# **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.

# **Elwha**

## RITT Review

The Elwha Watershed Monitoring & Adaptive Management Phase I Summary Report was completed by a core group referred to as the Elwha Work Group (EWG), convened by the North Olympic Lead Entity (NOPLE) and representing the Lower Elwha Klallam Tribe, Olympic National Park, the Lead Entity, Strait Ecosystem Recovery Network and the Puget Sound Partnership. Based on conversations with the Puget Sound Partnership (PSP) a consultant was contracted to work on both the Elwha and the Dungeness translations. The translation was a fairly simple translation of the Elwha Plan that took place on a compressed time line; additional work and vetting may be needed. This process worked fairly well for the identification of the Ecosystem components and indicators but more work may need to be done to identify additional strategies, especially for the WRIA 19 geography. Due to the magnitude of the removal of the dams on the Elwha, it was not surprising that dam removal was the top strategy for this watershed. With dam removal now complete, the watershed needs to shift some of their focus to other aspects of the watershed.

In addition to the Elwha, NOPLE is also the Lead Entity for the Dungeness watershed and Water Resource Inventory Area (WRIA) 19. Because of this relationship, the actions identified in the 3YWP submitted by the Lead Entity include the Elwha and Dungeness River watersheds and numerous independent tributaries, rivers and projects within the nearshore. Therefore it is difficult to determine if the actions in the 3YWP are consistent with the current hypothesis and strategies of the Elwha watershed or if they are properly sequenced.

This year, one of the seven projects submitted by NOPLE was a PSAR Large Cap project specific to the Elwha, which was a floodplain restoration project. Based on an evaluation of this one project as it relates to the information within the Phase I Summary Report for the Monitoring and Adaptive Management Framework, it appears as though this project is consistent with the Elwha hypothesis and strategy to restore degraded habitat and floodplain conductivity and function.

The removal of the Elwha and Glines Canyon dams is a separate process coordinated by the Olympic National Park and not very well integrated with the Lead Entity and the Puget Sound Chinook recovery planning process. The participation of both the Olympic National Park and the Lower Elwha Klallam Tribe in the EWG is a positive step in building stronger connections between the Lead Entity and the Elwha dam removal project. However, the unclear relationship between the primary Elwha dam removal project leaders and the Lead Entity combined with the fast-paced timeline the EWG was working on may necessitate additional vetting and work to ensure strategy alignment and future coordination.

During Phase I of the translation process six habitat strategies were identified. The first strategy listed is to restore access to the upper Elwha watershed; this has been accomplished by the removal of the Elwha dams. The remaining five strategies are related to protecting existing function habitat as restore habitat affected by the dams and the area below the dams. These strategies were used to identify fifteen priority Ecosystem components and their associated goals. It appeared that a significant amount of effort has been placed on the actions associated with the removal of the dams, but additional work will be needed to identify other actions outside of the dam removal. This is essential for ensuring the future projects brought forward can be tied to a recovery plan strategy for the watershed.

In addition to the habitat strategies, the EWG identified and developed strategies, result chains and potential monitoring actions for both harvest and hatcheries. It was also identified as part of their priorities and gaps for the future. With the removal of the dams and opening of upper Elwha, several gaps related to Chinook were identified. One of the harvest gaps identified is a goal for harvest rates on Elwha Chinook. The Elwha Work Group has requested an overfishing report from the Pacific Fisheries Management Council (PFMC) as well as an analysis of the Pacific Salmon Treaty. Another significant gap related to the dam removal is development of instream flow metrics, which will require an Instream Flow Incremental Methodology (IFIM) study to be performed post-dam removal.

The RITT recognizes that the Elwha dam removal project has a strong adaptive management plan, and believes this will be a good resource for the EWG as well as NOPLE going forward.

**Policy Review**

The watershed has a strong Monitoring and Adaptive Management plan, but it is limited to the footprint of the dam project. The recovery partners should consider exploring monitoring and adaptive management strategies and needs beyond the dam removal project. Phase 1 work could be expanded to include WRIA 19 geography and a separate barrier removal result chain for the dam removal project. One issue of discussion is the possible extension of the ESU boundary: there is limited data (some DNA testing could be done on the Chinook) and expansion of the boundary will likely include political and management considerations. There is potential for partners to address the issue and share best available science in the upcoming 5-yr review by NMFS. Time and money is the limiting factor in this watershed.

# **Dungeness**

**RITT Review**

The Dungeness watershed uses a transparent process of project submittal and review to select projects based on the expected benefit to salmon, link to recovery plan objectives, magnitude of expected response, and logistical considerations such as readiness and cost. Projects on the three-year workplan that are submitted for Salmon Recovery Funding Board (SRFB) or Puget Sound Acquisition and Restoration Fund (PSAR) funding are therefore generally consistent with hypotheses identified in the different recovery plans.

*Linkages to Monitoring and Adaptive Management Framework Review*

The draft Dungeness Framework identifies key ecosystem components and key ecological attributes (KEAs) and it does a nice job of describing what is known and unknown about these. The Framework also includes a comprehensive set of results chains (cause-and-effect hypothesis that are linked sequentially) that covers the recovery strategies in the recovery plans. Some additional work is needed to fill in and refine details for several Results Chains strategies addressing key ecological attributes of water, which is critical for this watershed. Overall, the projects in the three-year work plan are linked to the strategies and hypotheses in the Results Chains, although the descriptions in the three-year work plan use the “limiting factor” nomenclature rather than the Puget Sound Partnership’s pressure-stressor-stresses classification. This linkage could be made more obvious. The Framework itself, however, identifies 25 pressures and their definitions and does a nice job of cross-walking these to the limiting factors and stressors identified in the 2005 plan and the three-year work plan references.

The draft Framework identifies just over 40 status and trend indicators, with indicators for Chinook viability representing the largest fraction. The Framework identified no indicators for species and food web or uplands components during this phase, but the description of the available data and data gaps indicates that future indicators are possible. A key next step for developing the Framework is using the indicators to develop short-term and longer-term habitat objectives than can be tied to the steps of the Results Chains. Because Ecosystem Diagnosis and Treatment (EDT) analyses are available for the watershed, the watershed recovery planners should consider translating these analyses to inform the definition of objectives. Effectiveness indicators are not specifically identified in the Framework tables, but some of the objectives in the results chains do suggest possible indicators.

One of the strengths of this Framework is the focus on identifying data gaps that if filled would reduce uncertainty. Conducting sensitivity analyses to inform which knowledge gaps are most important to fill (and ultimately which strategies might be most important) could be very useful. EDT is not the best model for doing sensitivity analyses, but the watershed planners might want to consider other models if they exist. Like most other watersheds, a pressure assessment based on a quantitative analyses or ranking of pressures and stressors could also be useful.

**Policy Review**

The plan is very well developed and the watershed has a strong sense of what needs to be accomplished for recovery. Major limiting factors for implementation include water quantity and funding for lower river projects. The recent Department of Ecology instream flow ruling and new water trust may lead to shifts in water allocations and improvements to quantity. Improving the lower river is critical to restoring the native stock, which is currently in low productivity due to habitat quality. The watershed could focus on further developing the results chains around landowner access and long term private landowner stewardship, which continues to be a hurdle for project sponsors. Developing more measures for effectiveness and building a strong adaptive management process to learn from what is and what is not working may support further implementation of recovery efforts on private land.