

# Salmon and Steelhead related large scale Monitoring and Evaluation Programs in the Columbia River Basin related to the Council's Fish & Wildlife Program

High level overview

T. Grover 4/30/2013

## Large Scale Monitoring Programs

- **Hydrosystem Monitoring** – many subcomponents, operating at local and larger geographic scales. Dating back to the early 1980s or before.
  - Juvenile: reach survival, dam passage survival, smolt monitoring, transportation (barging) evaluations
  - Adult: passage survival
- **Project Implementation** – Essentially a contract fulfillment check – did the project sponsor do the work they said they would do.
- **Ocean research and monitoring** – Discover and then monitor which ocean factors influence salmon survival. Try to predict future survival and fish run returns.
- **AEM – action effectiveness monitoring** - focused on two scales
  - Project/reach scale level – how does the action(s) affect habitat characteristics
  - Population scale level – how does the actions(s) affect population characteristics (productivity, abundance)
- **IMW – Intensely Monitored Watershed** – Bonneville currently co-funds work in Lemhi, John Day and Wenatchee/Entiat.
  - Used to inform status and trend and effectiveness monitoring
    - Before and after with control streams, or
    - Innovative methods to improve habitat, or
    - Modeling to identify important sensitivities and take model suggested actions to find out if the model was capable and correct.

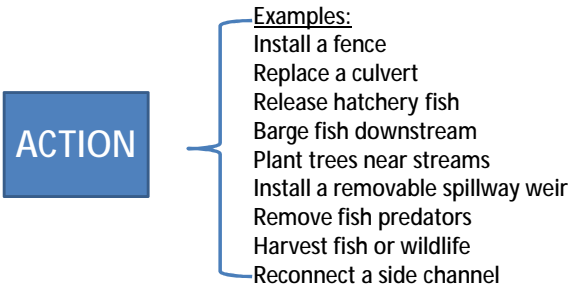
## Large Scale Monitoring Programs

- ISEMP – Integrated Status and Effectiveness Program. Supports improvements in status, trend, and effectiveness monitoring work (e.g. AEM Approach) and CHaMP. This project test drives new and innovative sampling designs, data collection techniques, analysis tools, and data management procedures to inform monitoring programs for ESA listed salmon. This is done by implementing Status and Trend and Effectiveness monitoring strategies in Intensely Monitored Watersheds (IMWs). This effort has been underway for about 10 years.
- CHaMP – Columbia Habitat and Monitoring Program. Collects status and trend of fish habitat. It doesn't focus on fish or action effectiveness. The data it provides can be used to inform action effectiveness. The CHaMP team are still developing techniques to use the data to inform action effectiveness at the population and watershed scale. This project has been under partial implementation since 2011.
- CEERP – Columbia Estuary Ecosystem Restoration Program. The framework guiding action effectiveness at the reach/project scale and also action effectiveness at the population scale life stage in the lower Columbia River and estuary. This framework is just now coming on-line and will require some additional development.
- CRHEET – Columbia River Hatchery Effects Evaluation Team – (not yet developed) will be intended to address action effectiveness of hatcheries using a broad scale of monitoring to detect if the hatcheries are having the intended effect at the fish population scale.

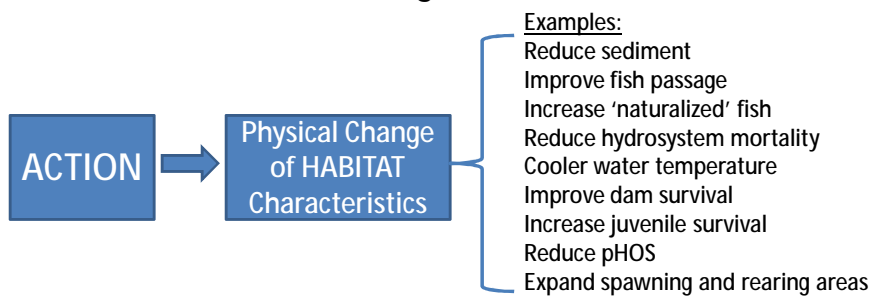
## Fish and Wildlife Program Framework

ACTION

## Fish and Wildlife Program Framework



## Fish and Wildlife Program Framework

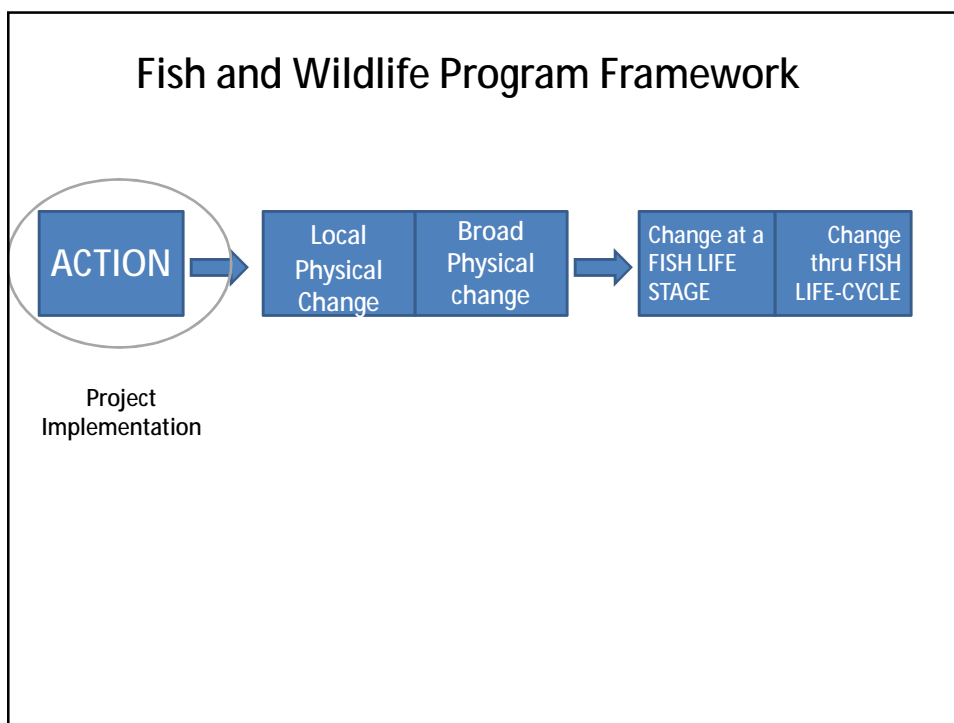
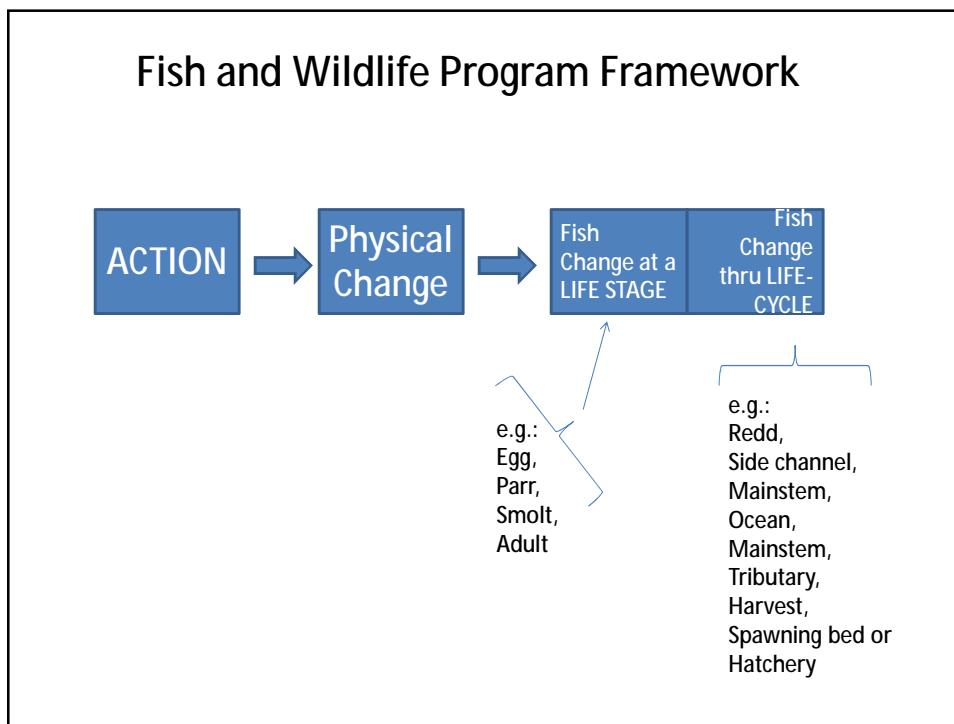


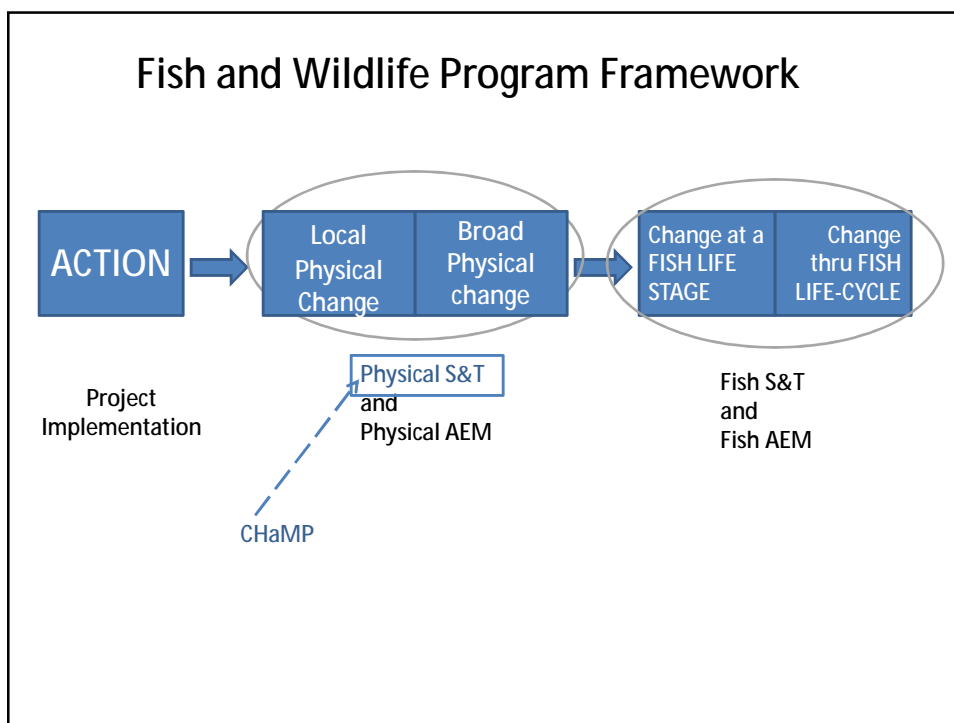
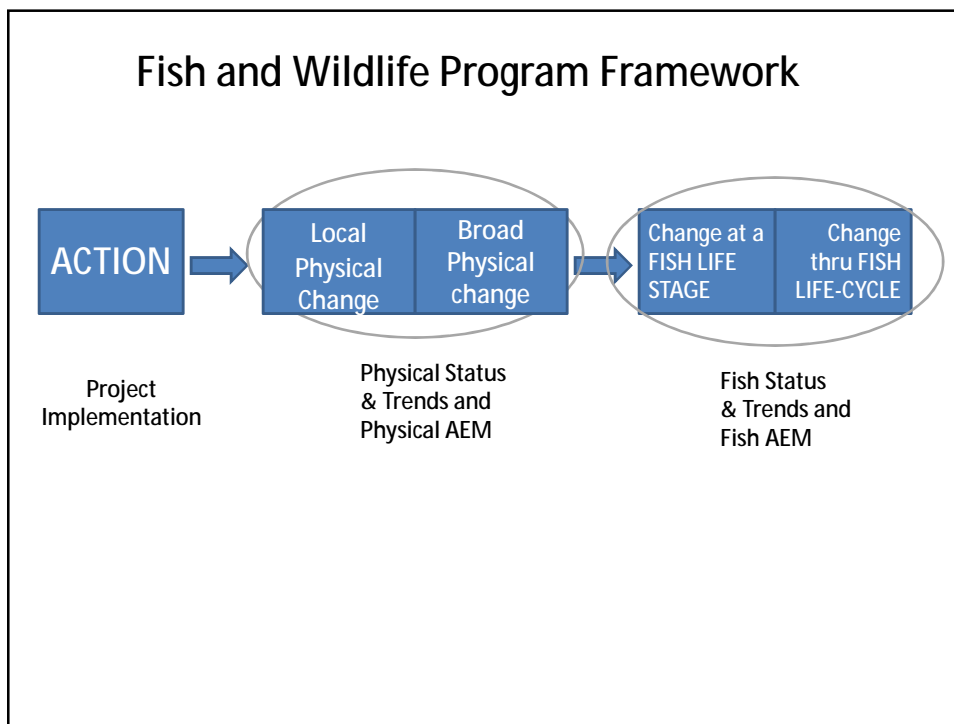
## Fish and Wildlife Program Framework

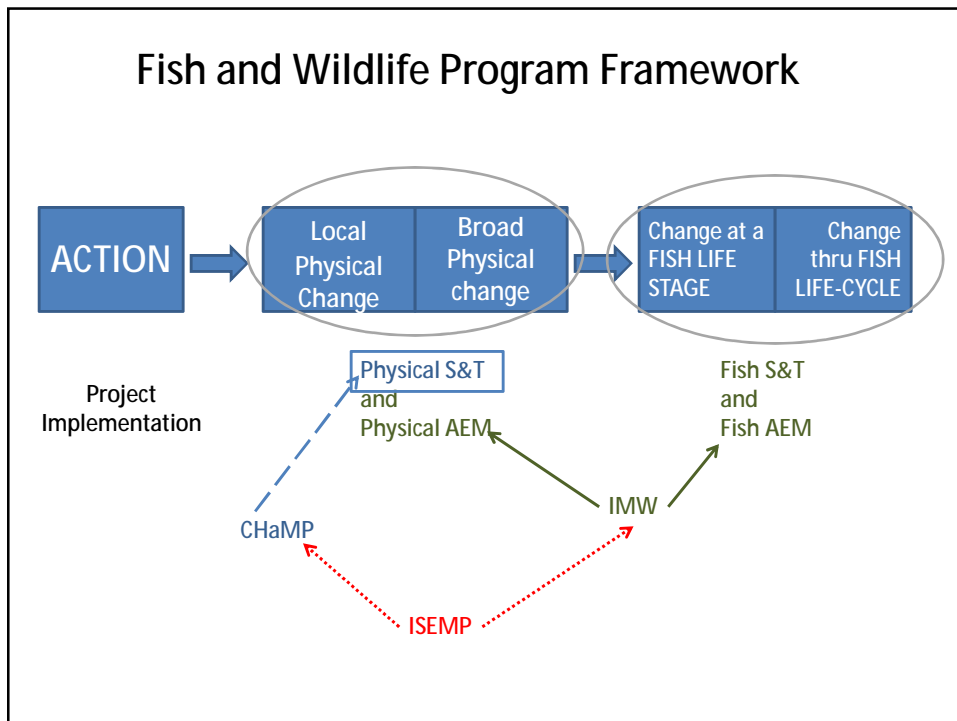
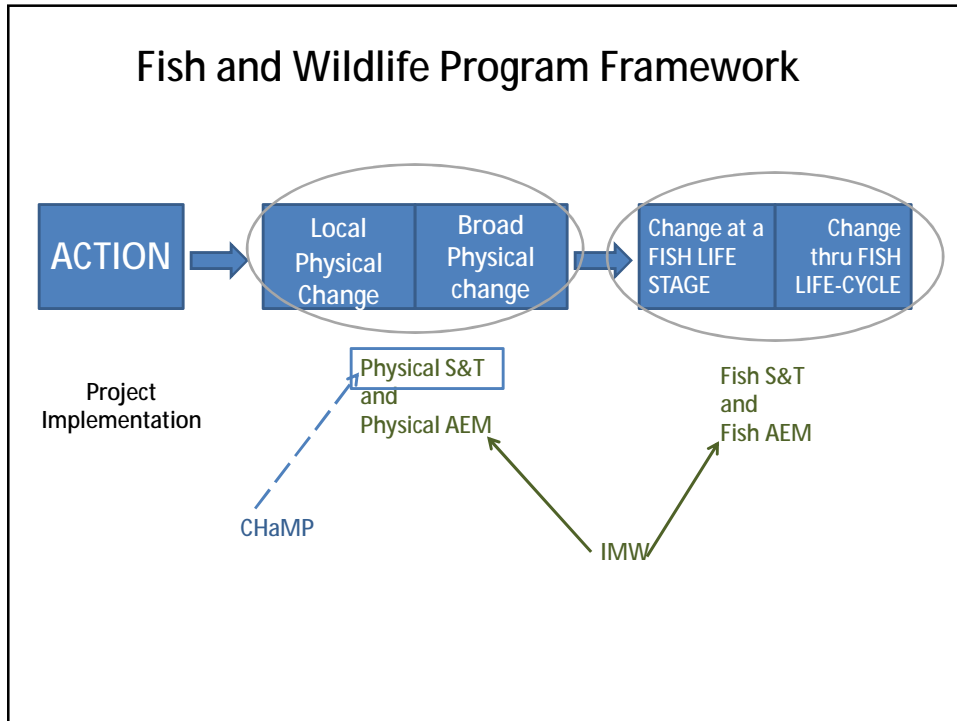


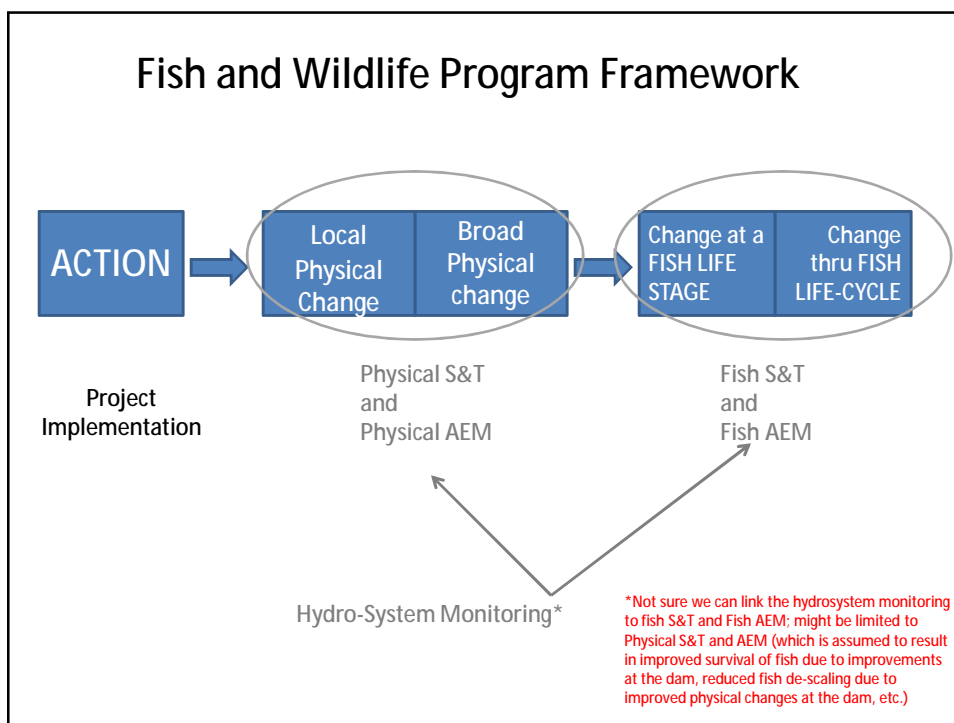
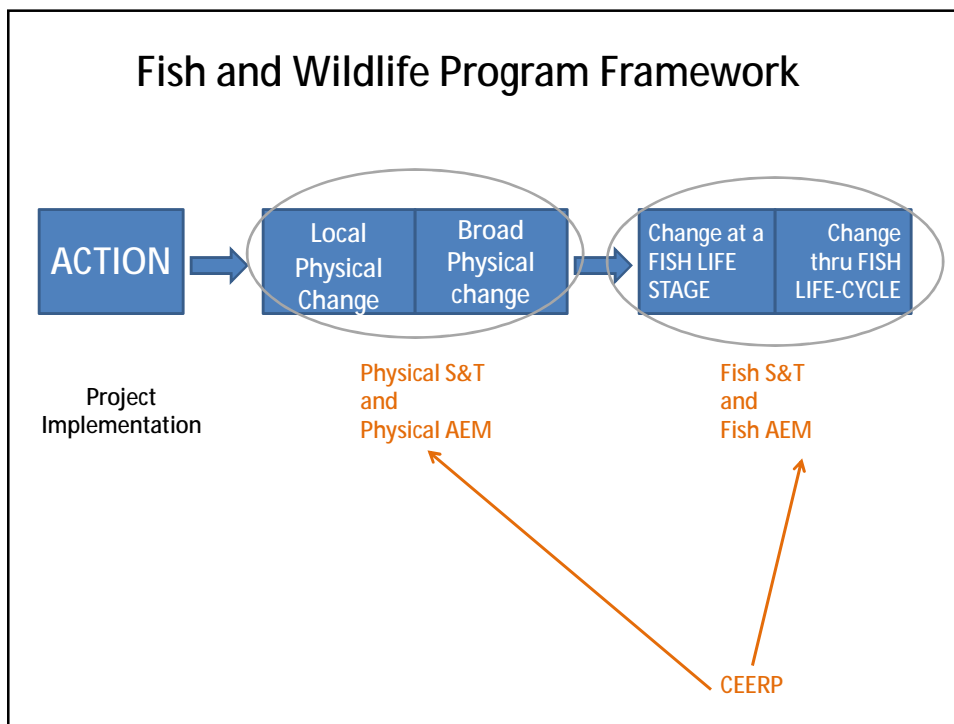
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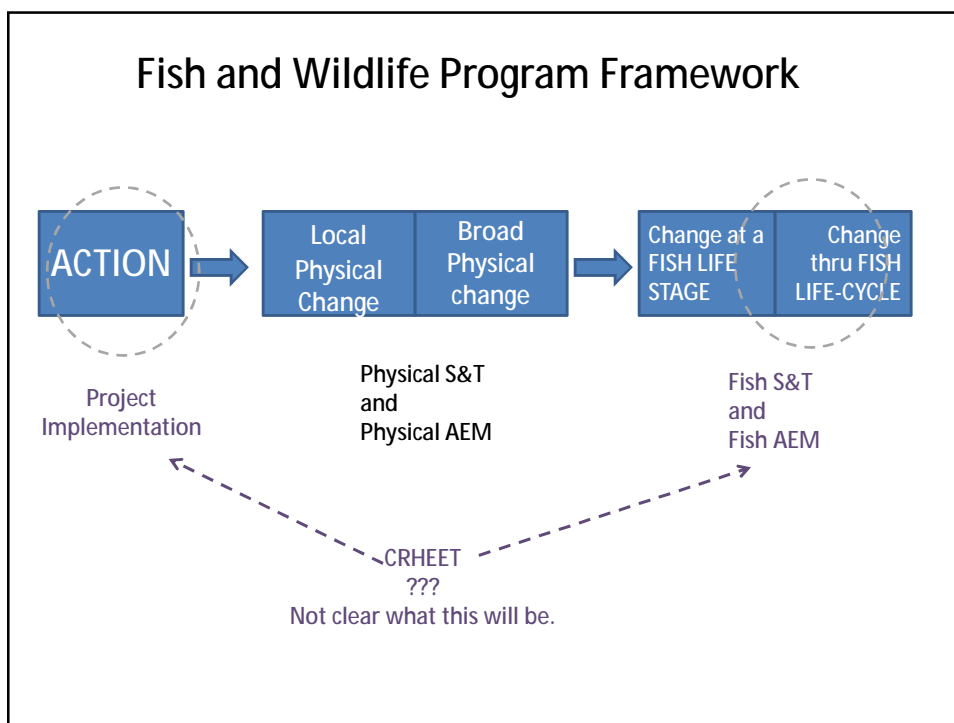
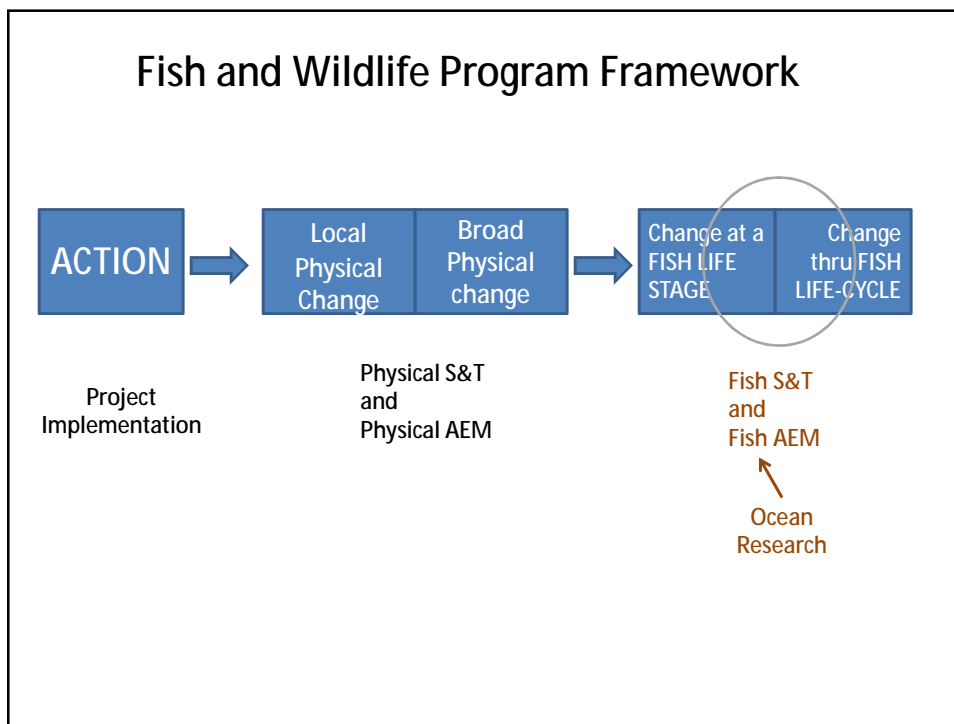


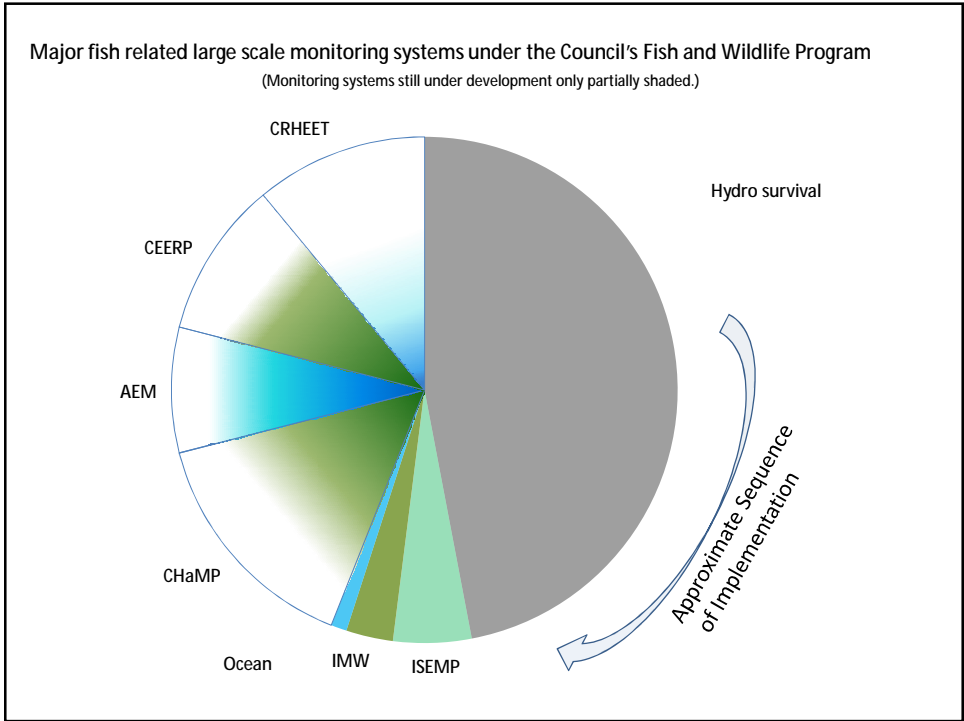












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April 30, 2013

## MEMORANDUM

**TO:** Fish and Wildlife Committee members

**FROM:** Mark Fritsch, project implementation manager

**SUBJECT:** Council decision on *ISEMP*, *CHaMP*, and *Action Effectiveness Monitoring*, a Programmatic Issue as part of the *RME and AP Category* review.

**PROPOSED ACTION:** Staff recommends that the Fish and Wildlife Committee follow the ISRP's recommendation in this annual review and continue to support the monitoring and evaluation activities that are currently underway to assess the effectiveness of the Program's habitat actions. This recommendation is subject to a number of conditions described at the end of this memorandum that limit the CHaMP project and the new AEM approach to a pilot effort; require further annual review of the development and implementation of the various elements of the habitat effectiveness monitoring and evaluation; and require the submission of definitive conclusions regarding a number of elements in 2015.

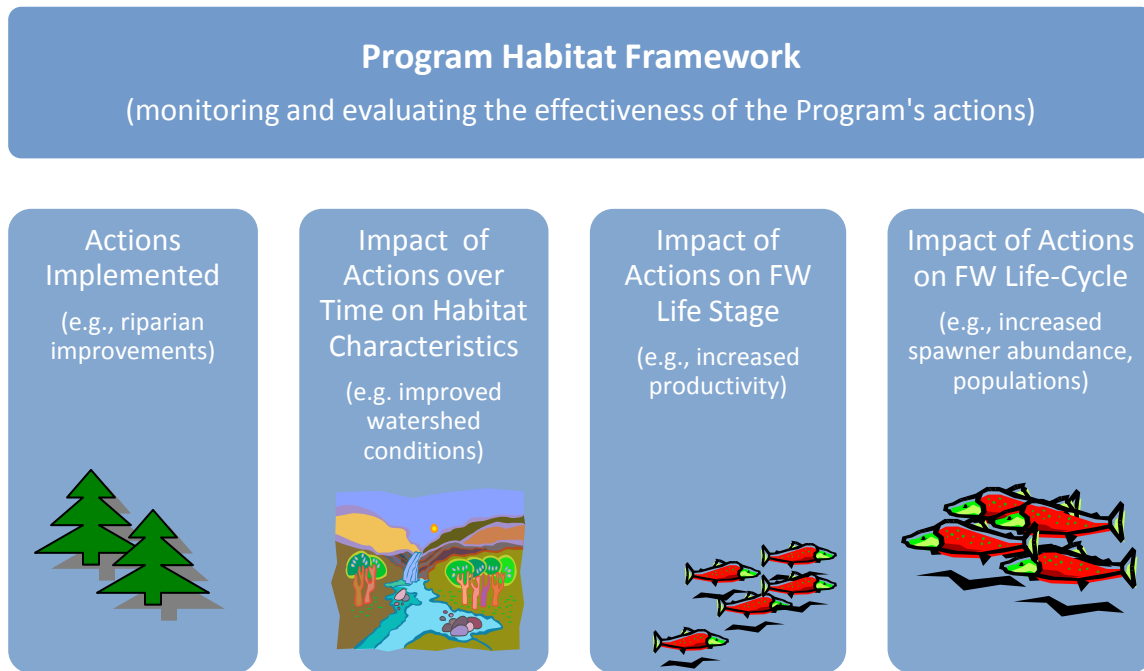
## BACKGROUND

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>1</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.



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.

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

- *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.

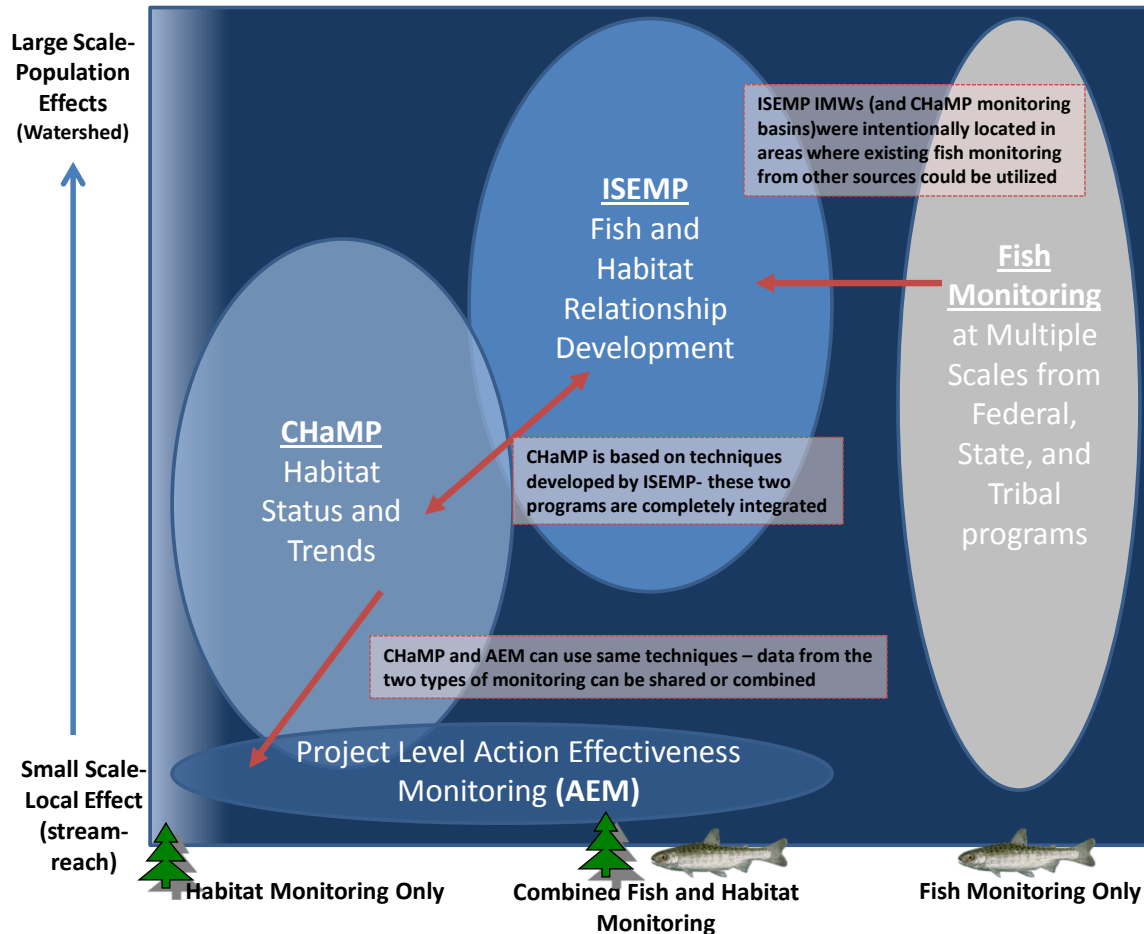
- *Columbia Basin Tributary Habitat Improvement: A Framework for Research, Monitoring and Evaluation, January 2013.* This document is provided as context and

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 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 BPA’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.*

#### **STAFF RECOMMENDATION**

Based on the ISRP review, the Council staff recommends that the Fish and Wildlife Committee support 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>2</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 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). 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.

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<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.

**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 eight contracts and two contract requests 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, Innaha, 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 six 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.

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High level overview

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    - Modeling to identify important sensitivities and take model suggested actions to find out if the model was capable and correct.

# Large Scale Monitoring Programs

- **ISEMP** – Integrated Status and Effectiveness Program. Supports improvements in status, trend, and effectiveness monitoring work (e.g. **AEM Approach**) and **CHaMP**. This project test drives new and innovative sampling designs, data collection techniques, analysis tools, and data management procedures to inform monitoring programs for ESA listed salmon. This is done by implementing Status and Trend and Effectiveness monitoring strategies in Intensely Monitored Watersheds (**IMWs**). This effort has been underway for about 10 years.
- **CHaMP** – Columbia Habitat and Monitoring Program. Collects status and trend of fish habitat. It doesn't focus on fish or action effectiveness. The data it provides can be used to inform action effectiveness. The CHaMP team are still developing techniques to use the data to inform action effectiveness at the population and watershed scale. This project has been under partial implementation since 2011.
- **CEERP** – Columbia Estuary Ecosystem Restoration Program. The framework guiding action effectiveness at the reach/project scale and also action effectiveness at the population scale life stage in the lower Columbia River and estuary. This framework is just now coming on-line and will require some additional development.
- **CRHEET** – Columbia River Hatchery Effects Evaluation Team – (not yet developed) will be intended to address action effectiveness of hatcheries using a broad scale of monitoring to detect if the hatcheries are having the intended effect at the fish population scale.



# Fish and Wildlife Program Framework

**ACTION**

# Fish and Wildlife Program Framework

**ACTION**

Examples:

Install a fence

Replace a culvert

Release hatchery fish

Barge fish downstream

Plant trees near streams

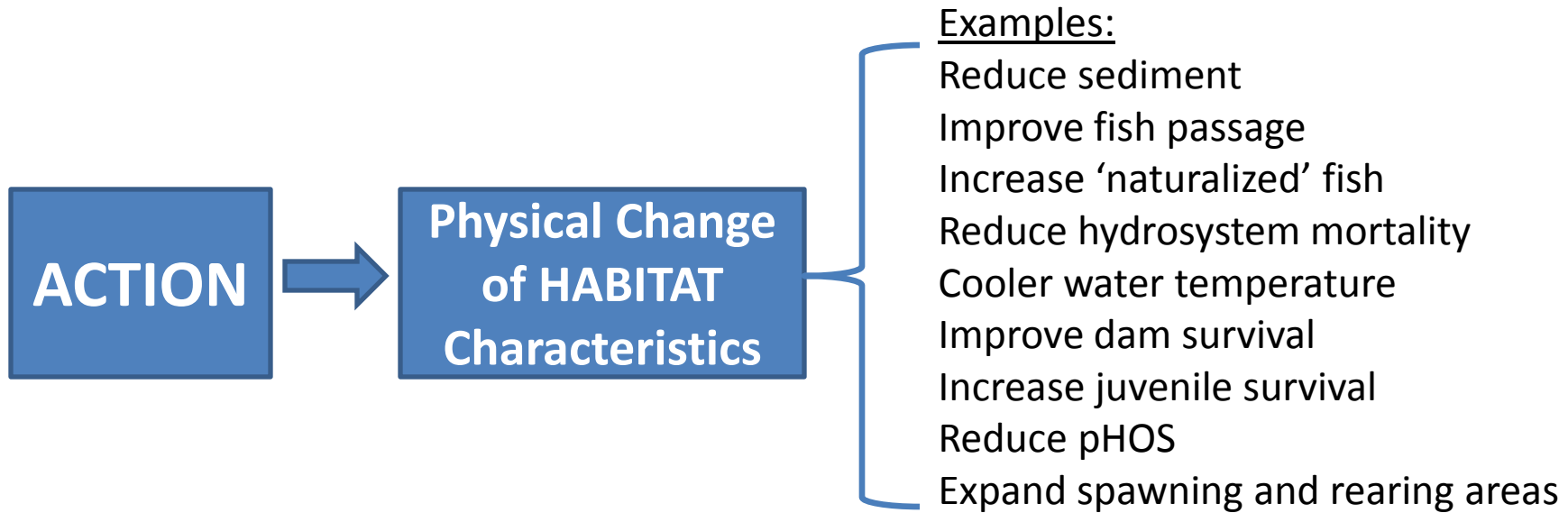
Install a removable spillway weir

Remove fish predators

Harvest fish or wildlife

Reconnect a side channel

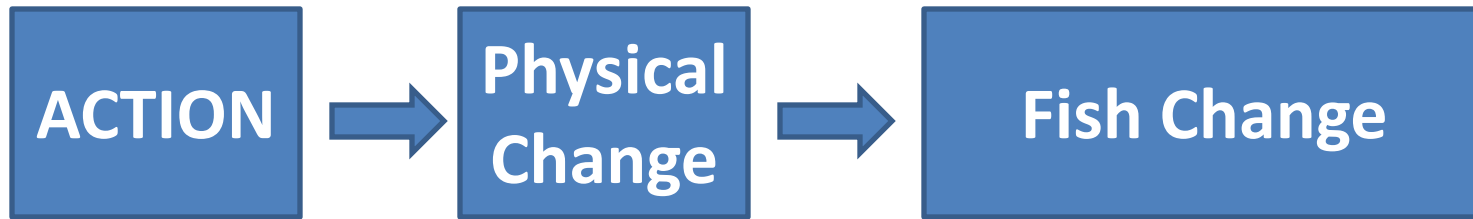
# Fish and Wildlife Program Framework



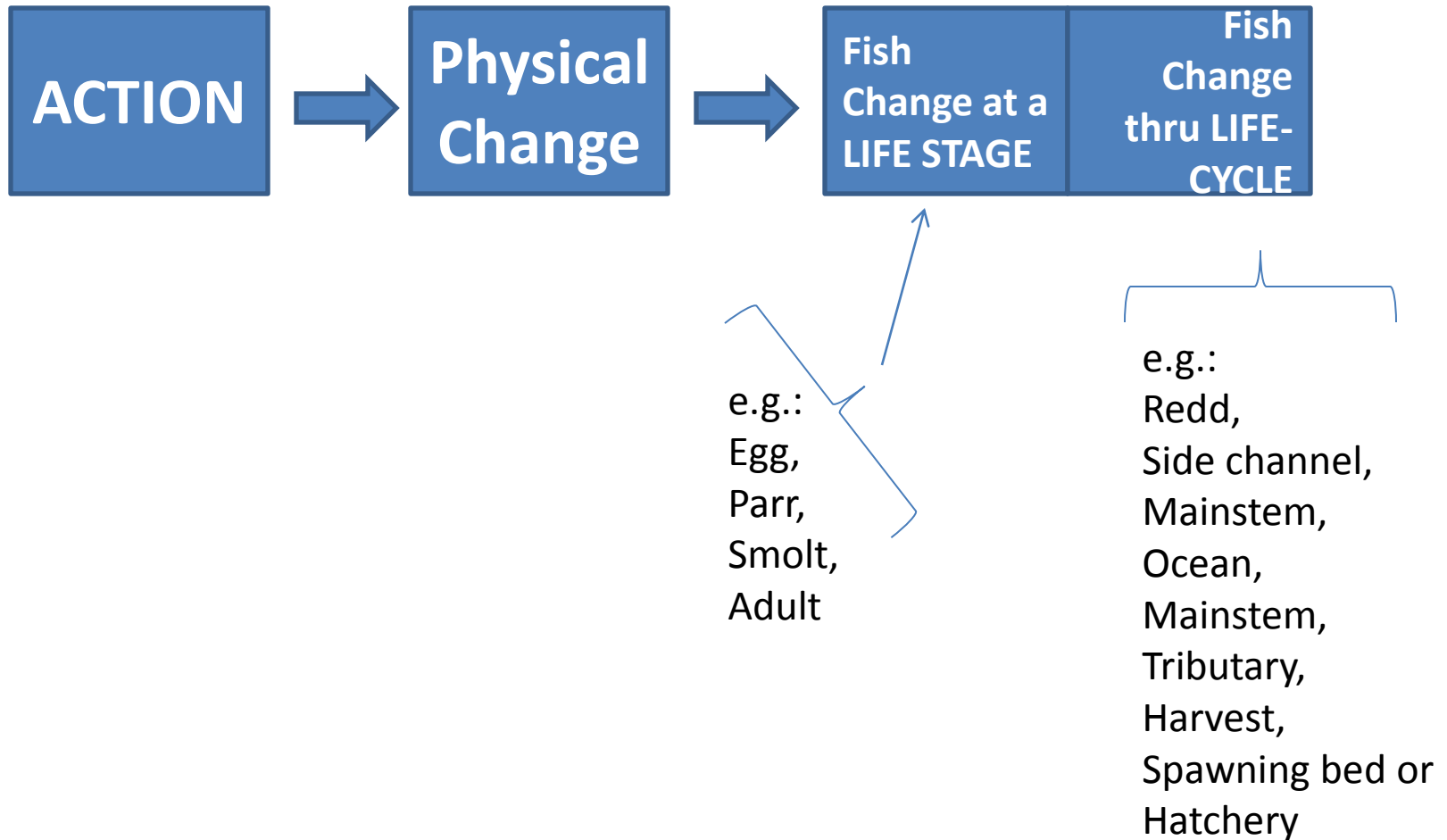
# Fish and Wildlife Program Framework



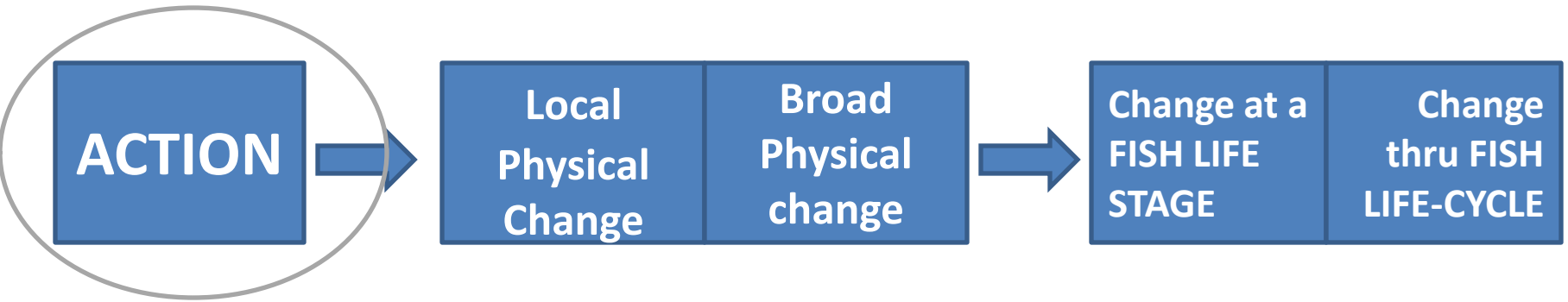
# Fish and Wildlife Program Framework



# Fish and Wildlife Program Framework

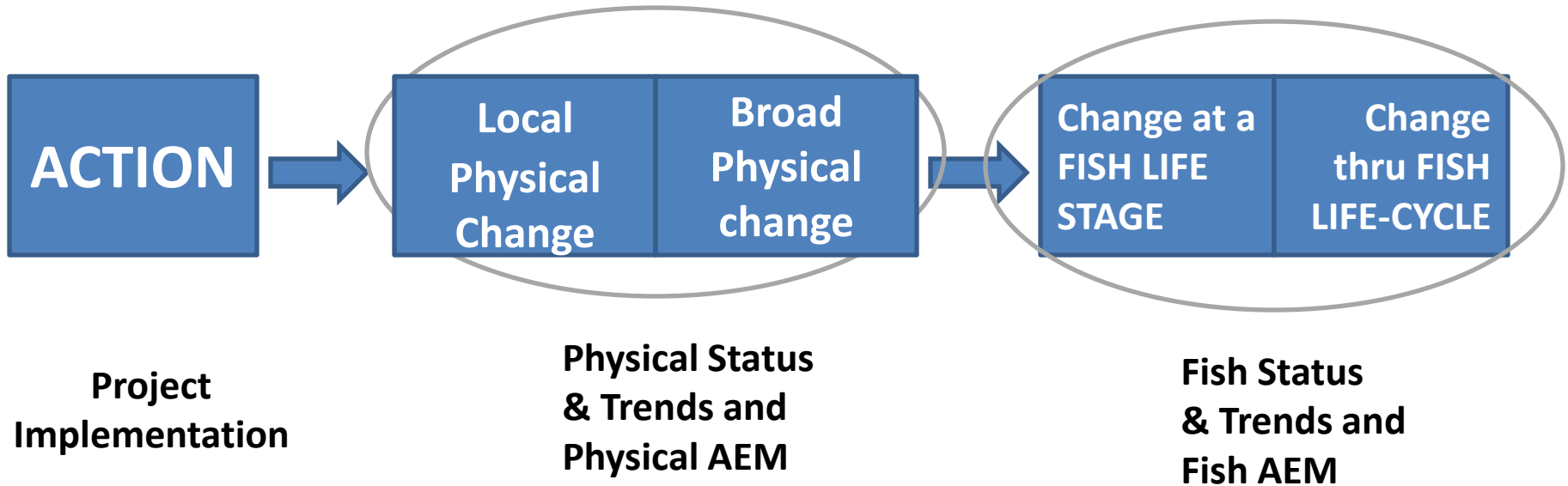


# Fish and Wildlife Program Framework



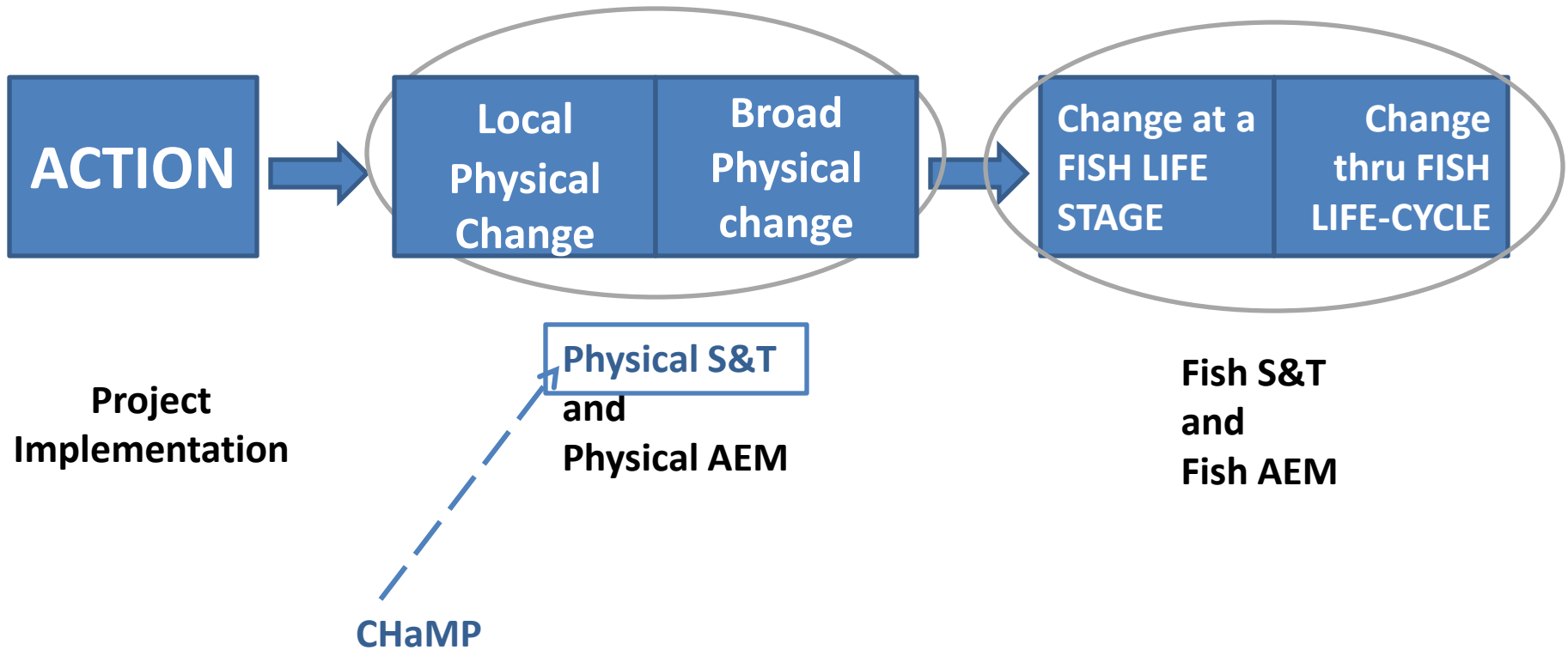
**Project  
Implementation**

# Fish and Wildlife Program Framework

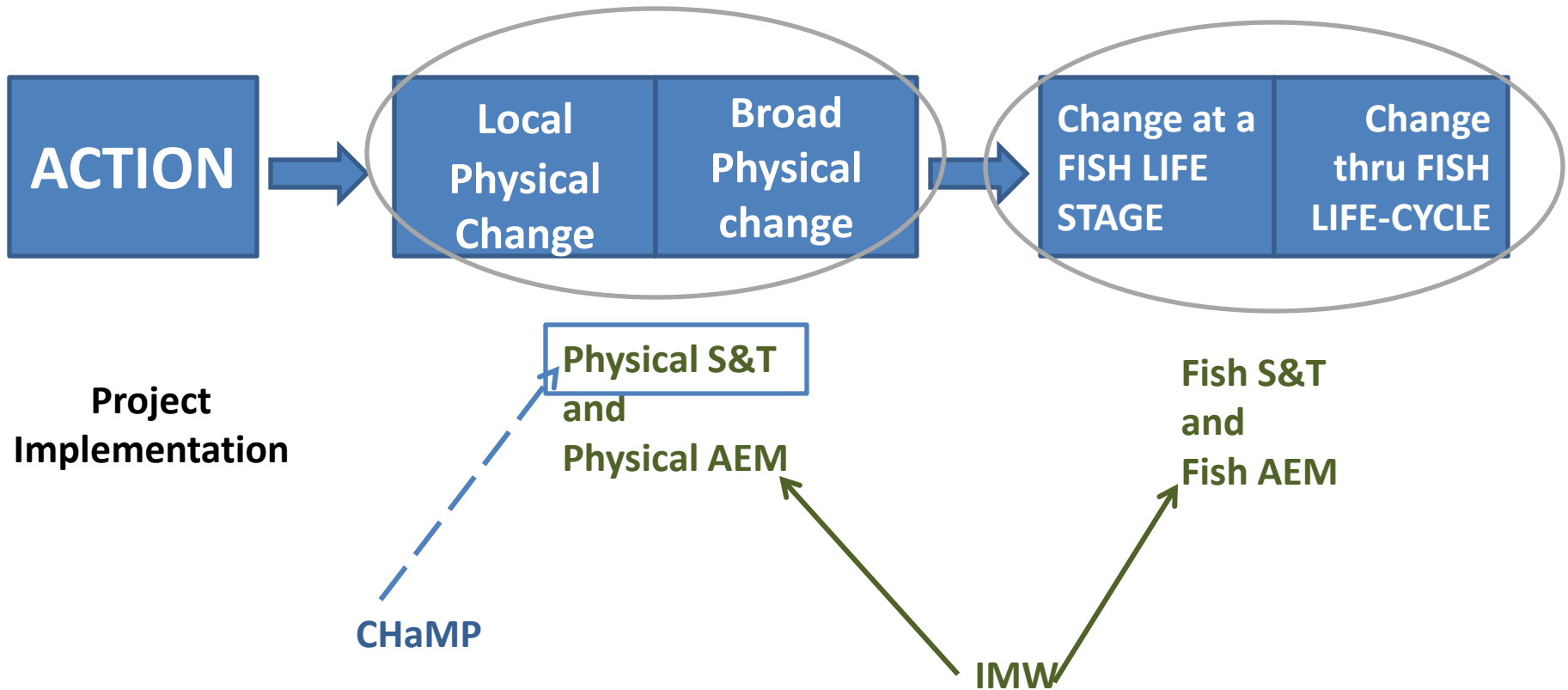




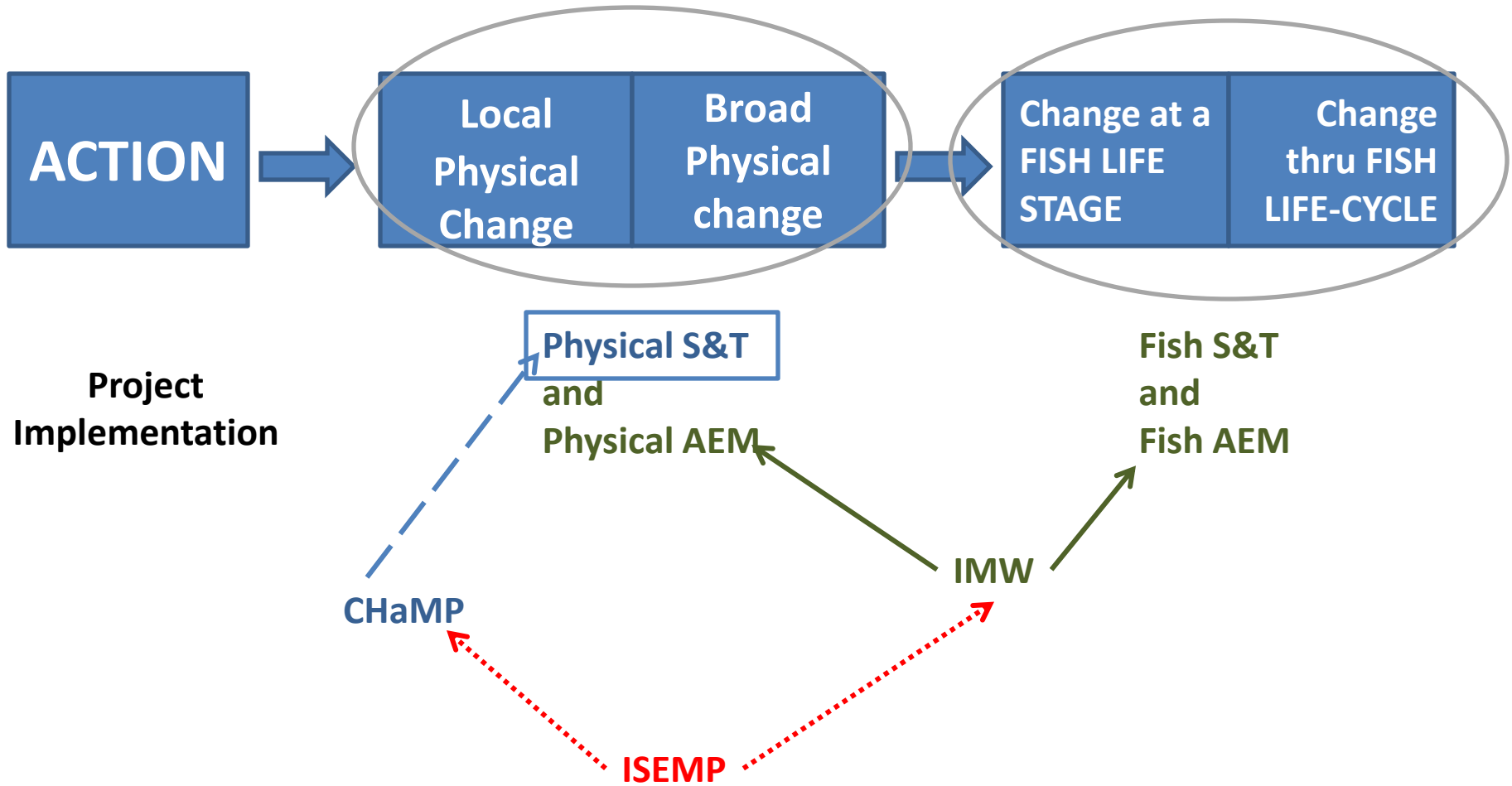
# Fish and Wildlife Program Framework



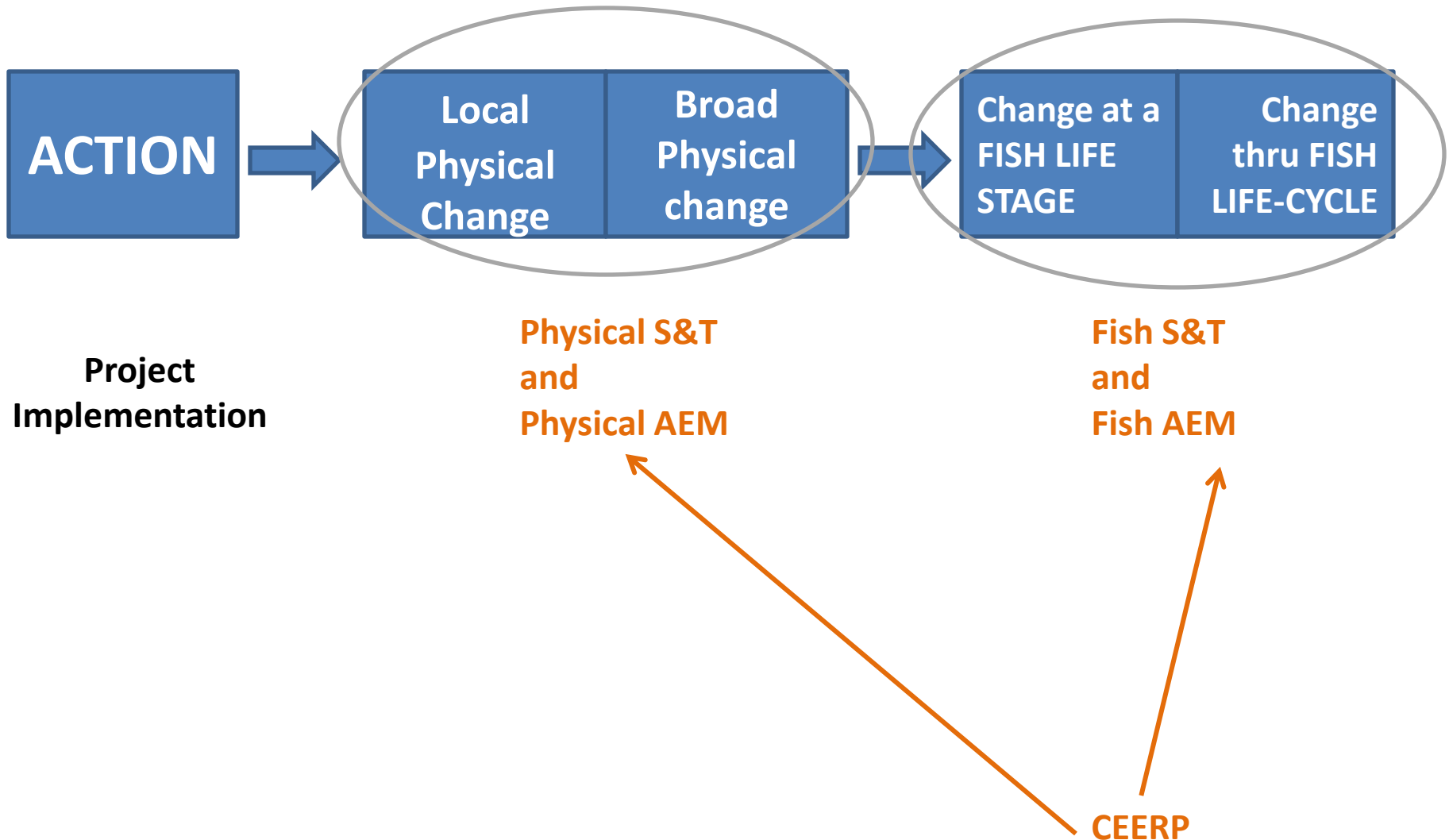
# Fish and Wildlife Program Framework



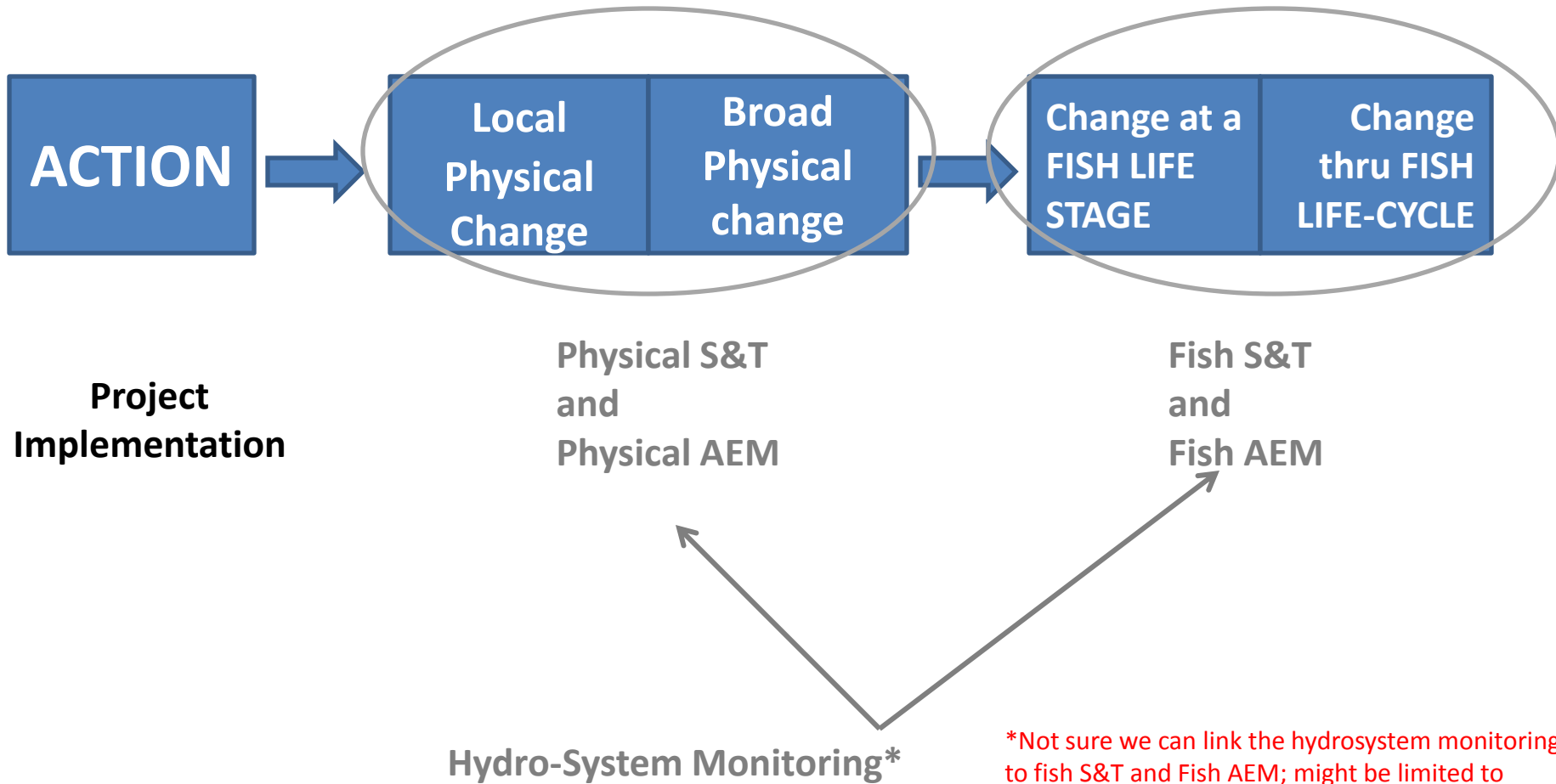
# Fish and Wildlife Program Framework



# Fish and Wildlife Program Framework

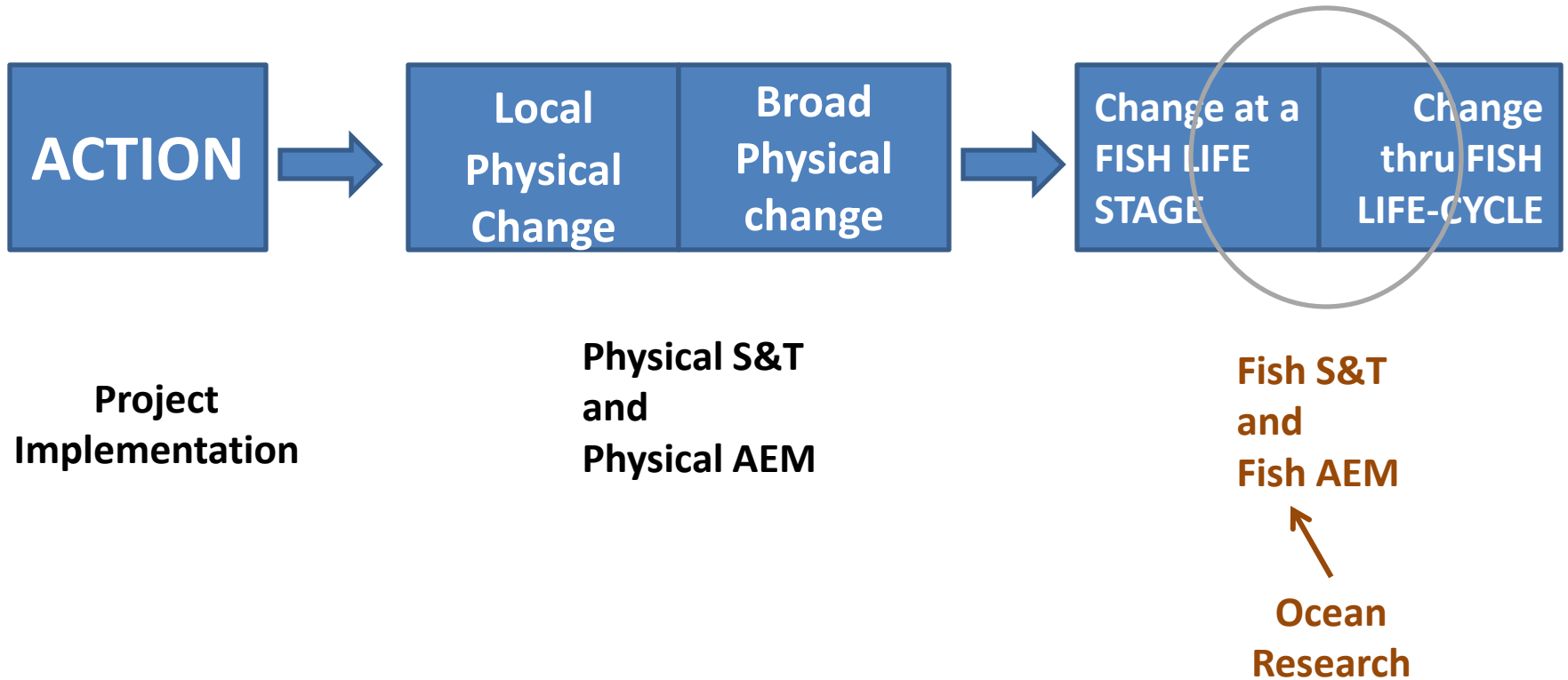


# Fish and Wildlife Program Framework

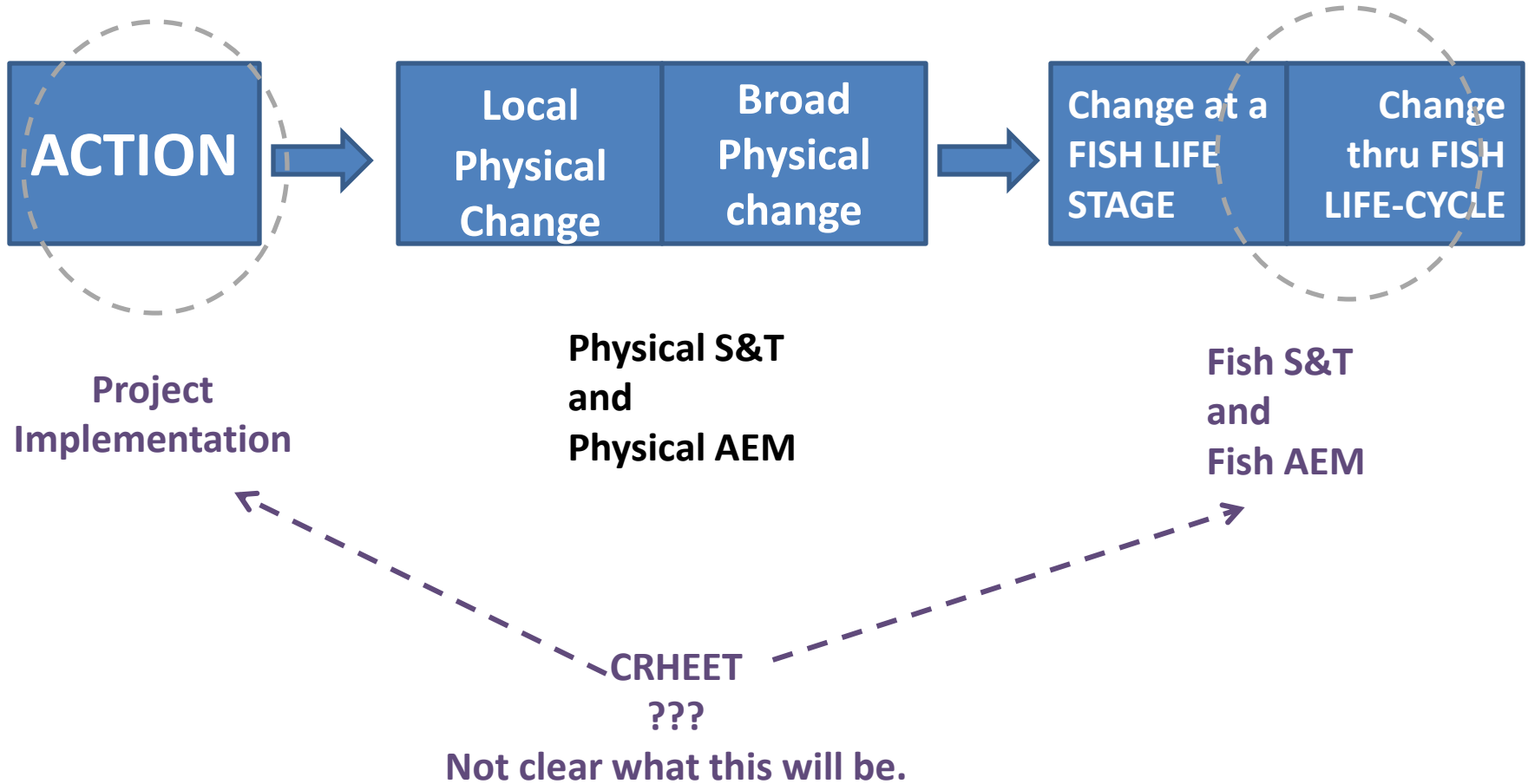


\*Not sure we can link the hydrosystem monitoring to fish S&T and Fish AEM; might be limited to Physical S&T and AEM (which is assumed to result in improved survival of fish due to improvements at the dam, reduced fish de-scaling due to improved physical changes at the dam, etc.)

# Fish and Wildlife Program Framework

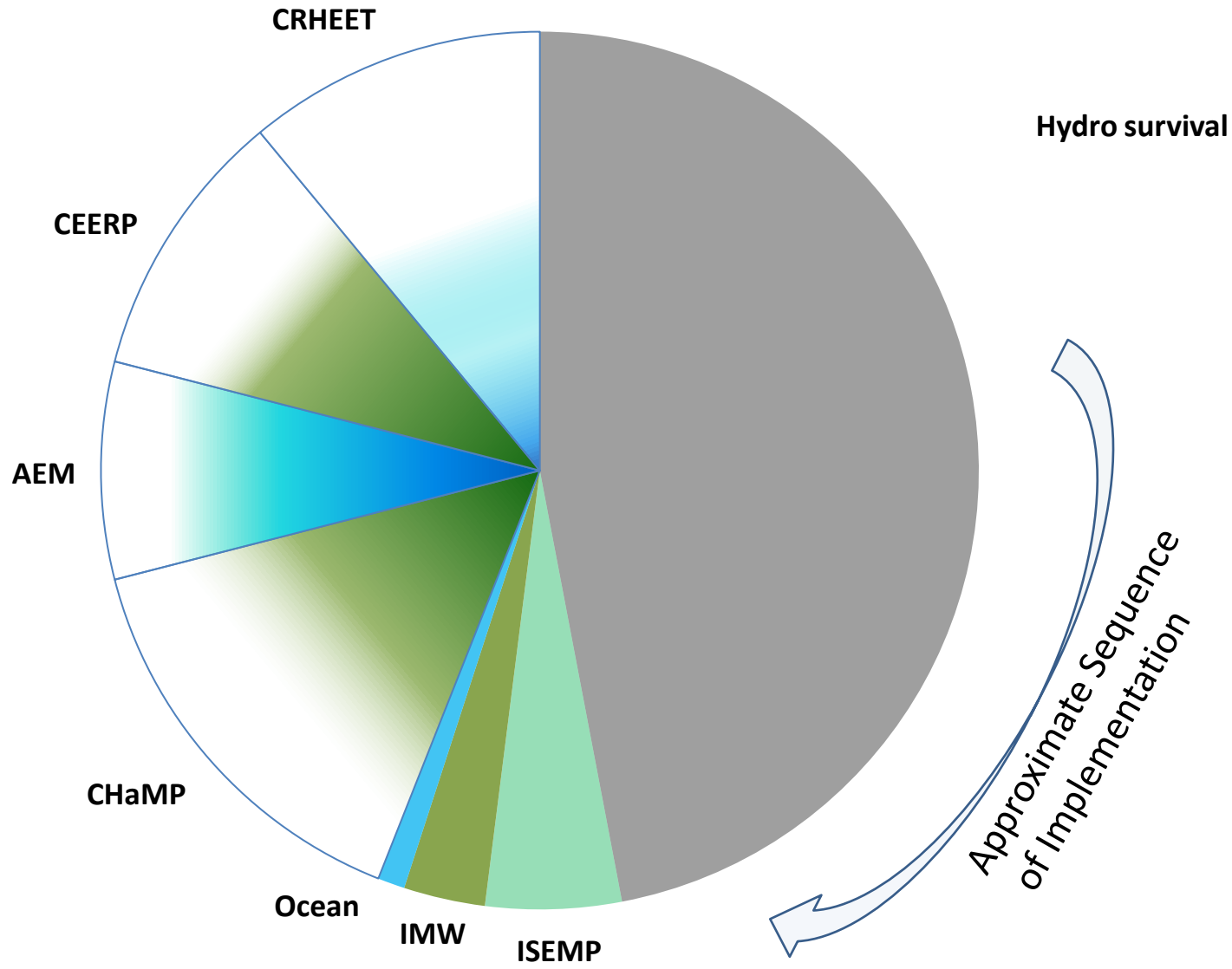


# Fish and Wildlife Program Framework



# Major fish related large scale monitoring systems under the Council's Fish and Wildlife Program

(Monitoring systems still under development only partially shaded.)

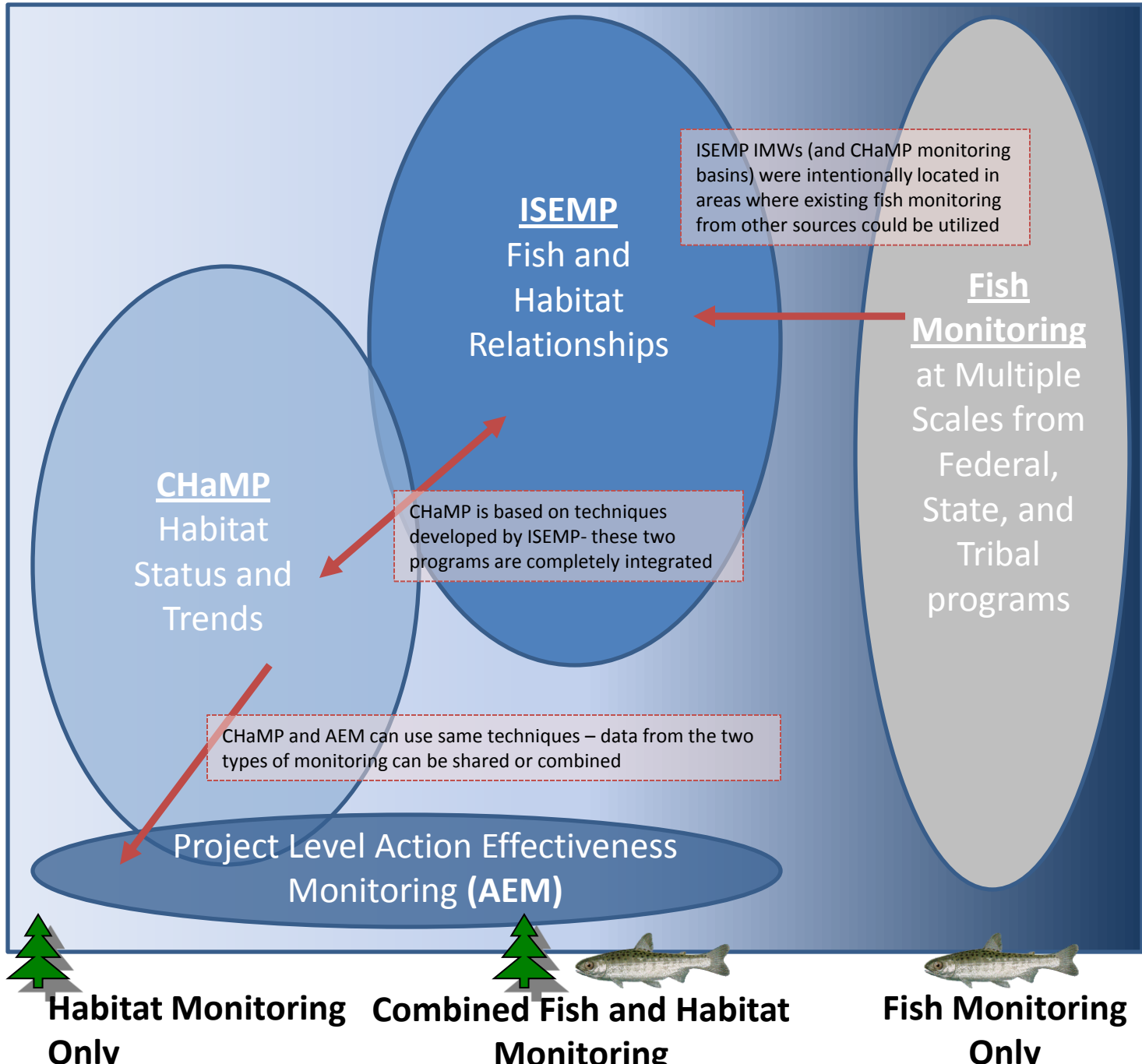




# ISEMP, CHaMP, and Action Effectiveness Monitoring

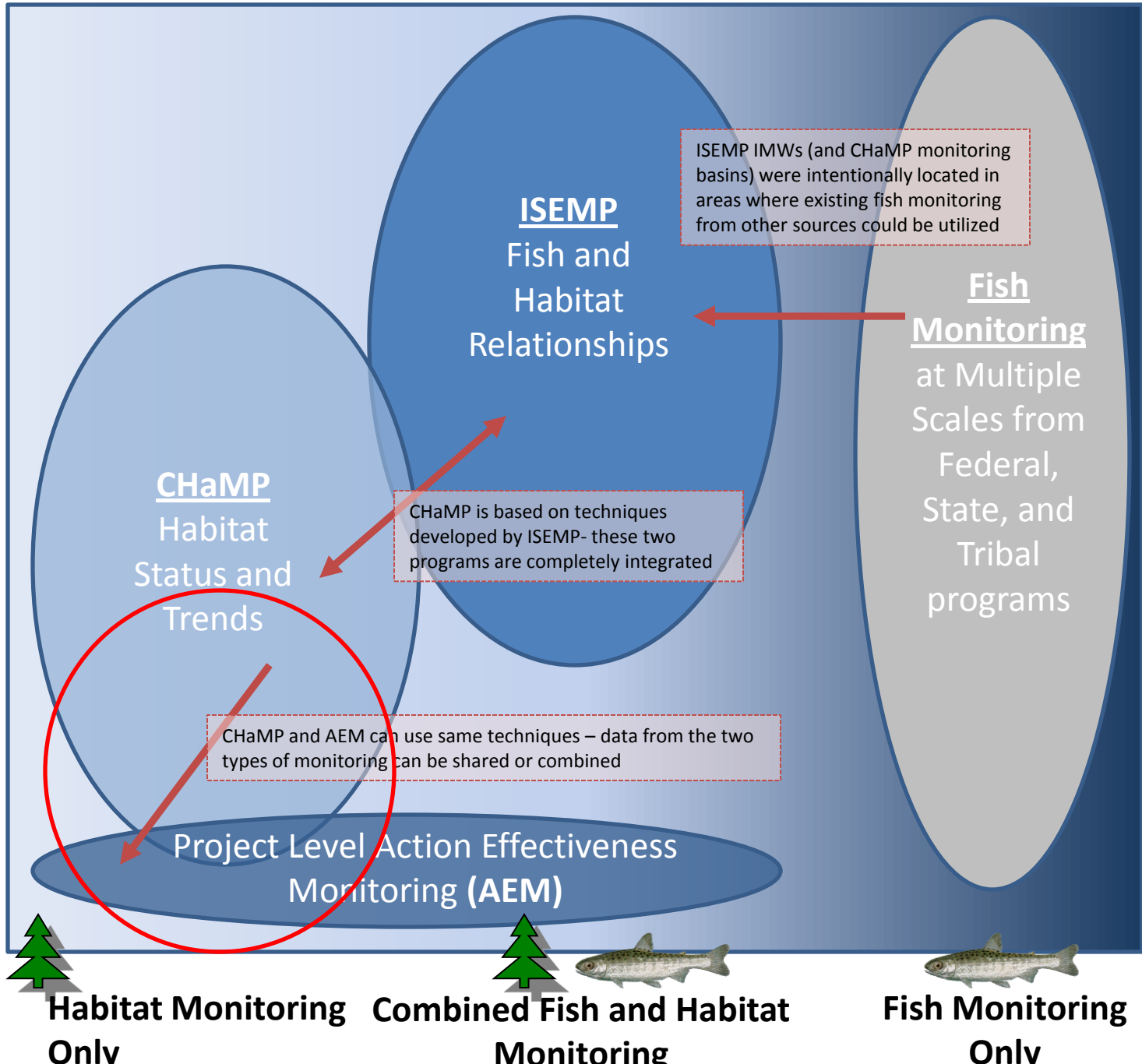
Relationships between RM&E  
Components

Large Scale-  
Populati  
on  
Effects  
(Watershed)



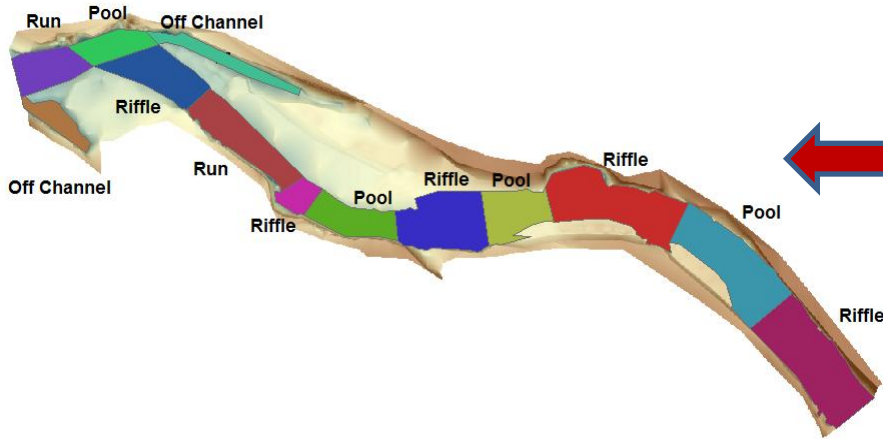
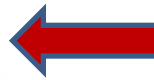
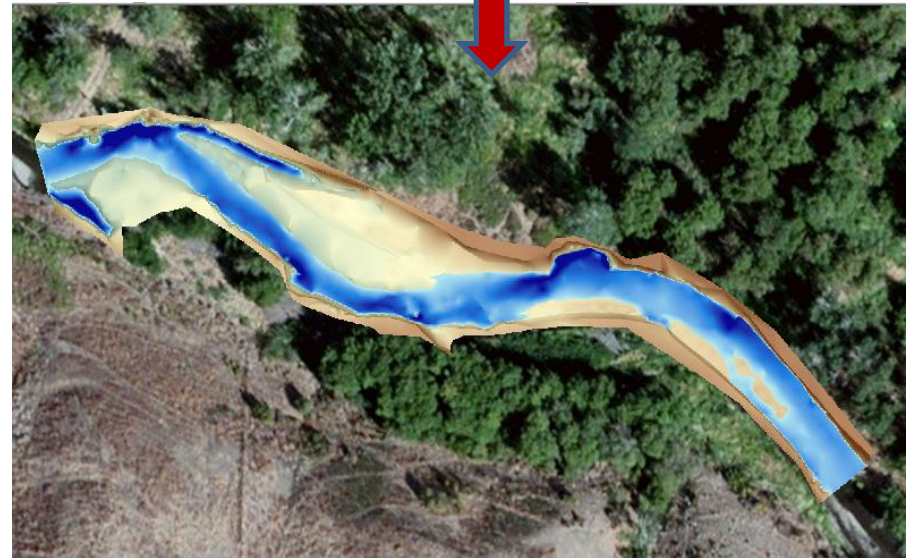
Small Scale-  
Local  
Effect  
(stream-)

Large Scale-  
Populati  
on  
Effects  
(Watershed)

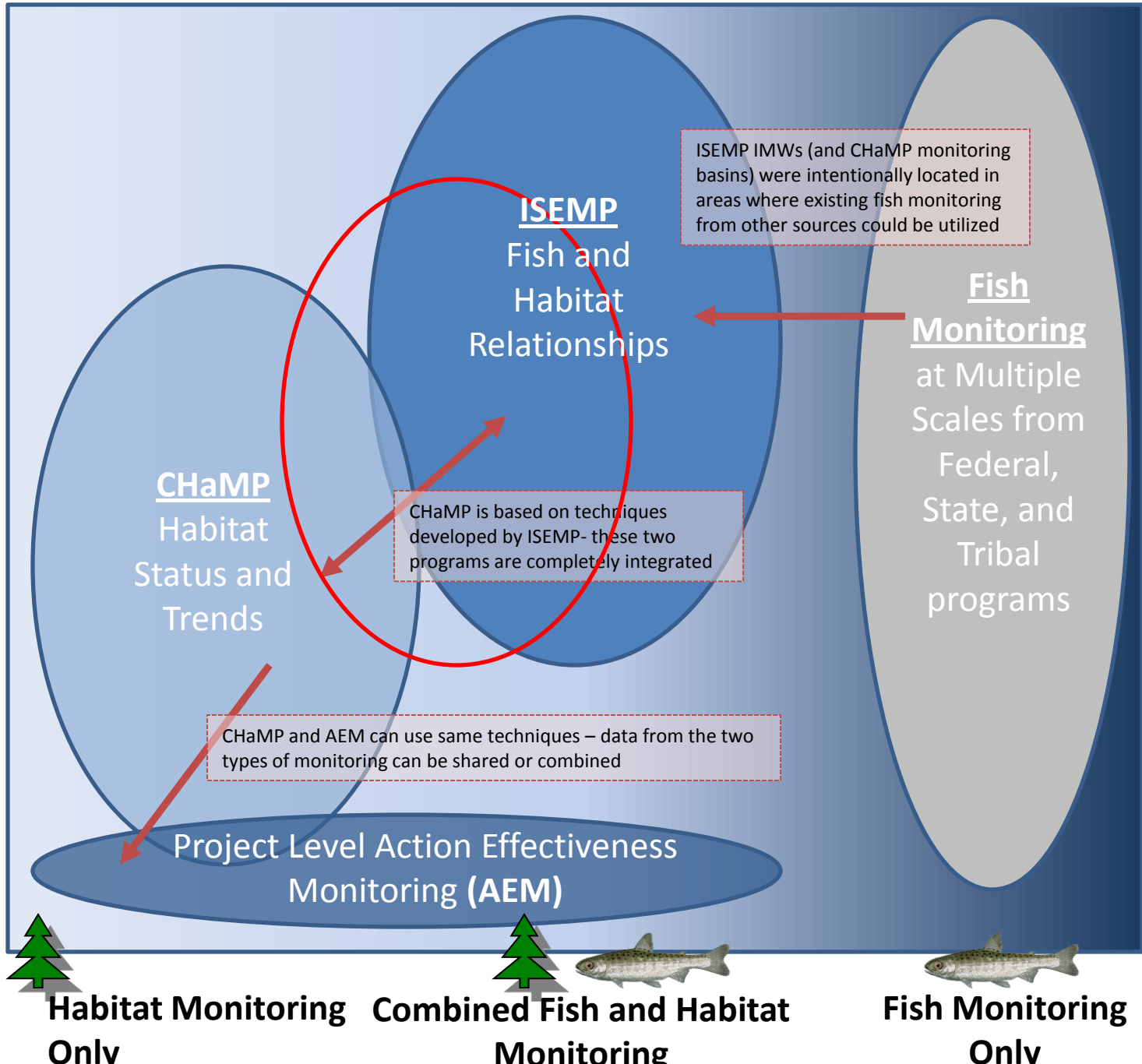


Small Scale-  
Local  
Effect  
(stream-)

# Columbia Habitat Monitoring Program (CHaMP) Data Collection Methods – Topographic Surveys



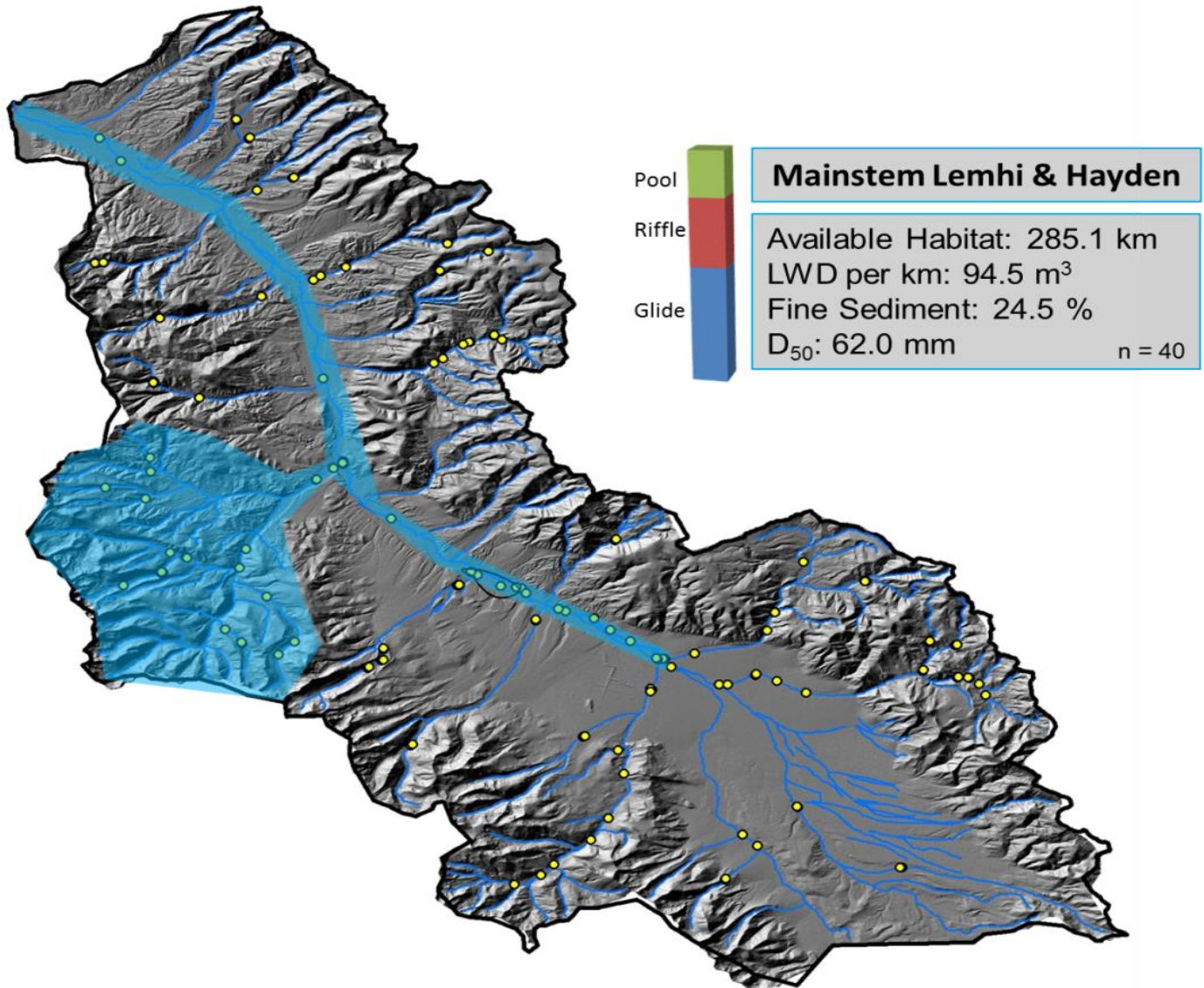
Large Scale-  
Populati  
on  
Effects  
(Watershed)





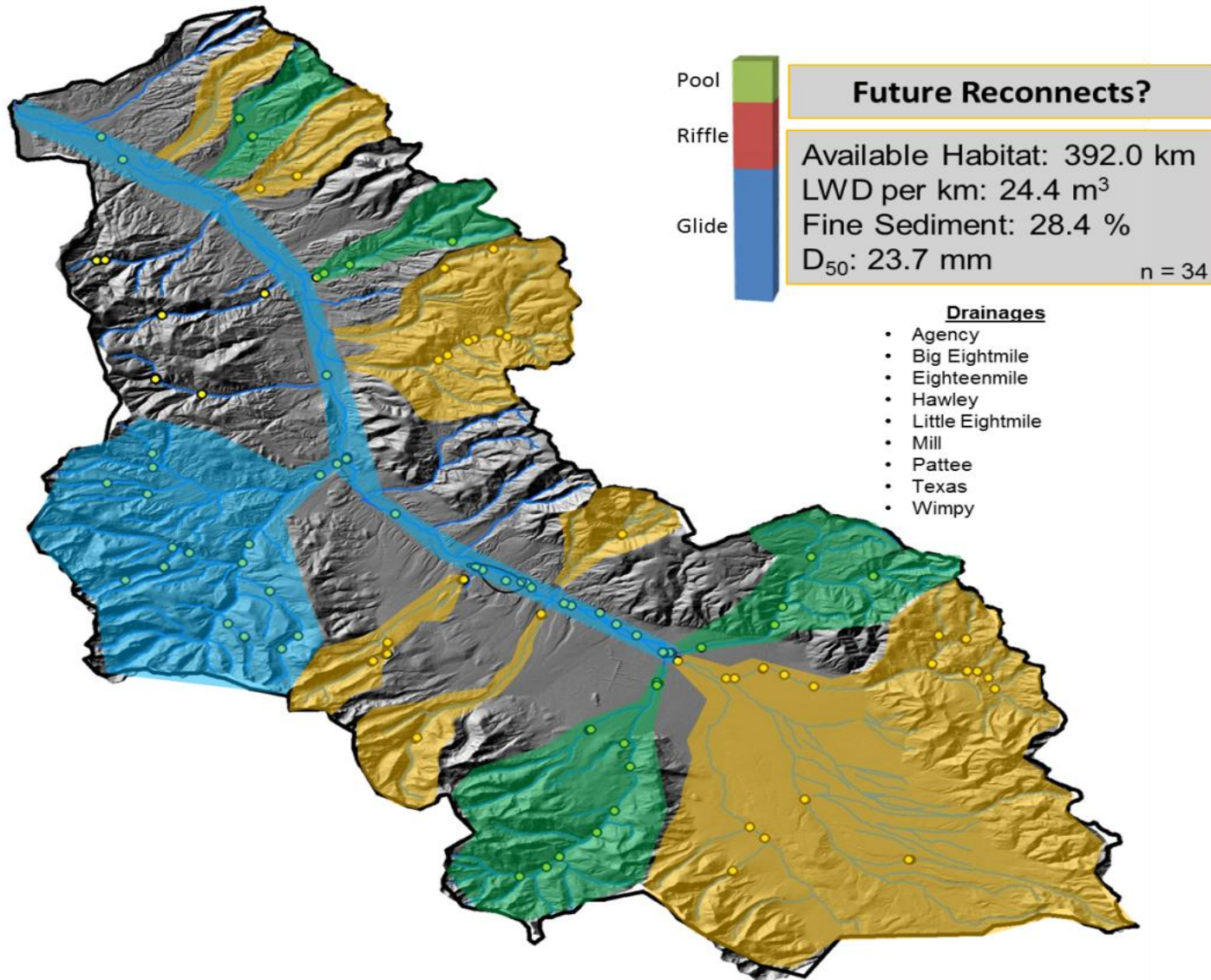
# ISEMP Watershed Model

## - Existing “Anadromous” Habitat in Lemhi



# ISEMP Watershed Model

## -Planned and potential habitat



Number of Smolts/Female

65

60

55

50

45

0

20

40

60

80



Existing



High Priority Reconnection



High & Moderate Reconnection

Number of Smolts

120000

90000

60000

0

20

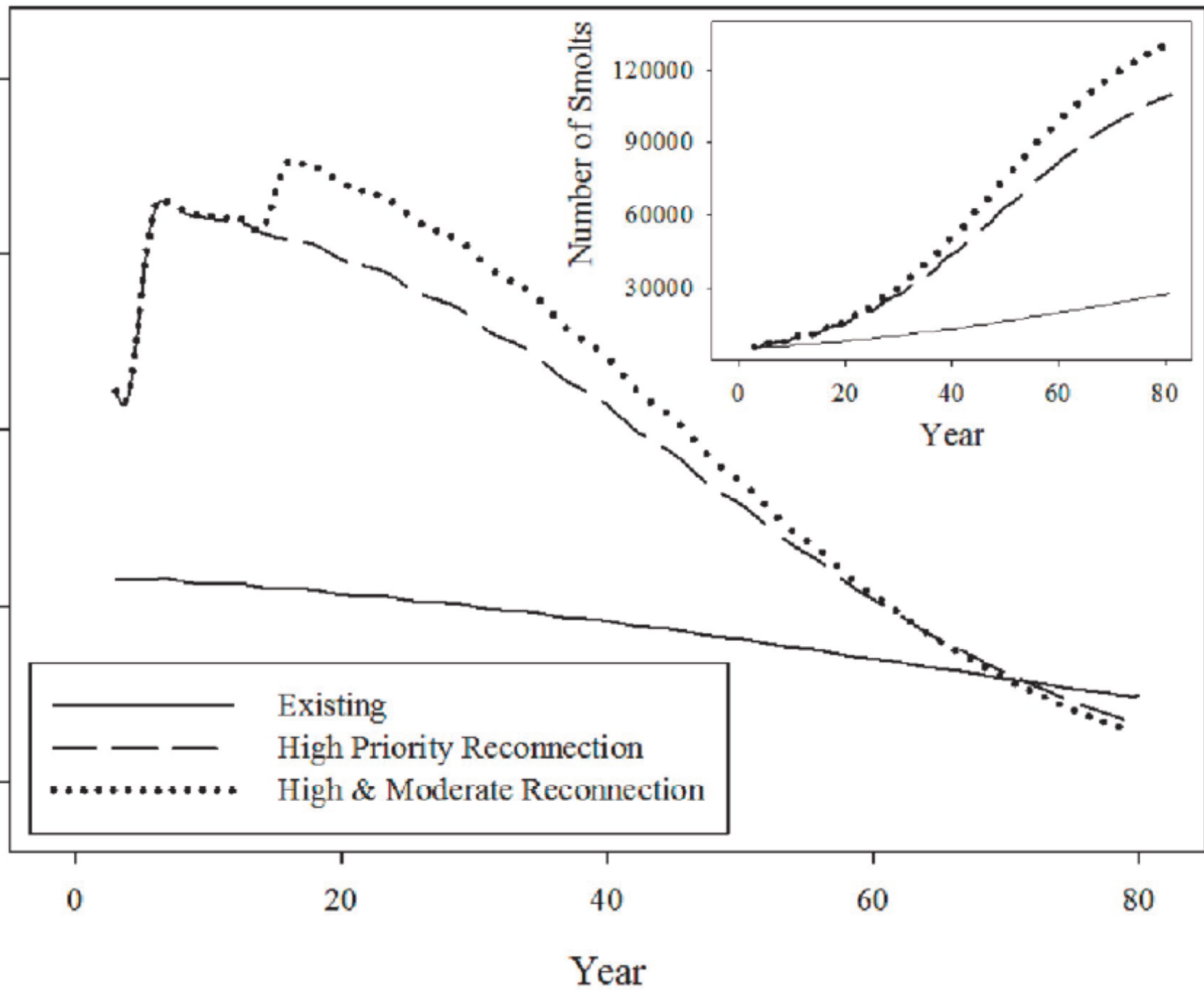
40

60

80

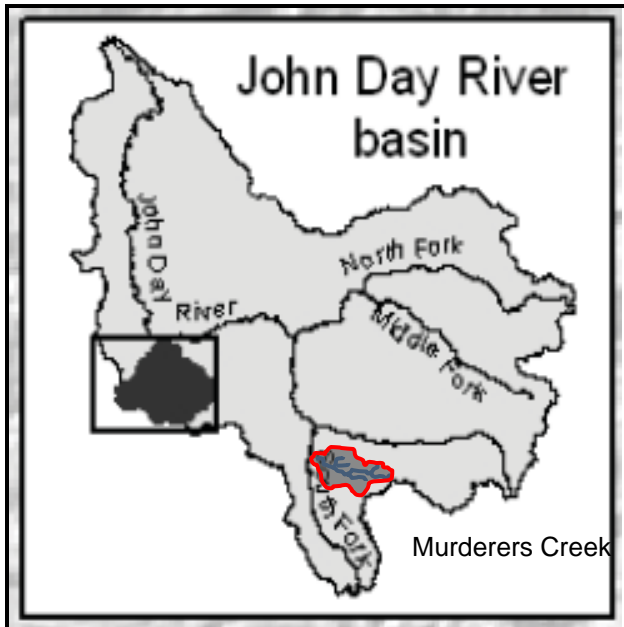
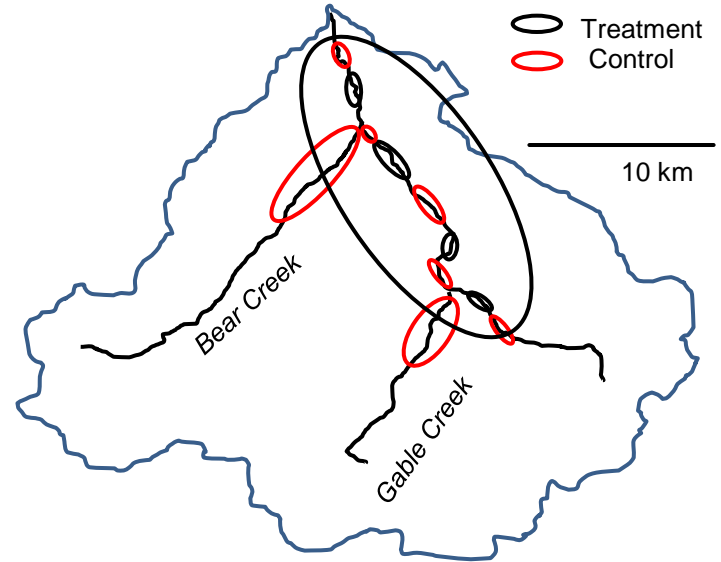
Year

Year

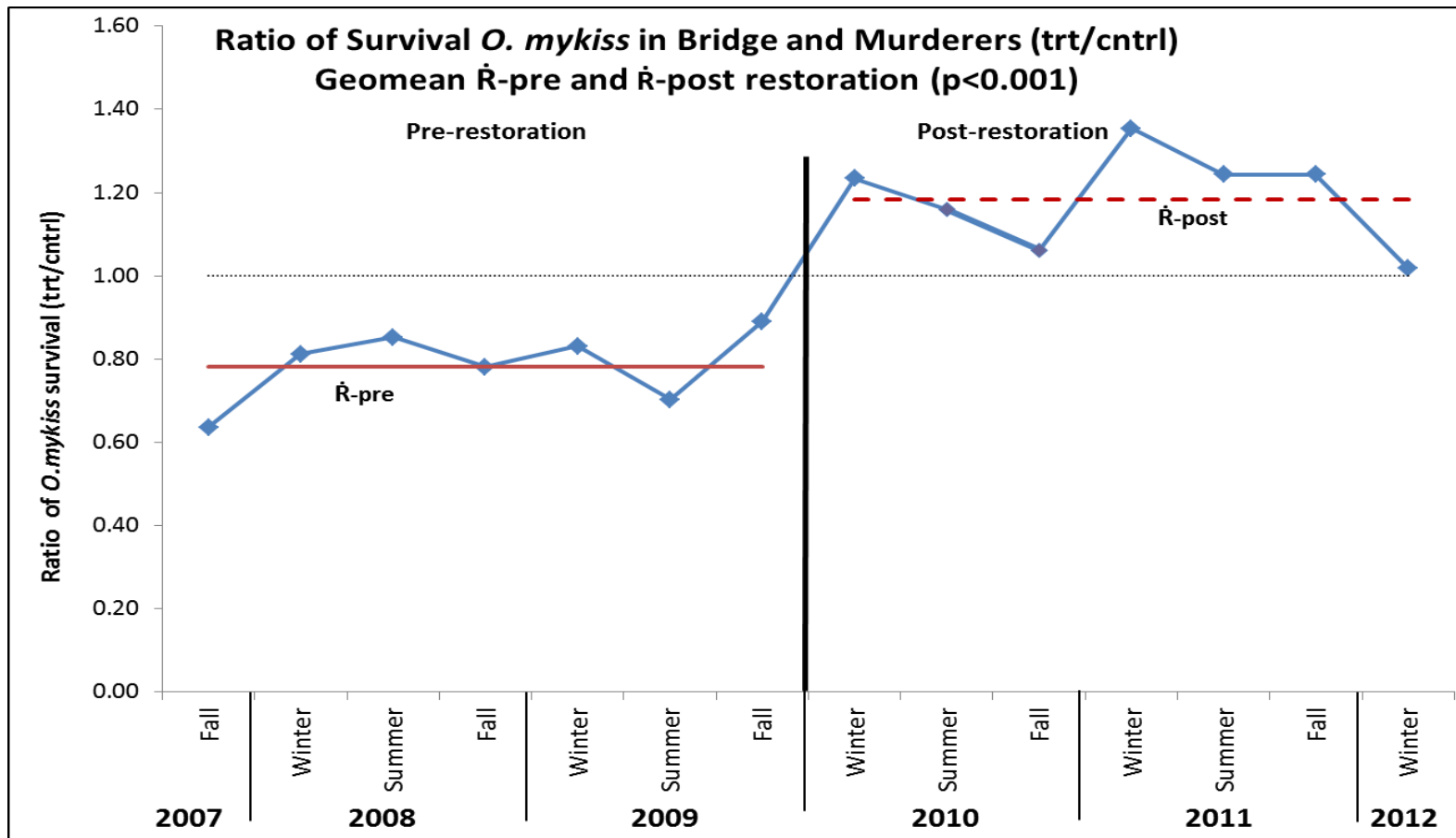




# Bridge Creek IMW



# Survival as a response to treatment actions



Questions?

# ISEMP (FY 13) Project 2003-017-00:

## IMW Action Effectiveness Evaluation

### Habitat Status Monitoring

#### RPA 56.1:

Implement research in select areas of the pilot study basins (Wenatchee, Methow and Entiat river basins in the Upper Columbia River, the Lemhi and South Fork Salmon river basins, and the John Day River Basin) to quantify the relationships between habitat conditions and fish productivity ) to improve the development and parameterization of models used in the planning and implementation of habitat projects.

#### RPA 56.2:

Implement habitat status and trend monitoring as a component of the pilot studies in the Wenatchee, Methow and Entiat river basins in the Upper Columbia River, the Lemhi and South Fork Salmon river basins, and the John Day River Basin.

#### RPA 56.3:

Facilitate and participate in an ongoing collaboration process to develop a regional strategy for limited habitat status and trend monitoring for key ESA fish populations. (CHaMP Habitat protocol implementation in ISEMP)

**RPA 50.4:** Fund status and trend monitoring as a component of the pilot studies in the Wenatchee, Methow, and Entiat river basins in the Upper Columbia River, the Lemhi and South Fork Salmon river basins, and the John Day River Basin to further advance the methods and information needed for assessing the status of fish populations. Cost: Wenatchee \$137K

**RPA 50.6** -- Review and modify existing Action Agencies' fish population status monitoring projects to improve their compliance with regional standards and protocols, and ensure they are prioritized and effectively focused on critical performance measures and populations. Cost \$81K PIT Tag Array O&M and \$119 K Analysis Install Future \$350K

**RPA 57.1:** Action effectiveness pilot studies in the Entiat River Basin to study treatments to improve channel complexity and fish productivity UC Cost \$1,439K

**RPA 57.2:** Pilot study in the Lemhi River Basin to study treatments to reduce entrainment and provide better fish passage flow conditions. Cost \$1,700K

**RPA 57.3:** Action effectiveness pilot studies in Bridge Creek of the John Day River Basin to study treatments of channel incision and its effects on passage, channel complexity, and consequentially fish productivity. Cost \$896K

#### RPA

**57.4** -- Project and watershed level assessments of habitat, habitat restoration and fish productivity in the Wenatchee, Methow, and John Day basins.

### Fish Population Monitoring

**RPA 50.5:** Provide additional status monitoring to ensure a majority of Snake River B-Run steelhead populations are being monitored for population productivity and abundance. Cost \$81K PIT Tag Array O&M and \$115 K Analysis Install Future \$350K

### Life Cycle Modeling (NOAA and EDT)

**RPA 57.5:** Action Agencies will convene a regional technical group to develop an initial set of relationships in FY 2008, and then annually convene the group to expand and refine models relating habitat actions to ecosystem function and salmon survival by incorporating research and monitoring results and other relevant information.

**Regional Coordination and Outreach**  
RPA 71.4

### Data Management

**RPA 72.1:** Continue to work with regional, Federal, State and Tribal agencies to establish a coordinated and standardized information system network to support the RM&E program and related performance assessments.

# 2003-017-00 ISEMP Budget FY 2013

	<b>2013</b>
Upper Columbia	\$1,439,000
Salmon River	\$1,700,000
John Day River	\$896,000
Data Analysis	\$400,000
Project Mgmt	\$280,000
Permits/Tags	\$285,000
2012 pre-contracting	\$0
<b>Total</b>	<b>\$5,000,000</b>