vs effectiveness and implementation of actions should also be carefully constructed. Strategies which guide monitoring in nearshore habitats must be consistent, clear and concise across the ESU.

Many watersheds refer to “no net loss” when it comes to habitat goals, but the reality is that these habitats are already currently “degraded” in many locations. While it is important to document what may seem to be ‘few’ losses in recent years (Higgins et al. 2014), watersheds should also consider what has already been lost relative to structure, function, and area (or extent).

There is also a need for policy and science to move forward in tandem on this issue. Recent research is beginning to inform restoration strategies. However, because of the considerable complexity of biological and physical processes, and the difficulties (money and time, policy, enforcement, and politics) in comprehensively tackling the many issues in our marine environment, our efforts have been limited. Monitoring on a coarse and ESU-wide scale should begin to inform the best use of limited resources for protection and restoration. Effectiveness monitoring of projects on local and watershed scales can identify what is successful, and begin to determine the extent of restoration of ecological function necessary to achieve salmon recovery.

The RITT recommends developing a strong focus on the relationship between nearshore habitats and Chinook salmon use. It is imperative that his relationship and resulting recovery efforts inform policy and decision making processes. The RITT also believes that efforts to develop indicators and strategies for nearshore must be coordinated and grounded in solid science. The RITT recommends that a nearshore watershed workgroup with strong technical background and help from PSP policy staff develop first a nearshore conceptual model and then common/generic hypotheses and results chains for the nearshore habitats. Then priority indicators can be identified. The RITT already provided guidance on a more limited priority list of indicators, but there still lacks a strong Conceptual Model and results chains. These results chains can then be tailored to specific watershed needs as appropriate. However, for a region-wide assessment of nearshore habitats, some list of common metrics will need to be monitored across the broad spatial scale. This is the same recommendation as delineated below in “Next Steps”.

## H Integration

H-Integration is the ***coordinated combination of actions among all sectors - harvest, hatchery, and habitat – that together work to achieve the goal of recovering self-sustaining, harvestable salmon runs*.** 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. 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 must be coordinated to achieve recovery of Puget Sound Chinook salmon.

Although actions are taking place for all three of these “Hs” in the watersheds with three-year work plans, the work plans do not yet reflect coordination or integration of the Hs (e.g. many watersheds have results chains for the different Hs, but do not include results chains that shows integration or coordination of the Hs). Work plans should be able to summarize how the Hs will work together to achieve the goal by: 1) identifying actions within each H; 2) predicting the outcomes in terms of VSP; 3) balancing the risks imposed by habitat, hatchery, and harvest actions consistent with the desired population status (Figure 1); 4) tracking progress on the implementation of actions; and 5) reporting progress on using indicators of VSP outcomes and the pressures and stressors affecting those outcomes.



**Figure 1. Integrating risks of habitat, hatchery, and harvest management according to the desired VSP population status.**

The Shared Strategy identified the following six steps in advancing H-Integration with the watersheds:

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 Hs 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.

Balancing the risks imposed by habitat, hatchery, and harvest actions consistent with the desired population status is fundamentally a policy activity informed by technical analyses. It does require that the appropriate decision makers participate. A few watersheds have expressed some frustration that not all the necessary participants are participating to effectively integrate the Hs or that neither side has the capability to make changes to the processes that drive the management of all the individual Hs. The RITT continues to urge the Recovery Council, whose members include all of the key parties in salmon recovery, to provide the leadership to ensure that all Hs must work together through a transparent adaptive management process. Historically, without this kind of leadership and participation, these decisions are likely to occur through the courts. The RITT believes that both effectiveness and efficiency of management and recovery dollars will be increased if habitat restoration, habitat protection, harvest management, and hatchery management are all part of the same salmon recovery plan.

**Priority Next Steps for Monitoring and Adaptive Management**

Phase I of the Monitoring and Adaptive Management (M&AM) process translated Chinook recovery plan watershed chapters into a common framework from which watersheds can develop or expand their current monitoring and adaptive management process. Phase I was a good start to this process and is useful to identify where the watersheds and the Puget Sound region needs to focus future monitoring and adaptive management efforts.

There is significant work that needs to be done in several areas to strengthen the M&AM products as M&AM plans are developed.

A primary task is to ensure that the results chains are scientifically defensible before moving forward into Phase II of the Monitoring and Adaptive Management process. Developing M&AM plans without first having defensible Results Chains and underlying conceptual models would complicate the process and potentially waste valuable time and resources. The RITT recommends the following steps for improving the Results Chains:

1. Develop Conceptual Models - The conceptual models are the basis for the Results Chains and still need to be developed for most watersheds. Doing so will provide a common understanding of the logic behind the Results Chains and shed light on why Results Chains vary across watersheds
2. Complete a Regional Consistency Review – Results Chains should be compared across the watersheds to identify similar strategies, and intermediate results, but different actions and pressures. PSP and watersheds will determine if these differences were process and input driven or if these differences are related to unique local circumstances.
3. Complete a Pressure Assessment- The RITT recommends that a pressure assessment is completed for each watershed (likely following a methodology that is more robust than that provided by Open Standards but not as extensive as the Puget Sound Pressures Assessment [PSPA]). A first step would be to look at the results of the PSPA by watershed and identify where there are consistencies and differences from the pressure identification that the watershed completed in Phase I. If there are differences, the watersheds should try to identify underlying reasons. The results of the pressure assessment should be reflected in the Results Chains and priority strategies. Completing a thorough identification and prioritization of pressures will help watersheds focus their efforts, monitoring, and resources.

Phase I identified the importance of quantifiable, scientifically defensible goals. All but one of the watersheds, have goals established by NOAA for the Chinook populations in their watershed. In addition, some watersheds have quantifiable goals for habitat. However it is unclear if these watersheds have determined if habitat goals and associated actions will achieve population recovery goals. A scientifically defensible recovery plan means having established a defensible linkage between habitat restoration actions and significant suitable habitat necessary to sustain and recover Chinook populations to achieve population goals.

Another regional need is to establish indicators and the metrics for monitoring by watershed and across the region, and metrics to monitor status and trends in population performance (productivity, abundance, and diversity) and habitat. The Phase I process was to include the identification of indicators and a binning exercise to evaluate current status relative to goals. Not all watersheds completed this task and it is clear, from reviewing the Phase I products, there is a need to provide guidance for a common set of indicators for the Puget Sound Region as well as recommended metrics and methods to determine condition and trends.

**2014 Chinook Monitoring and Adaptive Management Report and**

**Three Year Workplan Project List Review: Regional Policy Themes**

NOAA

NOAA reviewers:

* Thomas Sibley
* Matt Longenbaugh
* Paul Cereghino
* Randy McIntosh
* Alison Agness

**Capturing All Strategies**: The NOAA reviewers note that a lot more work is happening in the watersheds than what is captured in the results chains. This may be because those strategies have been developed since the 2005 plan was written or due to sensitivities around making strategies public. It is essential for plan updates and adaptive management to be captured in writing (and in Miradi) to reflect everything that the watersheds are doing. There are some very complex and innovative actions and approaches that can be shared across watersheds.

**Indicators**: For the future, need to make sure that we are including relevant content from Bruce Crawford’s report, Methods and Quality of VSP Monitoring of ESA Listed Puget Sound Salmon and Steelhead, as well as the indicators that NOAA is looking at applying across the entire ESU. Watersheds should continue to work collaboratively to prioritize indicators to a more manageable level.

**H-Integration**: The reviewers had a lengthy discussion on H-integration and how hatchery and harvest strategies could be used to leverage habitat strategies given that co-managers have greater control on hatchery and harvest. The reviewers recommend that an H-integration strategy may be best implemented at the regional scale as opposed to a watershed by watershed scale given that there is control at the local level on adaptive management of hatchery and harvest by only the co-managers. Some of the strategies presented by watersheds in this process may provide more coherence for a regional approach based on following the lead of co-managers in each watershed. The reviewers recommend a regional assessment across all watersheds to see where there are gaps on integration. No matter which direction we decide to take on H-integration, the reviewers believe it is important for the co-managers to be aware of and invited to participate in the M&AM work.

**Integration of protection and restoration**: The reviewers recommend that watershed work on building and maintaining landowner relationships over time through easements and other assurances of local regulatory protection: this may help accomplish longer term restoration goals. The reviewers want to see more emphasis on long term private landowner stewardship across all watersheds, however they recognize that there are challenges in securing funding for this work.

**Nearshore**: A number of regional assessments are underway or slotted to begin to define benefit and use of nearshore in Puget Sound. Reports and preliminary project designs by PSEMP based on scientific evidence enable prioritization decisions around nearshore watersheds. The reviewers recommend that a cost-benefit analysis of nearshore might be useful to see how much we are getting given that acquisitions are very expensive. The Skagit watershed has a very sophisticated approach to nearshore strategies with very specific targets. This will help measure progress and do adaptive management and may be a model for other watershed working in the nearshore. In addition, the original, stand-alone Nearshore Chapter needs updating and may need a related M&AM plan developed.

**Existing regulations**: Very few jurisdictions are taking advantage of implementing existing regulations such as those in compliance with FEMA’s NFIP. Watersheds should consider how the regulations can be used to further salmon recovery efforts. In addition, it is essential that enforcement and resources are secured for regulation implementation and this should be considered as part of all watershed strategies. This will be something for the SRC Regulatory Subcommittee to further discuss and provide guidance to watersheds on.

**PSP Leadership**: The reviewers recommend stronger PSP leadership on strategies of regional significance to prevent development of uncoordinated, parallel strategies. PSP should provide support to watersheds in making the plans more cohesive through specific guidance, considering NMFS recommendations and guidance in the Final Supplement to the Shared Strategy’s Puget Sound Salmon Recovery Plan. PSP can help identify where there are successful strategies in watersheds that can be transferred to other watersheds. PSP can also identify where the steelhead process and framework development can learn from the Chinook experience.

**Outreach**: The reviewers would like to see outreach strategies developed in more detail around the region. There are examples from some of the watersheds that could be used by other watersheds, such as identifying stakeholders that have ownership over certain parts of the river and identifying specific strategies for each (e.g. Puyallup).

**Stormwater**: There was less information on how stormwater impacts water quality and Chinook habitat when the plans were written in 2005. The reviewers would like to see more assurance of stormwater control in all of the watersheds.

**Results Chains**: Simplification (possibly through an executive summary) and standardization will support regional roll up of information and identification of commonalities across the watersheds. When structuring strategies, watersheds should consider how they want to tell the story (see Nooksack example).

**Watershed Specific Technical and Policy Reviews**

The RITT was asked to respond to the following questions:

*I. Consistency and Sequencing of Project and Activity List*:

1. Is the sequence of actions identified in the 3YWP consistent with the current hypotheses and strategies as identified in the watershed’s M&AM Framework?
2. (if applicable) Is the sequence of actions identified in the 3YWP consistent with the current hypotheses and strategies as identified in strategies for other species, including steelhead?
3. Are actions sequenced and timed appropriately for the current stage of implementation?

*II.* *Monitoring and Adaptive Management Framework Review*

1. Are projects and activities appropriately linked to strategies within the Framework?
2. Are the indicators selected for viability, pressures and effectiveness appropriate for the watershed?
3. What are the major technical gaps and challenges the watershed is likely to experience in developing and implementing their Monitoring and Adaptive Management Framework and subsequent Plan? What are potential solutions to overcoming these challenges? What regional technical support do you anticipate is needed for this watershed to succeed with implementing their Monitoring and Adaptive Management Framework and subsequent Plan?

The reviewers from NOAA were asked to consider the following questions:

1. Do the watershed’s strategies make sense given the local context?
2. Does the suite of strategies identified support recovery in the watershed? Why or why not?
3. Are any strategies missing? Examples of strategies to look for include the following:
	1. Freshwater restoration and acquisition
	2. Nearshore restoration and acquisition
	3. Freshwater habitat protection
	4. Nearshore habitat protection
	5. Harvest
	6. Hatchery
	7. H-integration
4. Are any strategies particularly exemplary or commendable that could be shared with other watersheds?
5. What needs, challenges, or barriers has the watershed identified that require regional support?

Three-year work plans describe how the strategies in a watershed recovery plan are implemented. The Recovery Implementation Technical Team (RITT) has reviewed three-year work plans since the Puget Sound Chinook Salmon Recovery Plan was adopted by the National Marine Fisheries Service in 2007. During 2013-2014 watershed groups made significant efforts to translate the original watershed recovery plans into a consistent framework of watershed monitoring and adaptive management steps and components across the Puget Sound. This year the RITT reviewed a set of questions focusing on sequencing of projects, which has been part of all our reviews since the beginning, and we examined the linkage of the projects to the development of the watershed monitoring and adaptive management plans.

Sequencing:

Sequencing refers to implementing projects in the right place, in the right order, at the right time, and with a level of effort that will produce the desired effects. This level of detail is rarely available in the three-year work plans for the RITT to review but it is evaluated in detail when considered for funding by the Salmon Recovery Fund Board’s technical review teams. The RITT review focuses on the first stage of sequencing, which is ensuring that the most important projects are put forward for funding.

# **Nooksack**

**RITT Review**

-Sequence of actions identified in the 3YWP are consistent with the hypotheses and strategies as identified in the M&AM Framework

-Actions are sequenced and timed appropriate for the current state of implementation.

-Projects and activities are appropriately linked to strategies within the Framework

-The indicators selected for viability, pressures and effectiveness are appropriate for the watershed, but there is a lack of information for estuary and nearshore.

The Nooksack Watershed Monitoring & Adaptive Management Phase I Summary Report core team was comprised of a strong technical group, with expertise which allows inclusion of habitat, hatchery and harvest strategies for Chinook 3 year work plan. The report represents migration of the Nooksack Salmon Recovery Plan into the Miradi/Open Standards framework. At the time the watershed report was submitted, it still needed to be reviewed and approved by the policy body. It is not clear if there are restrictions in content based on policy approval at this time.

The recovery plan relies heavily on EDT modeling analysis, and the objective of the SRP includes the entire watershed, all salmonid species, with a focus on ESA listed species and h-integration. Their stated priority objective is restoration of mainstem habitats, both process-based and geographically prioritized, for the two Nooksack early Chinook populations. This priority objective is clear, and Appendix B provides some information to help clarify assumptions about the populations and life history types present, and interactions among land use, habitat-forming processes, habitat conditions (Properly Functioning Conditions, PFC), and population response. PFC goals, as stated goals in EDT analysis, are not clearly defined. Hypotheses and assumptions are not clearly specified in this report (or in the 2005 plan, as pointed out by the TRT).

Also, the recovery plan and M&AM Framework report does not currently address Estuary and Nearshore habitats: it is not clear if this is because of sequencing (i.e. the watershed recovery team will address the estuary and nearshore in the future after work in the mainstem is complete) or if they do not believe any work needs to be done in the estuary and nearshore. TRT guidance was for watershed practitioners to develop data to better understand juvenile use of estuary habitats, estimated habitat capacity, and life stage productivity/survival data. The RITT supports prioritization of work in the watershed, but encourages the watershed to consider what future work would take place in the estuary and nearshore. The RITT also noted a lack of side channels called out in the plan and recommends the watershed considers these for inclusion (may be a condition of the concern raised below).

The report prioritizes ecosystem components of freshwater habitats: mainstem, tributaries, and floodplain waterbodies. This naming of habitats is not consistent with the RITT framework naming convention and it would be desirable to correct to be consistent with other watersheds to avoid confusion. (However, as long as the definitions are consistent and mapped to conventional terminology in Miradi then the watersheds can have the option to rename the components or KEAs.) Without adherence to the habitat classification the work may not be compatible. If they are actually compatible habitats (i.e., mainstems=large channels), then the divergence in terminology simply introduces confusion which is what the Open Standards method seeks to eliminate.

The report provides detailed indicators applicable to selected KEAs in freshwater habitats. They are relatively logical KEAs and Indicators (where specified), though it is difficult to assess for completeness as the goal specified is PFC. It would be more clear, and easier to evaluate, for consistency and completeness if PFC is defined, hypotheses are clearly specified, and the goals are quantitative and measurable. The RITT suspects this information exists, but did not see it in the report. It appears that indicators which measure effectiveness (of either projects/actions or towards goals or strategies) are not included.

Viability information was presented to the WRIA 1 Management Team and Policy Boards (and used in several regional presentations as a good example), but this work is not currently rolled into the viability tables. Viability ratings were done for specific KEAs under Chinook, Uplands, and several freshwater components. That information was not rolled into an overall rating (with the exception of Chinook) due to the viability rating “mode” selected in Miradi. That is something the watershed can easily address, possibly with a little technical assistance.

Indicators are presented for Chinook relative to abundance (smolts and adults) and harvest and hatchery management. Hatchery operations are an integral part of the plan in the watershed, as the South Fork population is critically low and a captive brood program has been instituted to preserve the gene pool. It is critical to consider monitoring of hatchery strategies in concert with habitat and harvest strategies in this basin.

The results chains for this watershed are detailed and well-constructed, some more fully developed than others. They include:

1) Chinook passage restoration

2) Large wood restoration

3) Riparian Restoration

4) Floodplain reconnection

5) Sediment reduction

6) Floodplain-salmon recovery integration

7) Forestland management

8) SMP/CAO

9) Instream Flows

10) Estuary/Nearshore

11) Harvest management

12) Hatchery management

The RITT applauds the work completed for this watershed. They present evidence of a well-designed approach to habitat restoration in the heavily impacted freshwater habitats, aimed at improving adult spawning capacity, incubation conditions, and juvenile rearing. As mentioned above, the RITT asks for clarification on prioritization or sequencing of estuary and nearshore and asks if the capacity of the estuarine habitats is adequate for the increased adult abundance and hence outmigrant juveniles proposed to produce? The RITT would suggest this is a gap, and that the watersheds has a clear need to develop this further in their plan and strategy.

**Policy Review**

The reviewers like that the Nooksack recovery strategies are very focused; work is primarily done in the forks and is focused on LWD and acquisition. They believe a focused approach is more efficient and effective as compared with trying to do everything everywhere. Overall, the reviewers like the way the strategies are structured for this watershed, in that it allows for comparison of fundamentally different things that we can mobilize around and address. They felt that the way the watershed structured their strategies tells a very compelling story on what we can and are able to accomplish and where the challenges or barriers are. The watershed should focus on addressing landscape practices that impact salmon recovery and holding a community conversation on how to support productive agricultural land while also supporting salmon recovery. The watershed will also want to further identify the root causes or sources of stress that lead to pressures. As the CAO and SMP are now complete, the watershed may want to work with partners on monitoring implementation.