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## Northwest Power and Conservation Council

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September 7, 2016

### MEMORANDUM

**TO:** Fish and Wildlife Committee members

**FROM:** Nancy Leonard, Mark Fritsch, Patty O'Toole, Stacy Horton,  
Tony Grover and Erik Merrill

**SUBJECT:** Follow-up discussion about program action effectiveness research  
and monitoring, with a focus on the current program-wide approach  
to tributary habitat: AEM, ISEMP, and CHaMP

### BACKGROUND:

**Presenter:** Fish and Wildlife Division staff

**Summary:** Following on the discussion about action effectiveness during the [August 9, 2016 Council meeting](#) staff will:

- Provide a brief overview of the program's progress towards a program-wide approach for monitoring and effectiveness. Tributary habitat status and trend monitoring and habitat action effectiveness have developed towards a basinwide and program-wide approach with the contribution of regional efforts that began around 2003. During 2013, implementation of a basin/program-wide approach to habitat status and trend and action effectiveness underwent a large change. The monitoring and effectiveness changes implemented align well with the information needs discussed by Member Karier as the three categories of effectiveness:
  - Uncertainty #1 habitat improvement,
  - Uncertainty #2 reach productivity, and,
  - Uncertainty #3 fish population response.

- Review the tributary habitat information expected from Bonneville staff by the end of this calendar year in response to Council's 2011 [recommendations](#) for Programmatic Issue #2 <sup>1</sup> and [2013 Decision letter](#) for a program-wide approach to tributary habitat effectiveness. Specifically, the Council is anticipating Bonneville staff providing a Comprehensive Report addressing:
  1. whether and how to transition CHaMP out of the pilot phase;
  2. confirm or alter the timeline for completion and end of the Program funded IMW studies and the evolution of the rest of the ISEMP project;
  3. confirm and implement or alter the AEM Approach to project-level effectiveness; and,
  4. flesh out, explain and decide on the analytical framework for an overarching evaluation of the habitat monitoring and evaluation information.

**Relevance:** Update the Committee on the status of deliverables related to the Council decision Programmatic Issue #2 from the 2010-11 review of RME and AP Category of projects, including *ISEMP*, *CHaMP*, and *AEM*. This decision also supports implementation of the 2014 Program guidance for Adaptive Management and the 2014 Program's [Emerging Priority #2](#).

**Workplan:** As described under the Council's Annual Work-plan 2, B

**Background:** The Program's policy guidance for research and monitoring of species, habitat, and measures (actions) implemented for mitigation has changed over time, from a focus on individual actions and projects to a program-wide approach. The guidance for research and monitoring follows the Program's logic steps for identifying actions to needed to achieve desired change in habitat and fish (Figure 1, see blue boxes). These logic-steps were also discussed during the [August, 9 2016 Council meeting](#) in terms of the three categories levels of effectiveness for habitat restoration actions: 1) habitat improvement, 2) reach productivity, and 3) fish population response (Figure 1, see gray boxes).

As a starting point for this discussion, staff will discuss the Council's 2011 recommendations (see footnote 1) related to implementation of the program-wide approach to tributary habitat effectiveness (see [Programmatic issue #2](#); Appendix A, B, C). In brief, this involves applying a standard approach to reach/project scale action effectiveness, and focusing on a few watersheds for detecting population-scale action effectiveness. A key document requested by the Council in its recommendations is the Comprehensive Report being prepared by Bonneville and due later this year (#5 in Appendix B).

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<sup>1</sup> Council's 2011 Research, Monitoring, and Evaluation and Artificial Production (RME&AP) Project Category Review

Council staff will provide a brief overview of these recommendations and discuss the information previously requested by the Council to be addressed in Bonneville's Comprehensive Report (see Appendix B for status of conditions, and Appendix C for Council decision letter).

Staff wants to confirm with the Committee that the requested information (#5 in Appendix B) adequately addresses Council concerns, including the three categories of effectiveness uncertainty associated with improving fish habitat discussed at the [August 2016 Full Council](#) meeting.

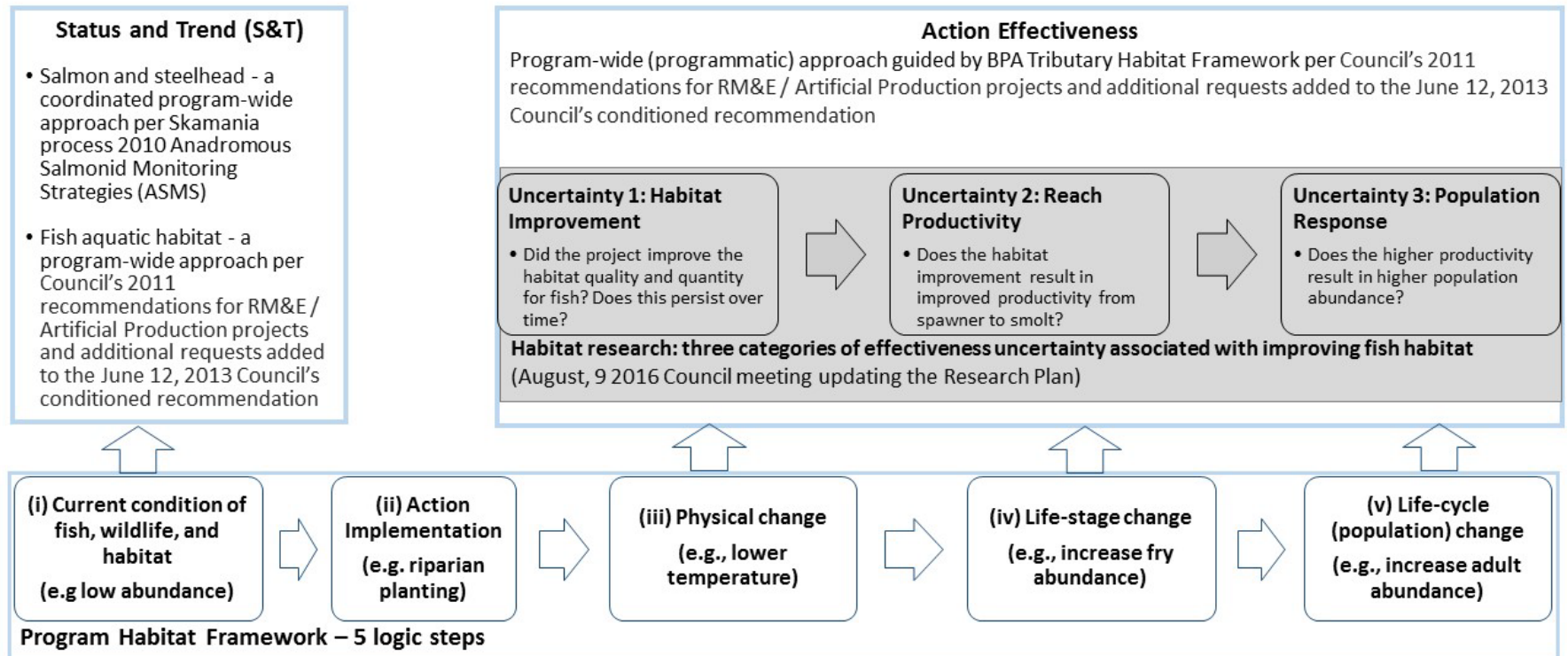
Related to the overall topic of monitoring and effectiveness research, Committee members also may want to discuss whether the monitoring and research guidance applied to all program strategies (e.g., habitat, predation, hydrosystem flow and passage, estuary) is appropriate for the Council's mitigation Program by considering questions such as:

- Is this information sufficient to assess the success of actions and, specifically, Program strategies?
- What amount of detail is needed to assess success?
- How can the risk-uncertainty matrix be used to inform this process (see Figure 2 risk-uncertainty matrix)?
- What level of understanding do we need to appropriately consider outside influences?

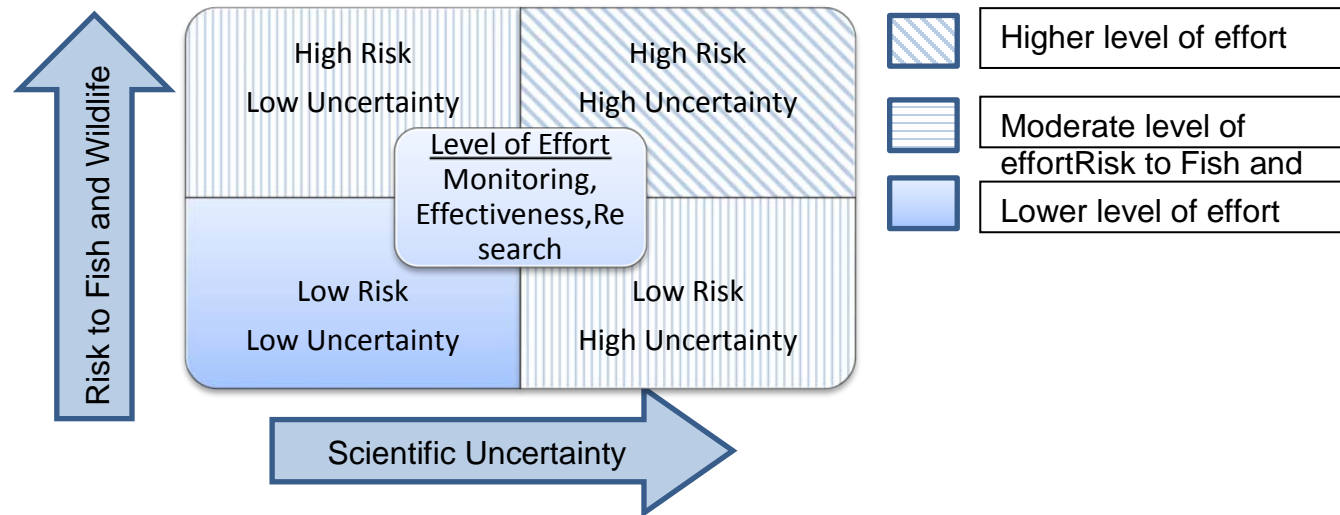
#### More Info:

- [2009 Program](#) amendment and [2014 Program](#) amendment
- Fish and Wildlife Program's [2012 RM&E / Artificial Production project review](#), [2013 Council recommendations](#), and Council's [decision letter](#) sent to Bonneville.
- Programmatic Issue #2 addresses the topic of tributary habitat effectiveness monitoring and evaluation. The Council's recommendation addressed:
  - Bonneville's *Columbia Basin tributary Habitat Improvement: A Framework for Research, Monitoring and Evaluation* ([Tributary Habitat Framework](#)),
  - Bonneville's program-wide approach to action effectiveness monitoring at the project/reach scale [document](#) (Project #[2016-001-00](#), *BPA Project Action Effectiveness Monitoring (AEM) Programmatic*),
  - Integrated Status and Effectiveness Monitoring Program (Project # [2003-017-00](#), *Integrated Status and Effectiveness Monitoring Program (ISEMP)*), and
  - Columbia Habitat Monitoring Program (Project #[2011-006-00](#), *Columbia Habitat and Monitoring Program - (CHaMP)*).
- 2007-ongoing, Pacific Northwest Aquatic Monitoring Partnership (PNAMP, [2004-002-00](#)) regional work on [IMW](#), [project effectiveness monitoring](#)
- 2003-2008 Collaborative Systemwide Monitoring and Evaluation Project ([CSMEP](#)), regional work on fish population and habitat data.
- 2007-2008 Ad Hoc Supplementation Monitoring and Evaluation Workgroup ([AHSWG](#)), regional work on hatchery fish.
- 2009-2012 Anadromous Salmonid Monitoring Strategy ([ASMS](#)), regional work fish populations.

**Figure 1:** The 5-logic steps of the program's habitat framework (blue boxes) and connection to the three categories of research effectiveness uncertainty (gray boxes) associated with improving fish habitat.



**Figure 2** Risk-uncertainty matrix guiding monitoring efforts for a given action (hatchery, hydrosystem, habitat), and biological status. Guidance also applies to effectiveness assessments and research (2014 Program [Adaptive Management](#)).



**Note:** the ISAB/ISRP suggested expanding the above conceptual two-dimensional matrix to a three-dimensional decision matrix by considering these three elements (see p.145 [ISAB/ISRP 2016-1](#)):

- Expected cost of the new information
- Expected benefit of the new information
- Value of information to reduce uncertainty of the proposed action

## Appendix A: Timeline of Events for Council Recommendation Programmatic #2

On June 11, 2011, the Council provided a [final recommendations](#) associated with the 2010-11 review of the *RME and AP Category* of projects. In this decision, one of the critical program-wide issues identified by the Council was whether the collective suite of ongoing and proposed projects is adequate to monitor and evaluate the effectiveness of our habitat actions in ultimately improving the population characteristics of key fish species and whether we be able to use what we learn to adapt the implementation and management of the Program (see page 8-19, [Programmatic Issue #2, Habitat effectiveness monitoring and evaluation](#)).

On January 10, 2013 the Council received a [submittal from Bonneville and NOAA Fisheries](#) for ISRP review. This submittal addressed part of the above Programmatic issue #2. In addition, Bonneville and NOAA Fisheries provided a [presentation/overview](#) of the submitted documents to the ISRP on January 11, 2013 and to the Fish and Wildlife Committee during the [January 15, 2013 meeting](#). The emphasis of the presentation was to explain Bonneville's proposed *Tributary Habitat Framework* including a discussion about how the proposed *AEM* will integrate with the program's habitat projects.

On March 11, 2013 the ISRP provided their review ([ISRP document 2013-2](#)) of documents submitted by Bonneville and NOAA, i.e., addressing habitat status and trend and effectiveness monitoring of habitat actions. The review was specific to the two existing projects, *ISEMP* and *CHaMP*, and to Bonneville's *AEM*. The ISRP did not provide comments on the overarching Bonneville's *Tributary Habitat Framework* document.

On April 9, 2013 the [ISRP presented](#) their findings to the Council.

On June 12, 2013, based on the ISRP review, the Council conditioned their recommendations in the [decision letter](#) sent to Bonneville for the continued implementation of *ISEMP* and *CHaMP* and supported the proposed *AEM* (see Appendix B). Among the Council's 13 conditions, the Council requested by 2014 a report on *ISEMP*'s IMW research hypotheses, an update on the three projects, and explanation and linkages of the RME activities across the entire Program and the other large monitoring programs in the Basin. The final request from the Council, a Comprehensive Report to be delivered in 2015, was to provide a comprehensive consideration of whether and how to transition *CHaMP* out of the pilot phase; to confirm or alter the timeline for completion and end of the Program funded IMW studies and the evolution of the rest of the *ISEMP* project; to confirm and implement or alter the *AEM* Approach to project-level effectiveness; and to flesh out, explain, and decide on the analytical framework for an overarching evaluation of the habitat monitoring and evaluation information.

On October 1, 2013 Bonneville provided a [response letter](#) to the Council that provided the requested information related to *ISEMP*'s IMW research hypothesis. Specially, the

key hypothesis being tested by *ISEMP*, the IMW locations where the hypothesis are being researched, schedule, status, and tentative answer to the hypothesis.

In May 2014, as recommended, Bonneville provided an [update](#) to the Fish and Wildlife Committee. The update provided an overview of how *AEM* would be implemented for each action category (e.g., fencing, logjams), status on *CHaMP* and *ISEMP*, and explained the linkages among RME activities across the Program and the Basin. During this update Bonneville presented a proposed timeline for submitting the requested Comprehensive Report that explains how projects integrate with the program-wide approach to effectiveness. This proposed timeline included a one year extension request until March 2016 for submitting this report to the Council for ISRP review.

At the March 2016 Council meeting Bonneville staff briefed the Fish and Wildlife Committee on their progress in addressing the Council's *2011 RME&AP Project Category Review* recommendation Programmatic issue #2 on habitat effectiveness monitoring and evaluation. The Bonneville presentation, referred to as [TRME Update briefing](#), included a high level summary of the current status of tributary habitat RME and progress on addressing Council recommendations. The TRME update also included the anticipated schedule for deliverables that will support evaluating and managing the tributary habitat RME program through 2018.

Since March 2016, Council and Bonneville staff have met periodically to ensure the Comprehensive Report being prepared by Bonneville will address the Council's June 12, 2013 conditional recommendation on Programmatic Issue #2, as well as the 2014 Program guidance.



**Appendix B:** Status of the 13 conditions sent to Bonneville in the Council's June 17, 2013 Decision letter related to the Council's 2011 RME&AP Project Category Review recommendations (see Attachment A for decision letter).

#	Council Conditions	Status
1	The scope of CHaMP (Project #2011-006-00) should remain in a pilot phase until there is stability in the data collection protocols and the evaluation analysis has been developed, and has undergone further ISRP and Council review. Broader implementation will depend on receiving a Council recommendation to proceed.	<b>Completed.</b> CHaMP is implemented in a subset of the proposed watershed.
2	The AEM Approach to monitoring and evaluating project-level effectiveness should be further developed through a pilot effort, such as is proposed and described in the AEM document, and then the results subject to further review before implementation beyond 2015 <sup>2</sup>	<b>Partially Completed.</b> Bonneville initiated development of a pilot AEM project in 2011.  On January 10, 2013 Bonneville submitted the proposed approach for a program-wide AEM Bonneville Project Action Effectiveness Monitoring (AEM) Programmatic <a href="#">2013 document</a> (project proposal # <a href="#">2016-001-00</a> )  Awaiting results from pilot implementation that will be part of Comprehensive Report due later in 2016 (see box # 5).
3	The CHaMP and ISEMP projects and the AEM Approach as it is developed should be subject to continued oversight by Bonneville, the Council and the ISRP, including submission of reports for review on an annual basis for Projects #2003-017-00 (ISEMP) and #2011-006-00 (CHaMP) and an overall status update for the AEM	<b>Ongoing</b> Oversight occurs through annual project reports, Bonneville discussions with the project sponsors, and Bonneville-Council staff discussions.

<sup>2</sup> According to the documents provided by Bonneville, the AEM Approach will be refined during 2013 and 2014 and completed by 2015, effecting a transition from the existing approach to monitoring and assessing how actions directly affect the local habitat. A pilot effort at implementing AEM will also occur in 2014, consistent with concurrent monitoring by the Washington SRFB program. Based on the results of this pilot, a schedule for AEM for the remaining action categories will be developed by 2015. The intent is to implement AEM using an appropriate sample size for all project categories by 2018 (e.g. not all projects within a category of habitat restoration will need monitoring). Evaluation of completed habitat actions using an EPT design will begin with barrier removals in 2013 or 2014 and move to other action categories in future years, with the hope to complete EPT evaluations of a subset of all actions categories by 2018 if not sooner.



	<p>Approach which will be implemented under a number of projects. Among other things, the review of these activities in 2014 should address the questions and comments provided by the ISRP in this year's review (ISRP document 2013-02). The project sponsors and Bonneville should submit the needed information for this review no later than March 2014</p>	
4	<p>In addition, the document submitted for review in 2014 should explain how these tributary habitat monitoring and evaluation activities link to and integrate into the monitoring, evaluation, reporting and data management effort for the entire program, including</p> <ul style="list-style-type: none"> <li>• for the tributaries (ISEMP, CHaMP and AEM), the estuary (CEERP),</li> <li>• artificial production (such as the CHREET proposal);</li> <li>• Bonneville's data management framework,</li> <li>• the Coordinated Assessment (CA) data sharing effort,</li> <li>• and other large scale aquatic monitoring programs occurring within the Basin that are funded by other agencies such as PIBO and AREMP</li> </ul>	<p><b>Completed</b></p> <p>On January 10, 2013 Bonneville submitted Bonneville's Effectiveness Guidance in Columbia Basin Tributary Habitat Improvement: <a href="#">A framework for Research Monitoring and Evaluation</a>.</p> <p>In May 2014, as recommended, Bonneville provided an <a href="#">update</a> to the Fish and Wildlife Committee that provided an overview of how <i>AEM</i> would be implemented for each action category (e.g., fencing, logjams), status on <i>CHaMP</i> and <i>ISEMP</i>, and explained the linkages among RME activities across the Program and the Basin.</p>
5	<p>Subsequent ISRP and Council review and recommendations for the two existing Program projects (ISEMP and CHaMP) should follow the timeline and transition as described in the AEM Approach documents (See above footnote 1). That is, the [Comprehensive Report] submission and the review in 2015 should be used for a comprehensive consideration of</p> <ul style="list-style-type: none"> <li>• whether and how to transition CHaMP out of the pilot phase;</li> </ul>	<p><b>Incomplete</b></p> <p>At the March 2016, Bonneville briefed the Fish and Wildlife Committee a high level summary of the current status of tributary habitat RME and progress on addressing Council recommendations. The TRME update also included the anticipated schedule for deliverables that will support evaluating and managing the tributary habitat RME program through 2018 ( see <a href="#">TRME Update briefing</a>). <i>[note: this briefing</i></p>

	<ul style="list-style-type: none"> <li>to confirm or alter the timeline for completion and end of the Program funded IMW studies and the evolution of the rest of the ISEMP project;</li> <li>to confirm and implement or alter the AEM Approach to project-level effectiveness;</li> <li>and to flesh out, explain and decide on the analytical framework for an overarching evaluation of the habitat monitoring and evaluation information.</li> <li>This submittal should be no later than March 2015</li> </ul>	<p><i>included a Bonneville requested an extension to later in 2016 for submitting the Comprehensive Report.]</i></p> <p>Since March 2016, Council and Bonneville staff have met periodically to ensure the Comprehensive Report being prepared by Bonneville will address the Council's June 12, 2013 conditional recommendation on Programmatic Issue #2</p>
6	<p><u>ISEMP &amp; IMWs</u></p> <p>1. Complete the individual research initiatives that are already underway (i.e. finish the post-monitoring if the premonitoring and implementation have been completed).</p>	<p><b>Unknown</b></p> <p>Status to be confirmed with Bonneville. In a 2013 email from Lori Bodi to Members Karier and Rockefeller, stated:</p> <ul style="list-style-type: none"> <li>- 2014 tentatively plan to complete Bridge Creek Study;</li> <li>-2018-2019 expect habitat actions to be completed in Lemhi and Entiat, and will track results.</li> <li>- anticipate savings in 2014 and beyond</li> </ul>
7	<p><u>ISEMP &amp; IMWs</u></p> <p>2. Don't start any new research initiatives or extend any ongoing initiatives. These require new proposals and review.</p>	<p><b>Unknown</b></p> <p>Status to be confirmed with Bonneville. In a 2013 email from Lori Bodi to Members Karier and Rockefeller, stated Bonneville is in agreement with this recommendation.</p>
8	<p><u>ISEMP &amp; IMWs</u></p> <p>3. All ongoing ISEMP and IMW research must report to the Council the hypotheses they are currently testing by August 1, 2013. All new research must include hypotheses.</p>	<p><b>Completed</b></p> <p>On October 1, 2013 Bonneville provided a response <a href="#">letter</a> to the Council that provided the requested information related to <i>ISEMP's</i> IMW research hypothesis</p> <p>More recent progress to be communicated as part of Comprehensive Report (see #5 above)</p>
9	<p><u>CHaMP</u></p> <p>4. Must demonstrate full integration with existing data metrics (including PIBO, AREMP, ....). The goal is to</p>	<p><b>Unknown</b></p> <p>Should be part of Comprehensive Report due later in 2016 (see box # 5).</p>

	consolidate multiple data series, not create a new one.	In a 2013 email from Lori Bodi to Members Karier and Rockefeller, stated discussions/work was ongoing with USFS and other sponsors.
10	<u>CHaMP</u> 5. Explain how CHaMP data will be analyzed to evaluate habitat actions. Identify who will conduct the research and by what time.	<b>Unknown</b> Should be part of Comprehensive Report due later in 2016 (see box # 5).  In a 2013 email from Lori Bodi to Members Karier and Rockefeller, stated that his would be addressed in the 3-year synthesis report on habitat trends to be submitted to the Council in 2014. Some of this was discussed in the May 2014 Bonneville <a href="#">update</a> .
11	<u>Action Effectiveness Monitoring</u> , 6. Review all proposed metrics with the Council and fully deploy this monitoring after a 2 year pilot	<b>Partially Completed.</b> Bonneville initiated development of a pilot AEM project in 2011 and submitted a proposed approach (see Box # 2 above).  In a 2013 email from Lori Bodi to Members Karier and Rockefeller, stated Bonneville was in agreement.  Information needed prior to full deployment will be part of Comprehensive Report due later in 2016 (see box # 5).
12	<u>Juvenile Fish Productivity</u> 7. Bonneville must report to the Council on the status of this data as well as where and how it is being used to evaluate habitat actions.	<b>Incomplete</b> In a 2013 email from Lori Bodi to Members Karier and Rockefeller, stated Bonneville was in agreement and had ongoing efforts to improve this reporting.  Coordinated Assessment is actively working on coordinating this information for regional data sharing and should provide part of the requested information.

		Should be addressed in the Comprehensive Report due later in 2016 (see box # 5).
13	<u>Budget</u> 8. Application of these recommendations should produce a significant reduction in FY2014 costs for ISEMP & IMWs, and CHaMP from projected levels (\$5,000,000 and \$2,933,062). Future budgets and expected work should be reviewed by the Council when they are developed.	<p><b>Dependent on ISRP's review and Council's</b> recommendation of the Comprehensive Report due later in 2016 (see box # 5).</p> <p>In a 2013 email from Lori Bodi to Members Karier and Rockefeller, stated:</p> <ul style="list-style-type: none"> <li>- anticipate savings of up to 460k in 2015 and beyond as Bridge Creek study is completed.</li> <li>- expect some savings as Lemhi and Entiat work is completed</li> <li>-Savings from CHaMP project as metrics are refined may be small compared to overall deployment costs.</li> <li>-important to note that we do not intend to increase CHaMP budget unless existing projects, including PIBO, are not able to meet the BiOP need of one population per MPG.</li> <li>- anticipate future savings from projects that included monitoring where that I no longer needed because of the programmatic approach and efficiencies associate with combined sampling (e.g. PIBO).</li> </ul>

**Appendix C:** The Council decision letter to Bonneville regarding the conditioned recommendation for Programmatic issue 2.

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June 17, 2013

Mr. William C. Maslen  
Manager, Fish and Wildlife Division  
Bonneville Power Administration  
P.O. Box 3621  
Portland, Oregon 97208

Dear Mr. Maslen:

The purpose of this letter is to advise you of the Council's decision on a 2008 Federal Columbia River Power System (FCRPS) Biological Opinion (BiOp) project. This recommendation was made by the Council at its meeting on June 12, 2013.

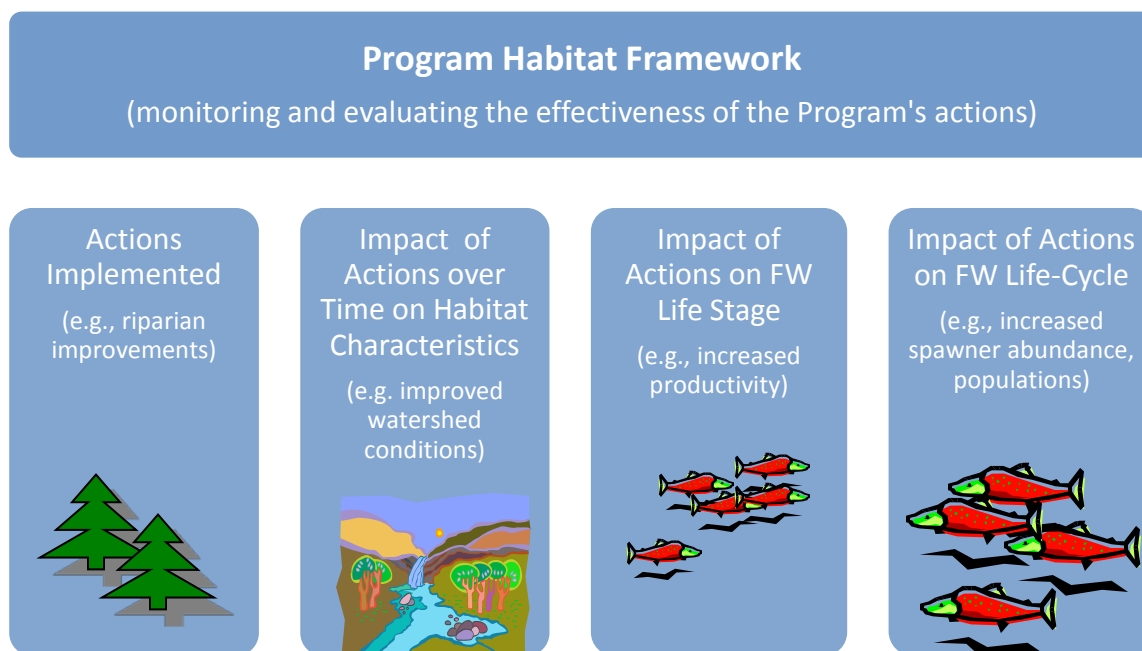
In addition, a purpose of this letter is to inform the project sponsor and other interested parties of the status of this Council action. The following is a summary of the Programmatic Issue and action taken by the Council at the meeting in June (please see pages 7 - 9 for the specific decision language).

***ISEMP, CHaMP, and Action Effectiveness Monitoring, a Programmatic Issue #2 as part of the RME and AP Category review.***

The Council's Fish and Wildlife Program is "a habitat-based Program," aiming "to rebuild healthy, naturally producing fish and wildlife populations by protecting, mitigating, and restoring habitats and the biological systems within them." The Fish and Wildlife Program (Program) thus depends heavily on actions in the mainstem, tributaries and estuary intended to protect or improve habitat characteristics as the way in which the Program will ultimately protect, mitigate and enhance fish and wildlife populations adversely affected by the hydrosystem. The Federal Columbia River Power System (FCRPS) Biological Opinion (BiOp) also builds on the same conceptual foundation and the analysis supporting the conclusions in the BiOp includes quantitative estimates of the improvements in life-stage survival to be gained from habitat actions in all areas.

It is critical for the Program and the BiOp that appropriate monitoring and reporting is conducted to assess whether the habitat actions are resulting in the intended environmental and biological improvements. For this reason, one of the key programmatic issues identified by the Council during its 2010-11 review of the *RME and AP Category* of projects, was whether the collective suite of ongoing and proposed habitat monitoring and evaluation projects<sup>3</sup> are adequate to monitor and evaluate the effectiveness of our habitat actions to improve the targeted habitat characteristics and then result in the desired improvements in the population characteristics of key fish species. See Figures 1 and 2; see *also* Programmatic Issue #2, Habitat effectiveness monitoring and evaluation, in the Council final decision in the RME review of June 11, 2011.

**Figure 1. Program Habitat Framework:** The Program Habitat Framework depicts the four main steps used to evaluate whether the actions implemented under the Fish and Wildlife Program are effective in producing the intended change needed to mitigate for the impacts of the hydrosystem on the Basin's fish, wildlife and their habitat. These four steps consists of (1) implementing actions such as planting riparian vegetation; (2) determining if the actions have produced over time the intended change in habitat characteristics such as improving the watershed condition for fish; (3) determining whether these cumulative changes in the habitat characteristics have resulted in the desired improvements at the targeted life-stages for fish and wildlife; and, (4) whether these cumulative changes in the habitat characteristics and/or improvements at the targeted life-stage have resulted in the expected changes in the life-cycle of fish and wildlife populations.



<sup>3</sup>Attachment 1 provides a description of two key projects (i.e., CHaMP and ISEMP) associated with habitat effectiveness monitoring and evaluation.



The Council conditioned the entire set of habitat m&e projects from the *RME and AP Category* review with the Council programmatic recommendation. Following is the specific language for Programmatic Issue #2 as approved and recommended by the Council.

- *Revise the CHaMP project and implementation plan and further develop the other elements of the habitat monitoring and evaluation effort consistent with the ISRP's review conclusions and do so in collaboration with the ISRP and the Council and its staff, as well as the basin's other participants in habitat monitoring and evaluation. This cannot be simply a federal agency effort imposed on the Fish and Wildlife Program, even as the Council is also sensitive to the federal agencies' need to meet Biological Opinion requirements. An overarching goal should be that what is developed and implemented is a cost-effective, standardized, independent, statistically valid approach for evaluating habitat effectiveness. Decisions regarding the implementation and sequencing of CHaMP should be driven primarily by how well the scientific review issues have been addressed and not by other considerations.*
- *Implement the CHaMP project through an incremental approach, consistent with the ISRP's review conclusions (i.e., pilot effort).*
- *Within one year, NOAA and Bonneville, working with other relevant participants, should further develop the analytical, evaluation and reporting elements of the habitat effectiveness monitoring and evaluation effort to accompany the CHaMP monitoring, consistent with the ISRP's review conclusions. The agencies should then produce a clear statement about those elements for the ISRP and Council to review.*
- *All projects involved in this review that are part of the overall habitat effectiveness monitoring and evaluation effort will receive implementation recommendations consistent with these principles, allowing for significant reshaping of the projects as the elements are better developed and reviewed. The Council expects the main focus of any reshaping to be primarily on CHaMP and other habitat monitoring projects.*
- *With regard to the monitoring and evaluation of how effective specific habitat projects are at obtaining and sustaining targeted changes in habitat characteristics (project effectiveness): Within the year Bonneville and its partners should develop for ISRP review a proposal to transform that effort away from monitoring work elements on individual projects into a cost-effective, independent third-party, standardized, and statistically valid method for evaluating project-level effectiveness. This transformation should be ready in time for the geographic review of habitat actions. Also, the development and review of analytical methods and models called for above should include consideration of how to use information on project or site-level effectiveness in the overall evaluation of the effectiveness of our collective habitat work in realizing improvements in habitat and fish characteristics at the population and watershed level.*

On January 10, 2013 the Council received a submittal from Bonneville and NOAA Fisheries for ISRP review. The intent of this submittal is to address the above recommendation. In addition, on January 11, 2013 Bonneville and NOAA Fisheries provided an overview of the submitted documents to the ISRP. This presentation was also made to the Fish and Wildlife Committee at their January meeting. The emphasis of the presentation was the proposed coordinated action effectiveness monitoring approach and how the project sponsors would apply this approach.

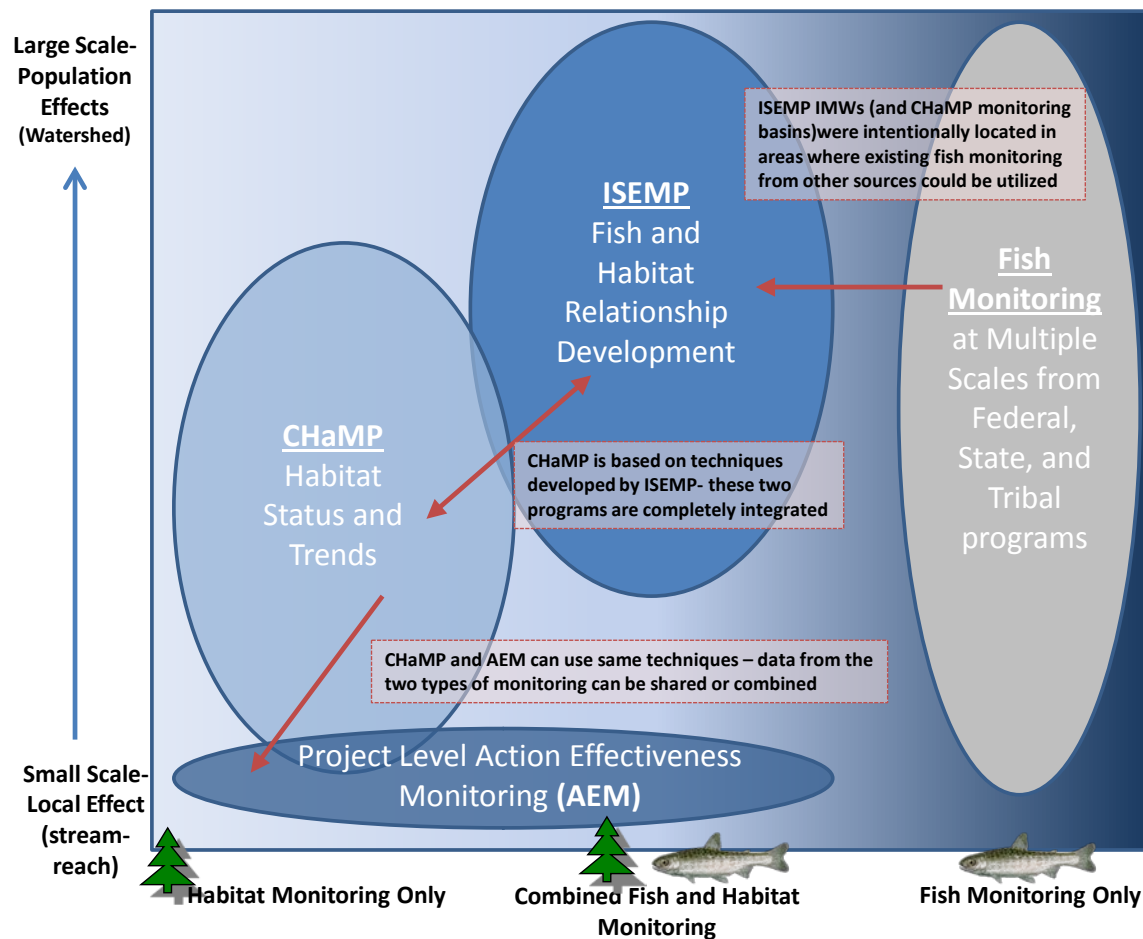
The documents submitted to the ISRP for review and contextual understanding included the following.

- *Columbia Basin Tributary Habitat Improvement: A Framework for Research, Monitoring and Evaluation, January 2013.* This document is provided as context and background for the three other documents. This document provides an overview of how the components of tributary monitoring, including the work done by CHaMP, ISEMP and the newly developed tributary habitat action effectiveness approach described in the last bullet all contribute to informing tributary monitoring. The Tributary Habitat Framework document was not prepared as a typical scientific document and should not require a formal ISAB or ISRP review.
- *CHaMP: 2011 Pilot Year Lessons Learned Project Synthesis Report. March 31, 2012.* This report reports data and results from 2011, which was the first year of implementation for the CHaMP pilot level project (Project #2011-006-00) as requested from Council. The CHaMP project is intended to implement a habitat monitoring protocol for fish habitat status and trends throughout the anadromous portion of the Columbia Basin using an approach to standardized data collection and management that will allow effective analysis at different spatial scales.
- *The Integrated Status and Effectiveness Monitoring Program: Lessons Learned Synthesis Report 2003-2011. July 6, 2012.* This report summarizes work completed by the ISEMP Project (#2003-017-00) that tests and develops fish and habitat monitoring methods, data management tools, and data analysis methods for general use by Fish and Wildlife monitoring projects across the interior Columbia River Basin. This project also contributes to our understanding the effectiveness of habitat actions by summarizing findings associated with its testing and development work. This work represents the summary of the work completed by ISEMP from 2002 - 2011 conducted in several watersheds across the Columbia Basin.
- *Action Effectiveness Monitoring of Tributary Habitat Improvement: a Programmatic Approach for the Columbia Basin Fish and Wildlife Program, dated January 8, 2013.* This document responds to ISRP and Council recommendations to move towards a standardized, programmatic approach to individual project level action effectiveness monitoring (i.e., AEM Approach). This paper provides many of the details of how Bonneville will move to implement a standardized program which will be implemented in phases beginning as early as 2013. The AEM Approach includes a pilot implementation period during 2013-2014 that transforms how action effectiveness monitoring is conducted away from an uncoordinated, project by project, approach to a coordinated, cost-effective, standardized, and statistically valid method for assessment. Bonneville

will also use the AEM Approach to integrate monitoring and evaluation of completed, existing and new habitat actions to better evaluate and report on the effectiveness of all actions funded through the Program.

Figure 2 illustrates how all the pieces of the habitat monitoring and evaluation effort fit together and relate to the program action framework.

**Figure 2. Visualization of how the components of monitoring work contribute to the overall tributary monitoring needs, including project compliance, action effectiveness at the project and watershed scale, status and trend of habitat and fish, and reporting needs. The components illustrated in this figure link up to the Program's Habitat Framework by providing the data needed to inform the status of the stream habitat (i.e., CHaMP), the status of fish (i.e., fish monitoring), which is used to inform whether the habitat actions implemented correspond to a change in habitat characteristics and in fish characteristics at both the life stage and life-cycle level (e.g., ISEMP).**



On March 11, 2013 the ISRP provided their review (ISRP document 2013-02) of documents submitted by Bonneville addressing habitat status and trend and effectiveness monitoring of

habitat actions. The review was specific to the two existing projects, ISEMP and CHaMP, and to the new AEM Approach. The ISRP did not provide comments on the overarching Tributary Habitat Framework document

On April 9, 2013 the ISRP presented their findings to the Council. The presentation included a high level overview of Bonneville's ongoing RM&E efforts, including ISEMP, followed by an update on CHaMP implementation through the first two years of pilot level implementation. The presentation also addressed the proposed AEM Approach.

## **ANALYSIS**

The ISRP commented, several times, on the hard work that has taken place in getting the monitor and evaluation approach to this stage. In addition, the review panel continues to stress the critical nature of this effort to demonstrate the progress that can be achieved through habitat actions in the Program. For the two existing Program projects, ISEMP and CHaMP, the review panel found that they meet science review criteria and provided a Meets Scientific Review Criteria (Qualified) recommendation. Though, not specific the qualifications associated with the two projects address the desire to continue to review and assist in the development and refinement through time of this effort. As for the AEM Approach the ISRP found it to be operationally and scientifically sound for effectiveness monitoring of habitat actions over many projects rather than focusing in on specific projects. Since this was not a recognized Program project, but an approach intended to be applied to the Program's habitat projects the ISRP did not provide a specific review recommendation. As you will note (see comments below) the ISRP indicates support for this AEM Approach but requested that additional detail and discussion occur as it develops. The ISRP did not provide written comments on Bonneville's Tributary Habitat Framework as this was provided as context to the other three documents.

The ISRP provided an extensive review of the two existing projects, ISEMP and CHaMP, and the proposed AEM Approach. The ISRP provided specific review recommendation as well as, additional comments and suggestions for the three key documents that were submitted for review (see ISRP document 2013-02). The specific review recommendations are as follows:

### ISEMP, Project #2003-017-00

#### *Meets Scientific Review Criteria (Qualified)*

- *ISEMP has become one of the most important monitoring programs in the Columbia River Basin. Because it employs a variety of novel techniques, it is essential that ISEMP collaborate with other large-scale monitoring efforts to maximize data sharing and opportunities for learning.*
- *To facilitate coordination and collaboration ISEMP, along with other major monitoring organizations, should promote annual meetings to exchange results and lessons learned.*
- *The ISRP should continue to review ISEMP progress reports as they become available.*

- *The ISRP continues to support Intensively Monitored Watersheds as venues for establishing relationships between habitat restoration and fish populations. New watersheds to be designated as IMWs should meet strict criteria for experimental design, including well-situated treatment and control sites, statistically sound sampling regimes, careful selection of response metrics, and commitment to long-term evaluation.*

#### CHaMP, Project #2011-006-00

##### *Meets Scientific Review Criteria (Qualified)*

- *CHaMP should continue its efforts to consolidate and streamline habitat measurements, as well as eliminate metrics that do not provide useful information. Excellent progress has been made, and additional work will result in a set of protocols that can be employed in a wide variety of locations.*
- *We recommend that CHaMP be open to inclusion of metrics that go beyond the characterization of physical habitat, such as additional measures of food webs and the condition of watersheds outside the boundaries of streams and their immediate riparian areas.*
- *The ISRP suggests that CHaMP look for opportunities to improve collaboration with other habitat monitoring efforts to improve sampling efficiencies and promote coordination with organizations having similar interests (e.g., PACFISH/INFISH Biological Opinion Effectiveness Monitoring Program [PIBO] and the Aquatic and Riparian Effectiveness Monitoring Plan [AREMP]; water quality monitoring programs).*
- *The ISRP finds that CHaMP's pilot phase has shown sufficient progress that potential expansions of the suite of sites visited is justified, but with caution as sampling protocols continue to be refined and funding for field crews grows.*
- *As with ISEMP, the ISRP would like the opportunity to review CHaMP progress reports as they become available.*

#### AEM Approach

- *The AEM Approach should be more explicit about how the AEM Approach can be integrated with the ISEMP, CHaMP, PIBO, Pacific Northwest Aquatic Monitoring Partnership (PNAMP), and Salmon Recovery Funding Board (SRFB) monitoring programs.*
- *We recommend that the AEM Approach include a more complete discussion of how preferred experimental designs can be modified to fit particular situations and restoration questions. We know that the authors do not mean to advocate rigid one-size-fits-all approaches for different restoration categories, but restoration practitioners would appreciate more discussion about how monitoring can be tailored to unique circumstances.*
- *The ISRP recommends that the AEM Approach include consideration of alternative analysis techniques, including Bayesian methods.*

## **RECOMMENDATION**

Based on the ISRP review, the Council supports the continued implementation of ISEMP and CHaMP and support the proposed AEM Approach as defined by this review. It is clear from the submittal received and the comments provided by the ISRP that the current effort is scientifically sound and is a much needed part of the overall monitoring and evaluation needs of the Program in order to assess the effectiveness of tributary habitat projects that are so central to the success of the Program.

This recommendation is conditioned by the following:

- **The scope of CHaMP (Project #2011-006-00) should remain in a pilot phase until there is stability in the data collection protocols and the evaluation analysis has been developed, and has undergone further ISRP and Council review. Broader implementation will depend on receiving a Council recommendation to proceed.**
- **The AEM Approach to monitoring and evaluating project-level effectiveness should be further developed through a pilot effort, such as is proposed and described in the AEM document, and then the results subject to further review before implementation beyond 2015. <sup>4</sup>**
- **The CHaMP and ISEMP projects and the AEM Approach as it is developed should be subject to continued oversight by Bonneville, the Council and the ISRP, including submission of reports for review on an annual basis for Projects #2003-017-00 (ISEMP) and #2011-006-00 (CHaMP) and an overall status update for the AEM Approach which will be implemented under a number of projects. Among other things, the review of these activities in 2014 should address the questions and comments provided by the ISRP in this year's review (ISRP document 2013-02). The project sponsors and Bonneville should submit the needed information for this review no later than March 2014.**
- **In addition, the document submitted for review in 2014 should explain how these tributary habitat monitoring and evaluation activities link to and integrate into the monitoring, evaluation, reporting and data management effort for the entire program, including for the tributaries (ISEMP, CHaMP and AEM), the estuary (CEERP), artificial production (such as the CHREET proposal); Bonneville's data management framework, the Coordinated Assessment (CA) data sharing effort, and**

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<sup>4</sup> According to the documents provided by Bonneville, the AEM Approach will be refined during 2013 and 2014 and completed by 2015, effecting a transition from the existing approach to monitoring and assessing how actions directly affect the local habitat. A pilot effort at implementing AEM will also occur in 2014, consistent with concurrent monitoring by the Washington SRFB program. Based on the results of this pilot, a schedule for AEM for the remaining action categories will be developed by 2015. The intent is to implement AEM using an appropriate sample size for all project categories by 2018 (e.g. not all projects within a category of habitat restoration will need monitoring). Evaluation of completed habitat actions using an EPT design will begin with barrier removals in 2013 or 2014 and move to other action categories in future years, with the hope to complete EPT evaluations of a subset of all actions categories by 2018 if not sooner.



other large scale aquatic monitoring programs occurring within the Basin that are funded by other agencies such as PIBO and AREMP.

- Subsequent ISRP and Council review and recommendations for the two existing Program projects (ISEMP and CHaMP) should follow the timeline and transition as described in the AEM Approach documents (See footnote 2 above). That is, the submission and the review in 2015 should be used for a comprehensive consideration of whether and how to transition CHaMP out of the pilot phase; to confirm or alter the timeline for completion and end of the Program funded IMW studies and the evolution of the rest of the ISEMP project; to confirm and implement or alter the AEM Approach to project-level effectiveness; and to flesh out, explain and decide on the analytical framework for an overarching evaluation of the habitat monitoring and evaluation information. This submittal should be no later than March 2015.

The Council added the following recommendations at their meeting on June 12, 2013:

- ISEMP & IMWs
  1. Complete the individual research initiatives that are already underway (i.e. finish the post-monitoring if the premonitoring and implementation have been completed).
  2. Don't start any new research initiatives or extend any ongoing initiatives. These require new proposals and review.
  3. All ongoing ISEMP and IMW research must report to the Council the hypotheses they are currently testing by August 1, 2013. All new research must include hypotheses.
- CHaMP
  4. Must demonstrate full integration with existing data metrics (including PIBO, AREMP, ...). The goal is to consolidate multiple data series, not create a new one.
  5. Must explain how CHaMP data will be analyzed to evaluate habitat actions. Identify who will conduct the research and by what time.
- Action Effectiveness Monitoring
  6. Review all proposed metrics with the Council and fully deploy this monitoring after a 2 year pilot.
- Juvenile Fish Productivity

**7. Bonneville must report to the Council on the status of this data as well as where and how it is being used to evaluate habitat actions.**

- **Budget**

**8. Application of these recommendations should produce a significant reduction in FY2014 costs for ISEMP & IMWs, and CHaMP from projected levels (\$5,000,000 and \$2,933,062). Future budgets and expected work should be reviewed by the Council when they are developed.**

Sincerely,

**Signed/ T. Grover/6/17/2013**

Tony Grover  
Director, Fish and Wildlife Division

cc: Marcy Foster, BPA  
Peter Lofy, BPA  
Paul Krueger, BPA  
Greg Dondlinger, BPA  
Jason Sweet, BPA  
Russell Scranton, BPA  
David Byrnes, BPA  
Phil Roni, NOAA  
Chris Jordan, NOAA

**Attachment 1: Description of the two ongoing projects associated with tributary habitat effectiveness monitoring.**

Project #2003-017-00, *Integrated Status and Effectiveness Monitoring Program* (ISEMP)

The ISEMP is a monitoring and evaluation design and testing project that was initiated in 2003 as a series of pilot subbasin scale test-beds for monitoring indicators and metrics, sampling designs, evaluation procedures, data management and communication processes, and large-scale coordination and implementation logistics. Originally begun in three pilot subbasins, Wenatchee/Entiat, John Day and the Salmon, the project now includes random habitat status and trend monitoring in the Methow and Entiat Subbasins, and an extensive program of installing and operating and maintaining instream PIT tag detection arrays in the Snake River basin in collaboration with co-managers in Oregon and central Idaho.

The ISEMP pilot was initiated in 2003 and was initially focused on monitoring program development. Early efforts were focused in the Wenatchee River basin through the collection of stream habitat and juvenile salmonid population data (2004 – present). The project then expanded to develop restoration project effectiveness monitoring techniques and evaluation methods. These efforts were first piloted in the Entiat River (2006) and then expanded to work in the John Day and Salmon River basins, with full implementation beginning in 2009 across these watersheds.

In 2010, through the Fast-Track process, ISEMP was asked to take on the additional scope of developing a network of in-stream PIT tag detection arrays that linked the fish and habitat monitoring programs. This request was based on a requirement in NOAA Fisheries' 2010 FCRPS supplemental BiOp to provide additional monitoring of both fish and habitat in key FCRPS BiOp population watersheds. To meet the habitat monitoring component of that new BiOp requirement, ISEMP spun off a stream habitat monitoring program, the Columbia Habitat Monitoring Program (CHaMP), which used methods developed by ISEMP but that was initiated as a separate project (2011-006-00) in 8 watersheds during 2011.

The focus of ISEMP is shifting away from method development and has now provided results from its monitoring efforts that meet the Council and ISAB's call for products that are useful for management decisions. Currently, ISEMP implements three IMWs (Entiat (2009-2020), Bridge Creek (2008-2017), Lemhi (2009-2018)), three population and habitat status and trends monitoring watersheds (Wenatchee, John Day and South Fork Salmon) and a network of approximately 50 in-stream PIT tag detection sites. While there may be a need for continued status and trend monitoring of both fish and habitat conditions

beyond 2018, the three ISEMP IMW experiments all have expected sunset dates in the 2017-2020 timeframe.

Currently, ISEMP is a key component to Bonneville's framework for the development of regionally supported status and effectiveness monitoring and has provided evaluation methods that directly meet the region's data and information needs with regards to the management of anadromous salmonid populations and habitat. These efforts are necessary for testing sampling design, data management, implementation and coordination logistics and protocols. They serve a simultaneous need by providing the co-manager community with extensive data-sets with well defined objectives, scope and quality controlled metadata. The project has also established itself as a resource for the development and testing of data management and communication tools and skills, development and testing of novel protocols, indicators and technologies, and the development and testing of an experiment-driven approach to monitoring and evaluation design and implementation. Washington Dept. of Fish & Wildlife, Idaho Dept. of Fish & Game, Oregon Dept. of Fish & Wildlife as well as many Tribal programs throughout the Columbia Basin such as the CRITFC, Nez Perce, and the Colville Nation's OBMEP program are either using techniques developed by ISEMP or are directly contributing to current efforts..

Currently the project has an approved expense budget of \$5 million and has contracted \$3,812,800 for Fiscal Year 2013. Currently there are 12 contracts associated with this project.

#### Project #2011-006-00, *Columbia Habitat and Monitoring Program - Pilot (CHaMP-P)*

The purpose of this project is to implement a habitat monitoring protocol for fish habitat status and trends throughout the portion of the Columbia Basin that is accessible to anadromous salmonids using a programmatic approach to standardized data collection and management that will allow effective data summarization at various spatial scales important for the management of fish and habitat.

CHaMP was first proposed in 2010 for implementation in 26 Columbia Basin watersheds. As mentioned above in the ISEMP summary, this proposal was to address new conditions in the 2010 supplemental FCRPS BiOp released by NOAA Fisheries. CHaMP was implemented in 2011 as a pilot project in eight Columbia Basin watersheds (i.e., John Day, Upper Grande Ronde, Tucannon, SF Salmon, Lemhi, Wenatchee, Entiat, and Methow), per the Council recommendations on June 11, 2011 associated with the *RME and AP Category* review.

The goal of CHaMP is to provide information on the status/trends in habitat conditions, and will support habitat restoration, rehabilitation and conservation

actions, performance assessments, and the adaptive management requirements of the 2008 FCRPS BiOp. In addition, the CHaMP helps to meet the FCRPS BiOp by characterizing stream and fish responses to watershed restoration and/or management actions in at least one population within each steelhead and Chinook major population group (MPG) which have, or will have, fish in-fish out monitoring. The original 26 watersheds identified for CHaMP include: Hood River, Wind River, Toppenish, Klickitat, Fifteen Mile, Lower Mainstem JD, North Fork JD, Upper Mainstem JD, Middle Fork JD, South Fork JD, Umatilla, Upper Grande Ronde, Catherine Ck, Imnaha, Lolo Ck, Tucannon, Asotin, SF Salmon, Big Ck, Lemhi, Pahsimeroi, Yankee Fork, Wenatchee, Entiat, Methow, and Okanogan. These watersheds were chosen to maximize the contrast in current habitat conditions and also represent a temporal gradient of expected change in condition through planned habitat actions. CHaMP collaborators will be supported by cross-project data management, stewardship and analysis staff, annual pre- and post-season meetings, annual field protocol and data management tool implementation training sessions.

Currently the project has an approved expense budget of \$2,933,062 for Fiscal Year 2013. Currently there are seven contracts associated with this project. The CHaMP project handles administrative agreements for project collaboration primarily as coordinated contracts between Bonneville and numerous Program projects to meet data needs. In addition, two other contracts (Project #1998-016-00 and #2009-004-00) were modified to facilitate participation in CHaMP by ODFW (approximately \$50,571 annually) and CRITFC (Accord project, through close coordination), respectively.

In 2013, the Shoshone Bannock tribe will use techniques developed by CHaMP to monitor the effectiveness of their recent habitat restoration actions on the Yankee Fork Salmon River Restoration (Project #2002-059-00) and the Umatilla Nation is also looking to the CHaMP program for action effectiveness in their program as well. The adoption of CHaMP methods for use in action effectiveness monitoring is a demonstration of the utility and flexibility of these methods across Bonneville's RM&E program.



# Past, Current and Where We are Headed: *monitoring and action effectiveness*



Post Condit Dam removal (2012)

**Council staff**  
**September 13, 2016**  
**Fish and Wildlife Committee, Spokane, Washington**



# Today's Research, Monitoring, and Effectiveness Topics

- How Program guidance has changed over-time
- What we need to know about mitigation actions and their effects
- Moving towards implementing a program-wide approach
- Will this approach provide information needed to guide mitigation in a cost-effective manner?

# How Program Guidance for Research, Monitoring and Effectiveness has Changed Over-time

**progressing from individual to coordinated program-wide effort**

# Program Guidance - 1980 to present

*Monitoring, Effectiveness, Research*

## **1982 and 1984 FW Program**

- Very specific independent studies, with no overarching framework

# Program Guidance - 1980 to present

Monitoring, Effectiveness, Research

## **1987 FW Program, 1992-1994 Strategy for Salmon, 1994-95 FW Program**

- Guiding principles, research areas, *Systemwide monitoring and evaluation approach*

## **1982 and 1984 FW Program**

- Very specific independent studies, with no overarching framework

# Program Guidance - 1980 to present

Monitoring, Effectiveness, Research

## **2000 FW Program**

- Monitor all projects (1990s systemwide approach not developed)

## **1987 FW Program, 1992-1994 Strategy for Salmon, 1994-95 FW Program**

- Guiding principles, research areas, *Systemwide monitoring and evaluation approach*

## **1982 and 1984 FW Program**

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# Program Guidance - 1980 to present

Monitoring, Effectiveness, Research

## **2009 FW Program**

- Monitor Program progress (Implementation/Compliance, Status/Trend, Effectiveness)
- Comprehensive monitoring to inform program priorities and key questions
- Individual project or suite of projects can inform effectiveness.

## **2000 FW Program**

- Monitor all projects (1990s systemwide approach not developed)

## **1987 FW Program, 1992-1994 Strategy for Salmon, 1994-95 FW Program**

- Guiding principles, research areas, *Systemwide monitoring and evaluation approach*

## **1982 and 1984 FW Program**

- Very specific independent studies, with no overarching framework



# Program Guidance - 1980 to present

Monitoring, Effectiveness, Research

## 2014 FW Program

- Cost-effective approach for habitat actions and water transactions effectiveness (program-wide) & cost-effective approach to monitoring
- Implementation/compliance monitoring of projects and measures (actions).
- Status/trend for current conditions, objectives, indicators, and models
- Effectiveness of actions to inform decisions and assess actions

## 2009 FW Program

- Monitor Program progress (Implementation/Compliance, Status/Trend, Effectiveness)
- Comprehensive monitoring to inform program priorities and key questions
- Individual project or suite of projects can inform effectiveness.

## 2000 FW Program

- Monitor all projects (1990s systemwide approach not developed)

## 1987 FW Program, 1992-1994 Strategy for Salmon, 1994-95 FW Program

- Guiding principles, research areas, *Systemwide monitoring and evaluation approach*

## 1982 and 1984 FW Program

- Very specific independent studies, with no overarching framework

What we need to know about  
mitigation actions and their effects

**The habitat framework and the 3 categories of effectiveness uncertainty**

# Habitat Action Framework applied through the Program

*Changing the habitat to fix a limiting factor and improve conditions for fish*

**(i) Current condition of species and habitat**



[http://es.123rf.com/clipart-vector/flowing\\_river.html](http://es.123rf.com/clipart-vector/flowing_river.html)

**(ii) Action Implementation**



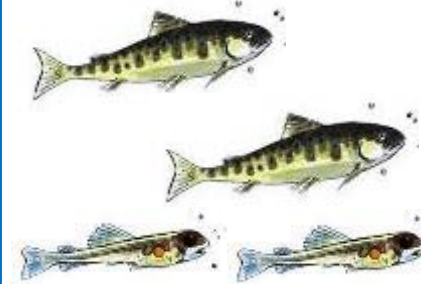
[https://www.shutterstock.com/search/child+planting+tree?image\\_type=vector](https://www.shutterstock.com/search/child+planting+tree?image_type=vector)

**(iii) Physical change - impact of actions over time on habitat characteristics**



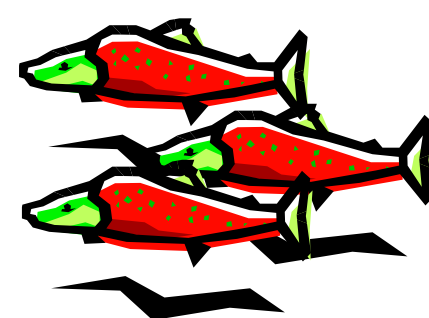
<http://www.clipartkid.com/stream-cliparts/>

**(v) Life-stage change - impact of actions on species' life stage**



<http://www.eaglewoodgourmetfood.com/salmon-life-cycle.html>

**(v) Life-cycle (population) change - impact of actions on species entire life-cycle**



## Habitat Framework

*Changing the habitat to fix a limiting factor and improve conditions for fish*

**(i) Current  
condition of  
species and  
habitat**

**Status and Trend  
Monitoring**

**(ii) Action  
Implementati  
on**

**(iii) Physical  
change** - impact  
of actions over  
time on habitat  
characteristics

**(v) Life-stage  
change** - impact  
of actions on  
species' life  
stage

**(v) Life-cycle  
(population)  
change** - impact  
of actions on  
species entire  
life-cycle

### **Action Effectiveness Monitoring/Research**

*Habitat research: three categories of effectiveness uncertainty  
(August, 9 2016 Council meeting updating the Research Plan)*

#### **Uncertainty 1: Habitat Improvement**

- Did the project improve the habitat quality and quantity for fish?



#### **Uncertainty 2: Reach Productivity**

- Does habitat improvement, improve spawner-smolt productivity?

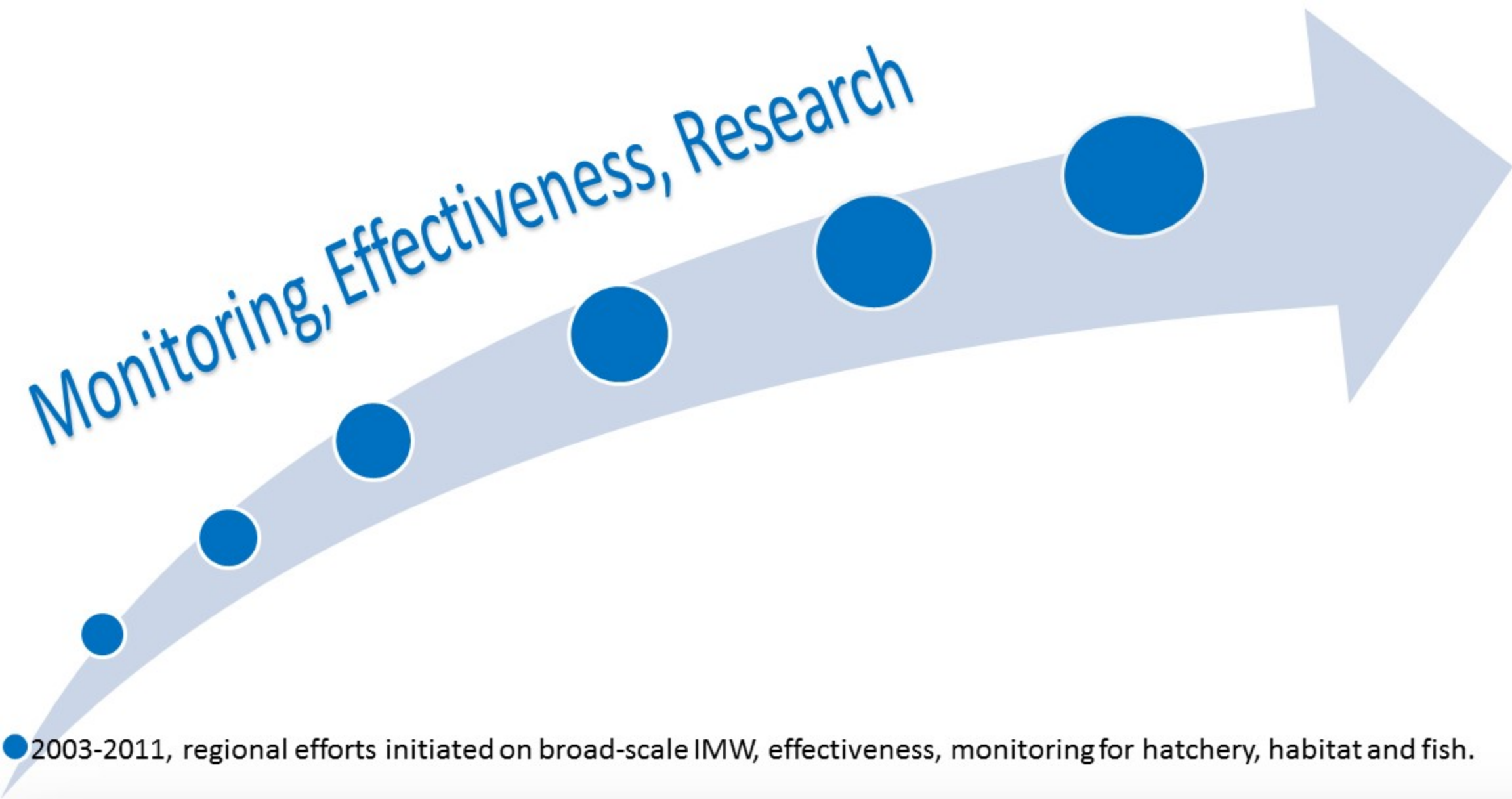


#### **Uncertainty 3: Population Response**

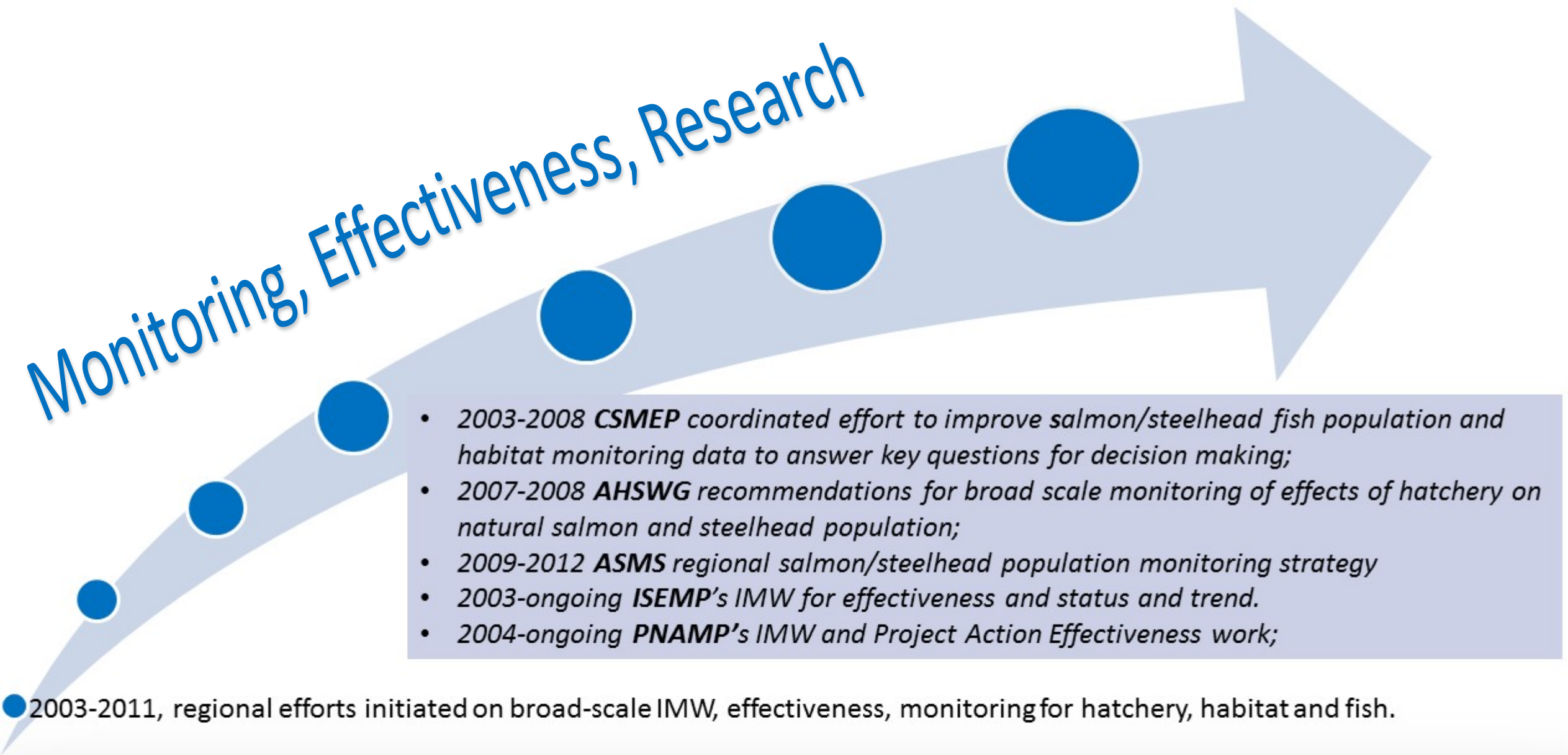
- Does higher productivity result in higher population abundance?

# Moving towards implementing a program-wide approach

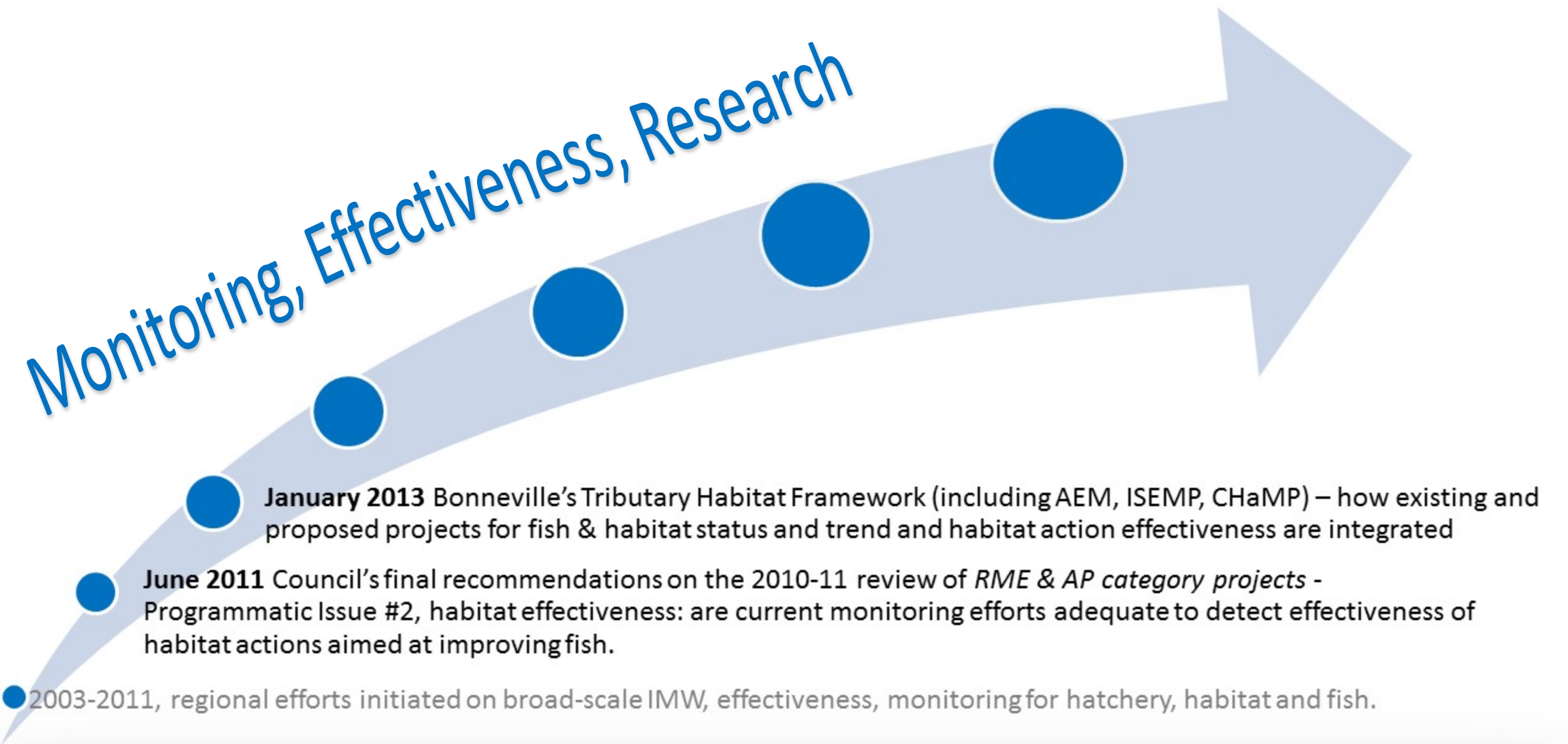
*focus on post 2011 approach for tributary habitat actions*











## Habitat Framework

*Changing the habitat to fix a limiting factor and improve conditions for fish*

(i) Current  
condition of  
species and  
habitat

(ii) Action  
Implementati  
on

(iii) Physical  
change - impact  
of actions over  
time on habitat

(v) Life-stage  
change - impact  
of actions on  
species' life

(v) Life-cycle  
(population)  
change - impact  
of actions on

### Bonneville's Tributary Habitat Framework

#### Status and Trend Monitoring

- **Salmon and Steelhead**
  - Coordinated through the 2010 Anadromous Salmonid Monitoring Strategies (**ASMS – Skamania process**)
- **Aquatic Habitat**
  - Coordinated through **CHaMP** and regional efforts.

#### Action Effectiveness Monitoring/Research

**Uncertainty #1 & #2**  
Informed by **BPA's AEM, ISEMP**,  
other regional efforts.

**Uncertainty #3**  
Informed by **ISEMP**  
**IMWs**

#### Uncertainty 1: Habitat Improvement

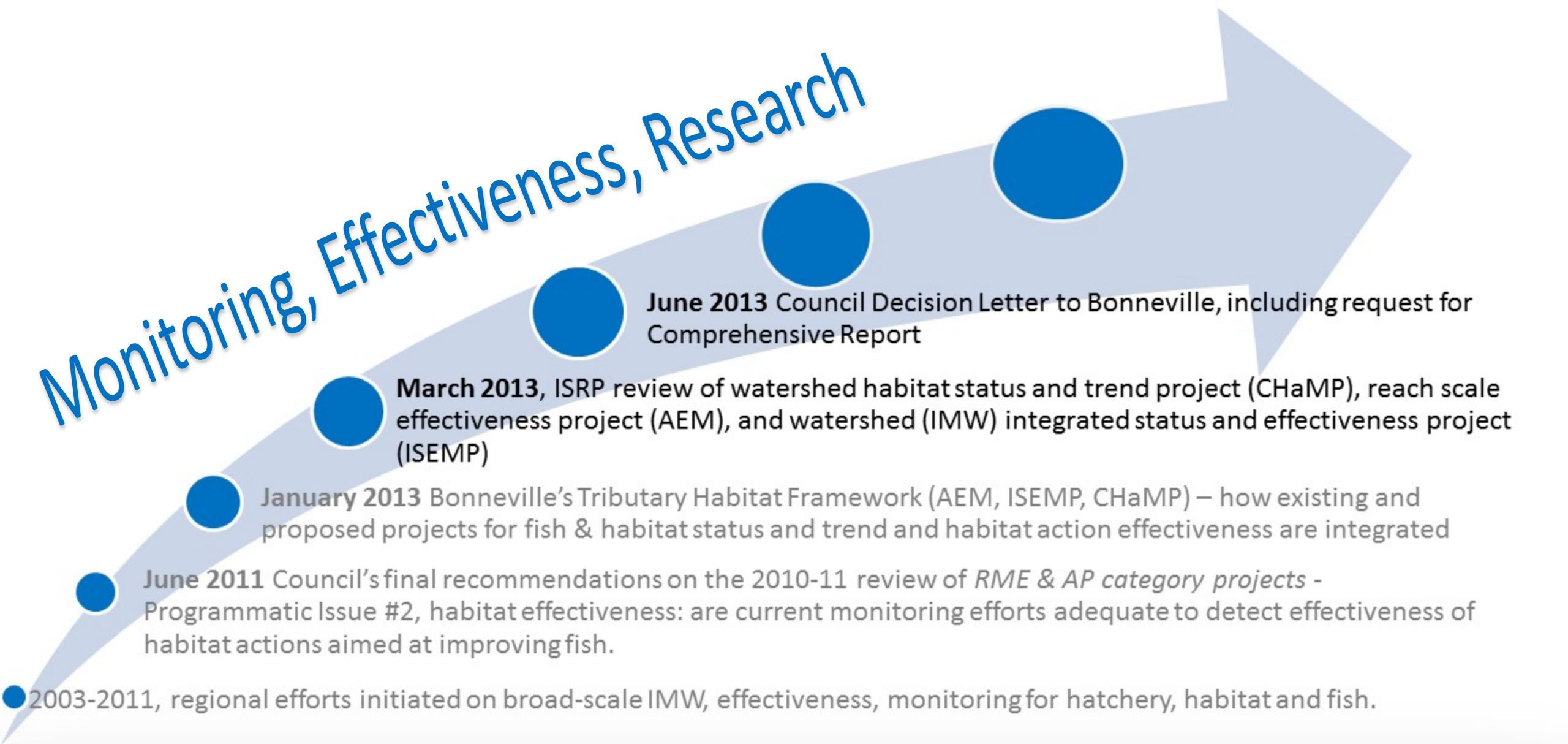
- Did the project improve the habitat quality and quantity for fish?

#### Uncertainty 2: Reach Productivity

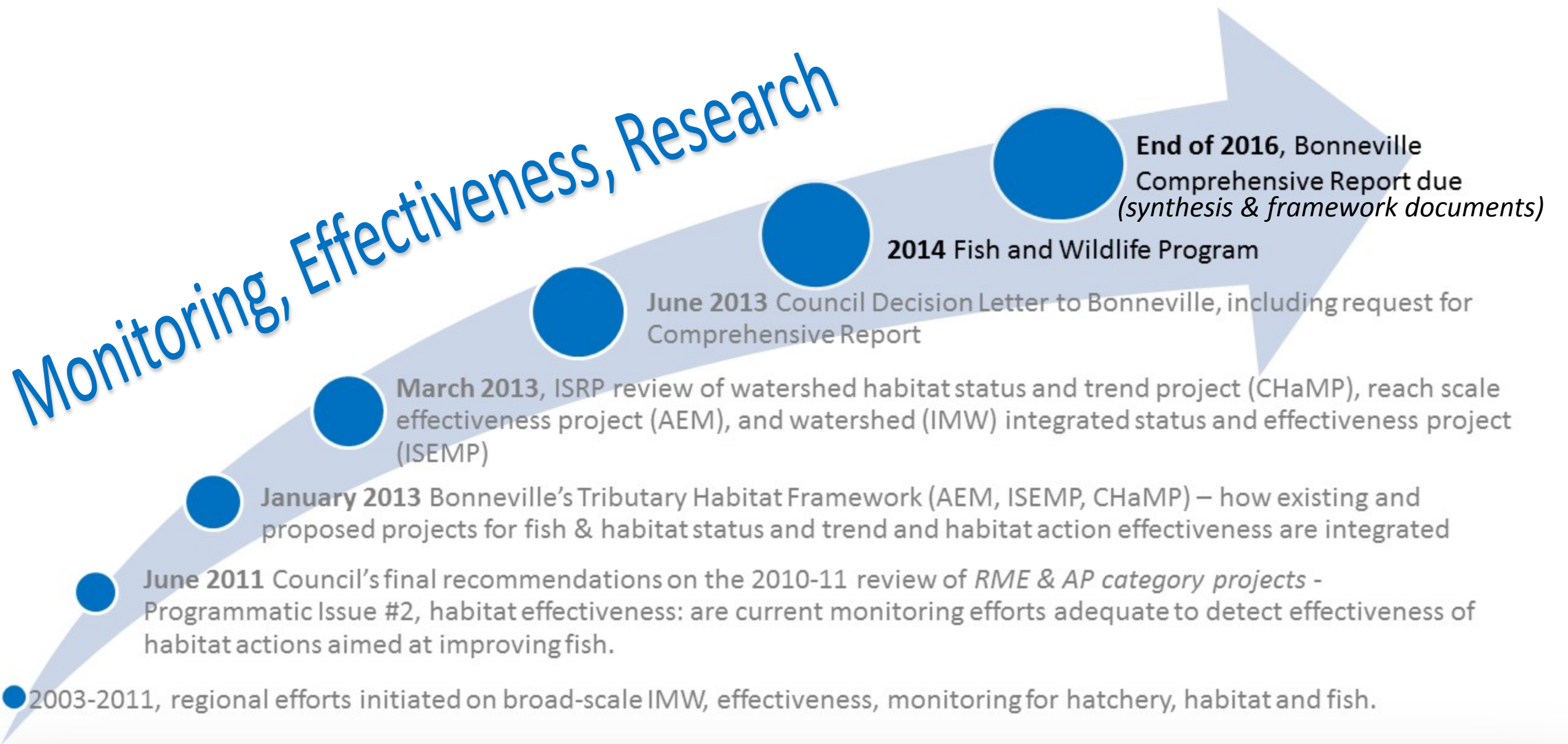
- Does habitat improvement, improve spawner-smolt productivity?

#### Uncertainty 3: Population Response

- Does higher productivity result in higher population abundance?







Will a program-wide approach provide information needed to guide mitigation in a cost effective manner?

**are current monitoring efforts adequate to detect effectiveness of habitat actions aimed at improving fish (3 effectiveness uncertainties)?**

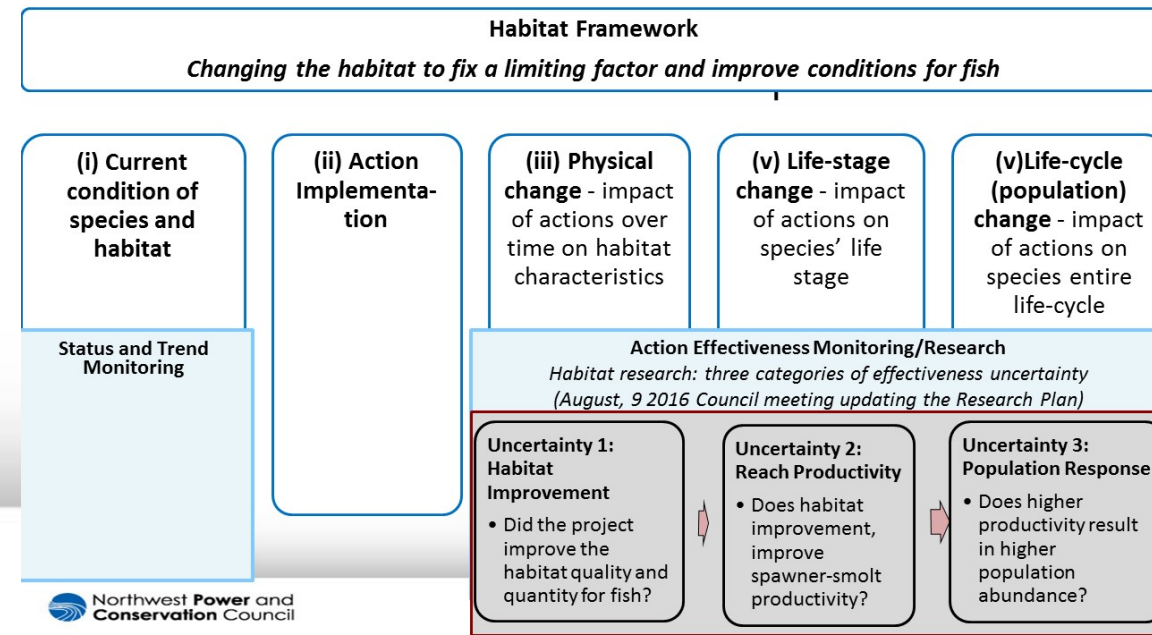
# Many Potential Questions to Consider

- **Which actions are needed where and what extent?**
  - Are approaches for identifying limiting habitat factors the best available?
  - How much habitat protection and restoration is needed?
  - How long will the mitigation effect last? Do we need to plan/budget for maintenance?
- **Are we achieving desired change / mitigation?**
  - Do mitigation actions improve conditions for fish, wildlife and their habitat?
- **What and how much do we need to know to assess mitigation success?**
  - Is the level of reasonably certain differ among mitigation under the Power Act and recovery under the ESA? What level of certainty is appropriate for the Program (risk-uncertainty matrix)?
  - How to consider outside influences on mitigation success?
  - Is program guidance on research, monitoring, effectiveness appropriate to assess success of mitigation actions and Program strategies? Too little? Too much?
- **Are we learning and adapting?**
  - Is information about mitigation actions and from IMWs informing decision-makers and guiding restoration activities in the Basin?
  - Is this information improving the Program's mitigation strategies and ?

# Topic for Today's Discussion

## ***Are current monitoring of habitat mitigation actions adequate to detect effectiveness of habitat actions aimed at improving fish (3 effectiveness uncertainties)?***

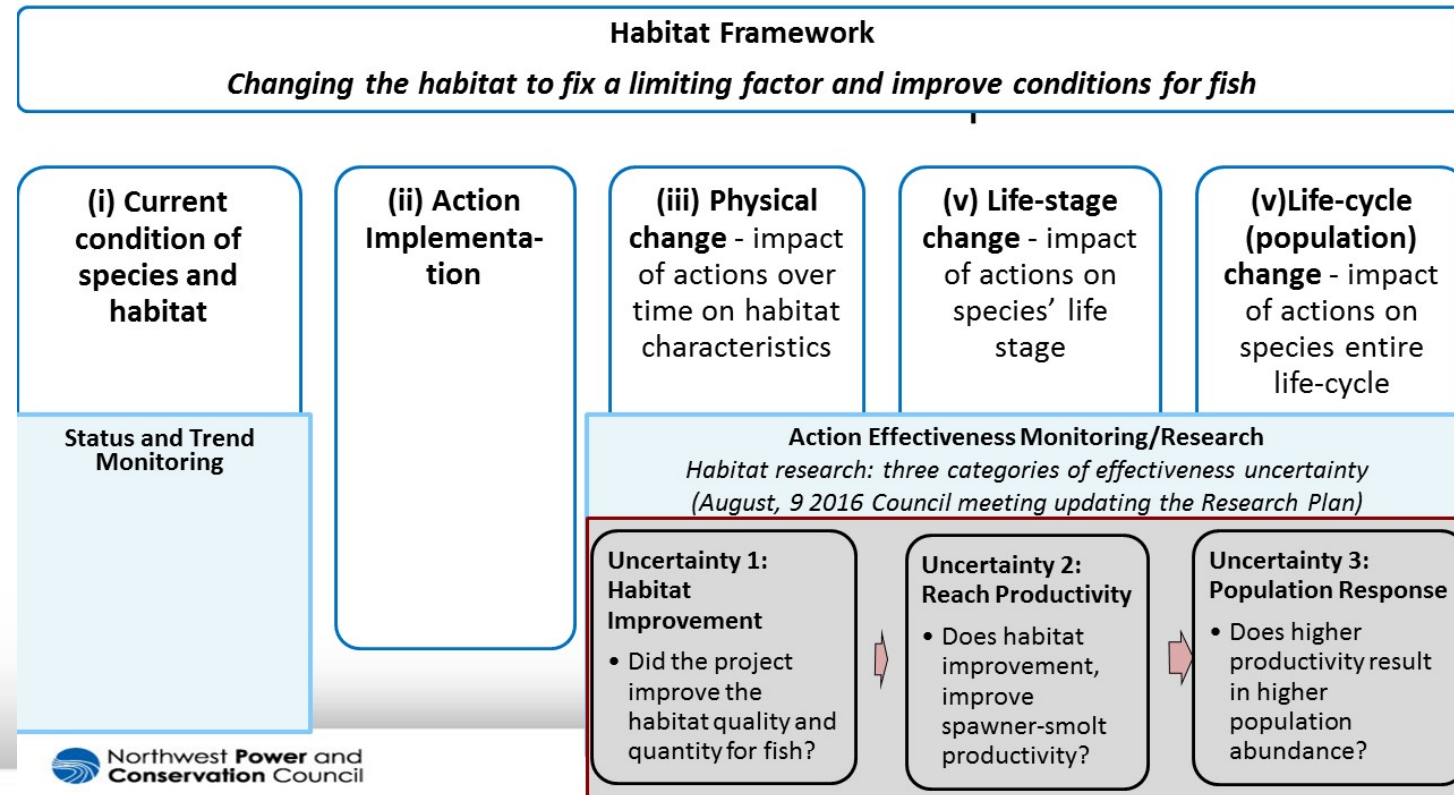
- Council recommendations to Bonneville's regarding habitat effectiveness (see Packet Memo Appendix C, page 13; the report will be provided by Bonneville later this year and consists of a synthesis and a framework document).
- Are current program-wide efforts adequate to:
  - Inform projects implementing habitat actions?
  - Produce cost-savings?
  - Assess success of the program's mitigation strategies, measures, and 3 uncertainties?
  - Will this meet science review expectations?





# Possible Topics for Future Committee Meetings

- What/how much information is needed to assess mitigation progress under the Power Act?
- How sure do we need to be with the expected success of program mitigation strategies/actions before deemed effective for mitigation and less monitoring/research is needed? Does this vary among strategies/actions types?
- Do we need to address all 3 levels of uncertainty to inform adaptive management of the program's strategies and measures?
- How do we consider / what level of understanding is needed about external influences?
- Other topics?



# End of Presentation Slides



Pond Boat returning with Salmon,  
Columbia River, Washington.

# Bonneville's 2013 Tributary Habitat Framework

*Note: other complementary projects also contribute to these components but are not included in the figure.*

