



Columbia Estuary Ecosystem Restoration Program (CEERP)

CEERP Action Effectiveness Monitoring & Research

in the Columbia River estuary, OR/WA

5th National Conference on Ecosystem Restoration (8/1/2013)



**US Army Corps
of Engineers®**



Pacific Northwest
NATIONAL LABORATORY



Lower Columbia
Estuary
Partnership





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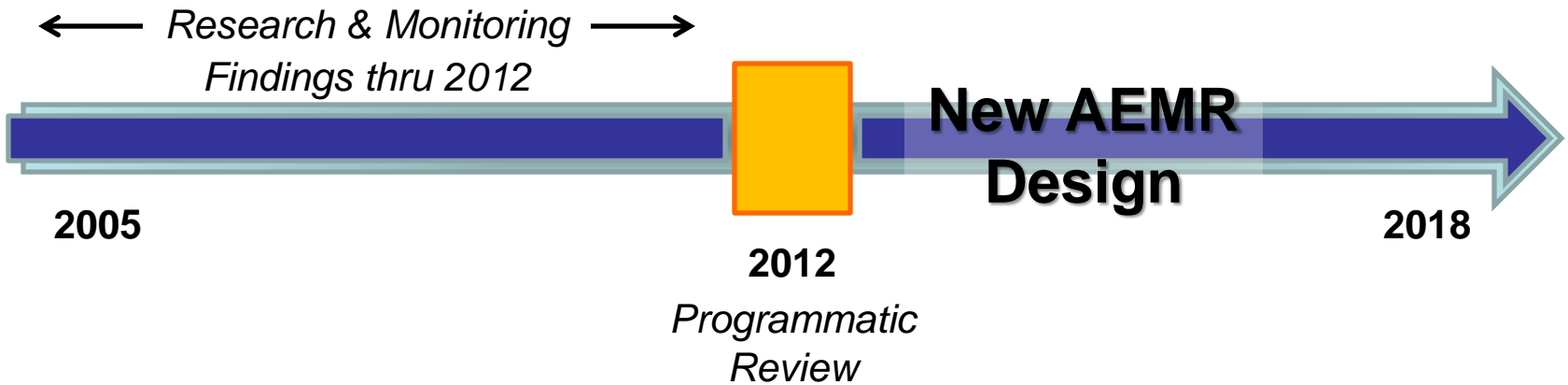
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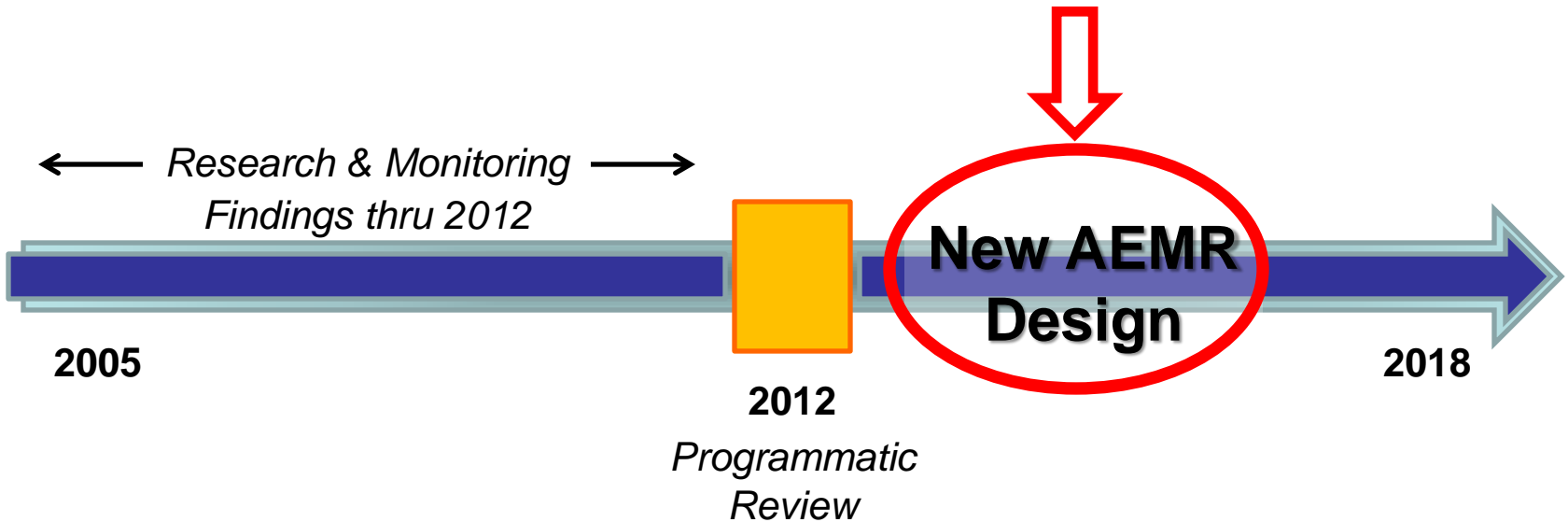
Overview





Overview

- ✓ **Technical Elements**
- ✓ **Prioritization & Implementation**
- ✓ **Application in CEERP**





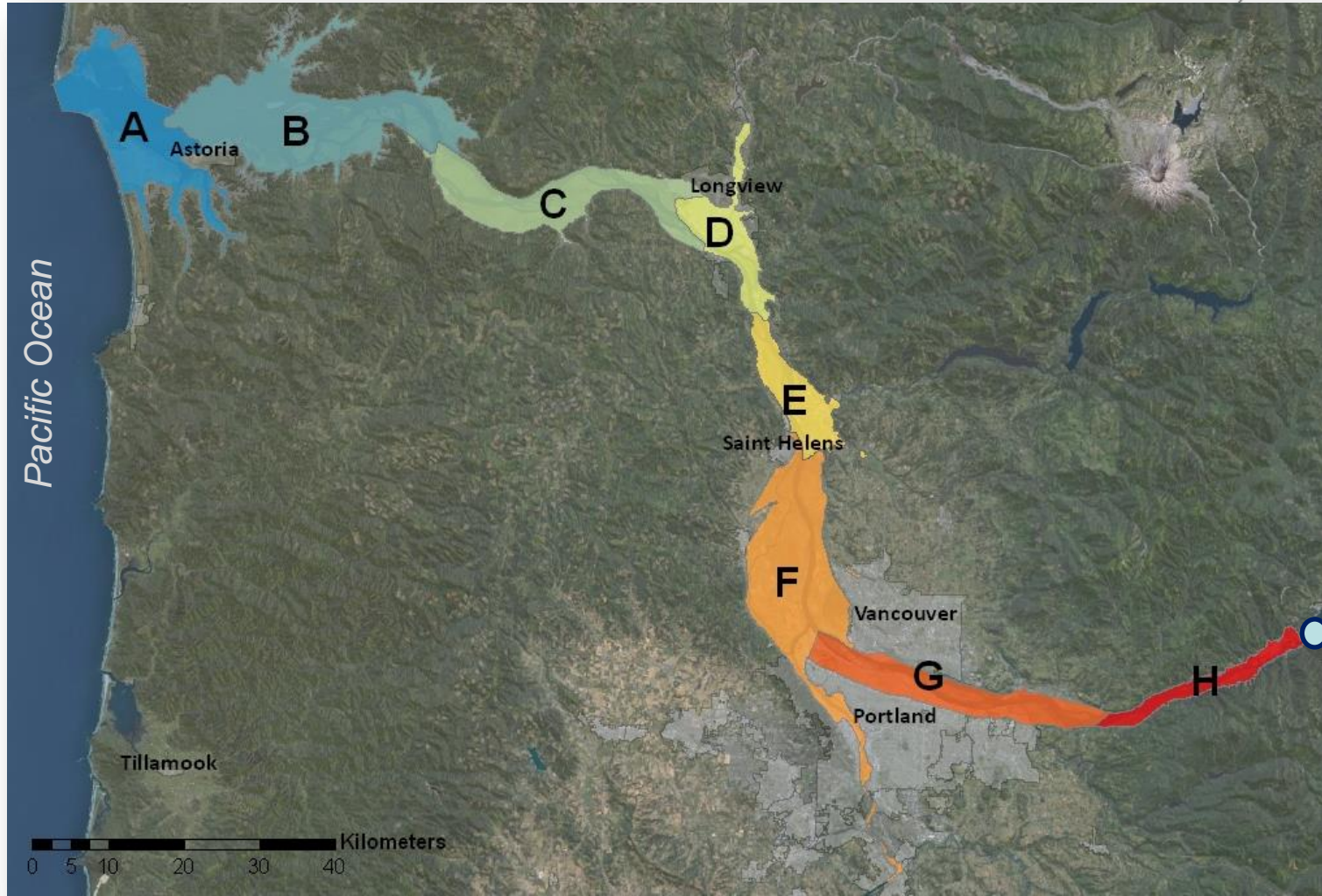
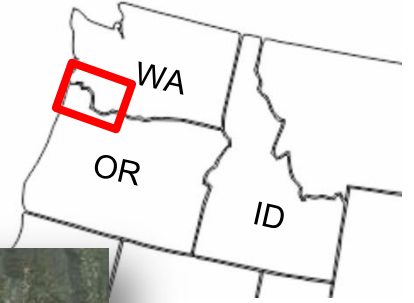
Program Context & AEMR

- CEERP Adaptive Management & AA Coordination
- Regional interest in Action Effectiveness at all restoration sites

- **AEMR Objective: Quantify** ecosystem changes (benefits) resulting from restoration actions
 - Target spp.: juvenile salmonids
 - Indicators: ecosystem capacity within sites; juv salmonid access to sites
 - Ability to generalize results (to some degree)



Lower Columbia River & Estuary



Bonneville Dam



Action Effectiveness

Accomplishments to Date

- Global literature strongly supports benefits of tidal wetland reconnections for juvenile salmonids (Diefenderfer *et al.* 2012)
 - Presence, residence, prey, diet
- Salmonid response at recent LCRE restoration sites is mixed; fast-response variables show restorative ecosystem processes (Diefenderfer *et al.* 2012)
- Thom *et al.* (2013) on hydrologic reconnections:
 - Increased fish access
 - Improved capacity (water temp, prey production)
 - Improved realized function (residence time)
- Creation of standard AE protocols (Roegner *et al.* 2009)



2012 Evaluations

- Since 2004, 15% BPA/Corps habitat actions received AE monitoring
- Limited spatial representation & applicability of results across sites
 - Most in lower 90 rkm
- Inconsistent allocation of action effectiveness funding across partners, types of actions
- Variable designs, types of responses measured
 - Many lacked pre- data, reference sites, statistical analyses



2012+ Implementation Objectives

- Have some level of ecological effectiveness monitoring at all sites
- Objective site selection for AEMR
- Efficient use of program budget
- Efficient use of fish take permits

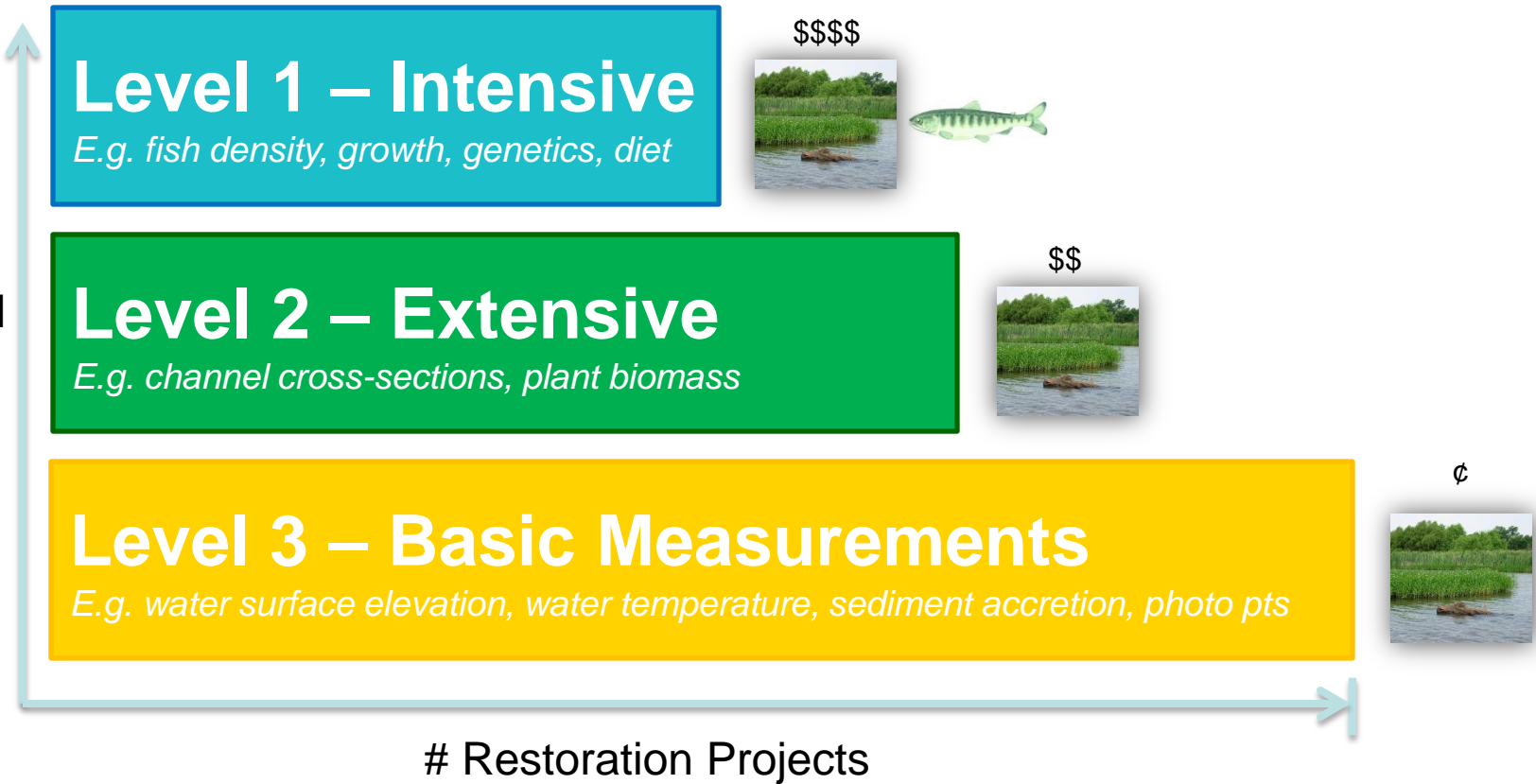




New AEMR Design
Technical Elements
 Prioritization & Implementation
 Application in CEERP

3-Tiered Approach:

Monitored Indicators



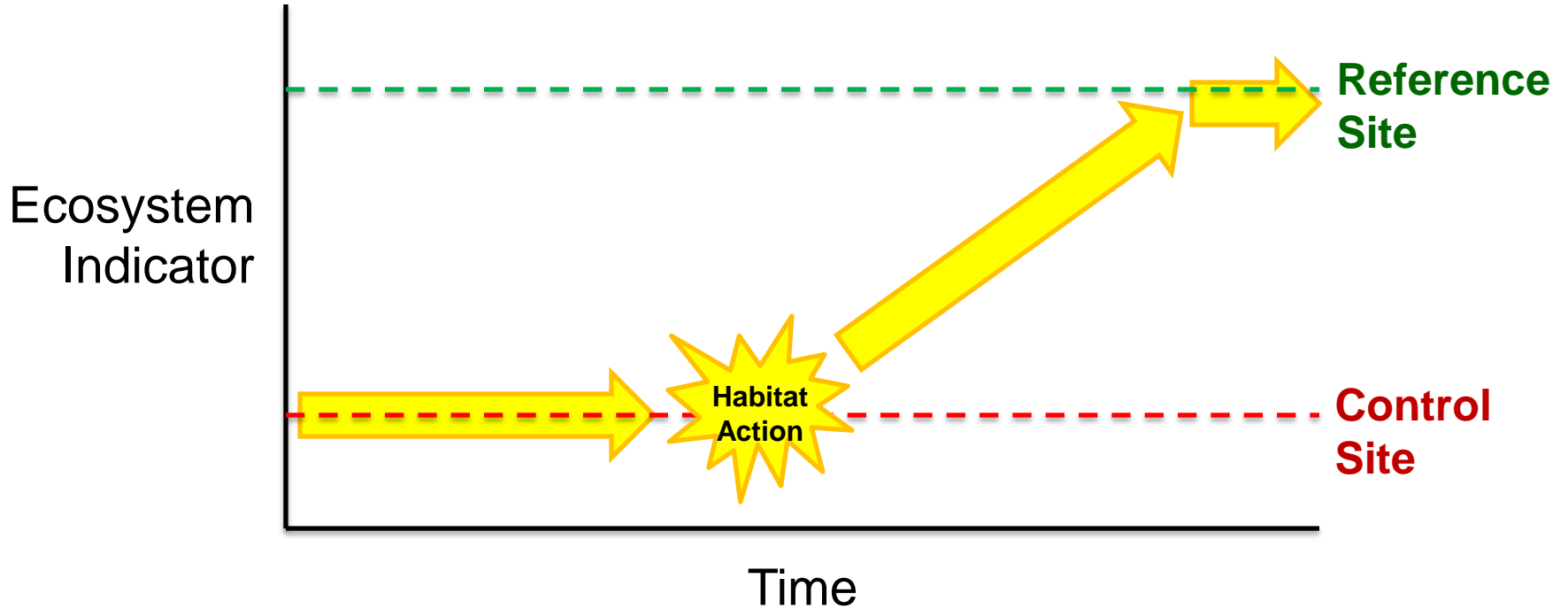
~Use **ratio estimators** between levels, where possible



New AEMR Design
Technical Elements
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Reference & Control Sites

(Used whenever possible)



Note: natural variation omitted here for conceptual purposes

**New AEMR Design**

Technical Elements

Prioritization & Implementation

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Prioritization Criteria

Weights

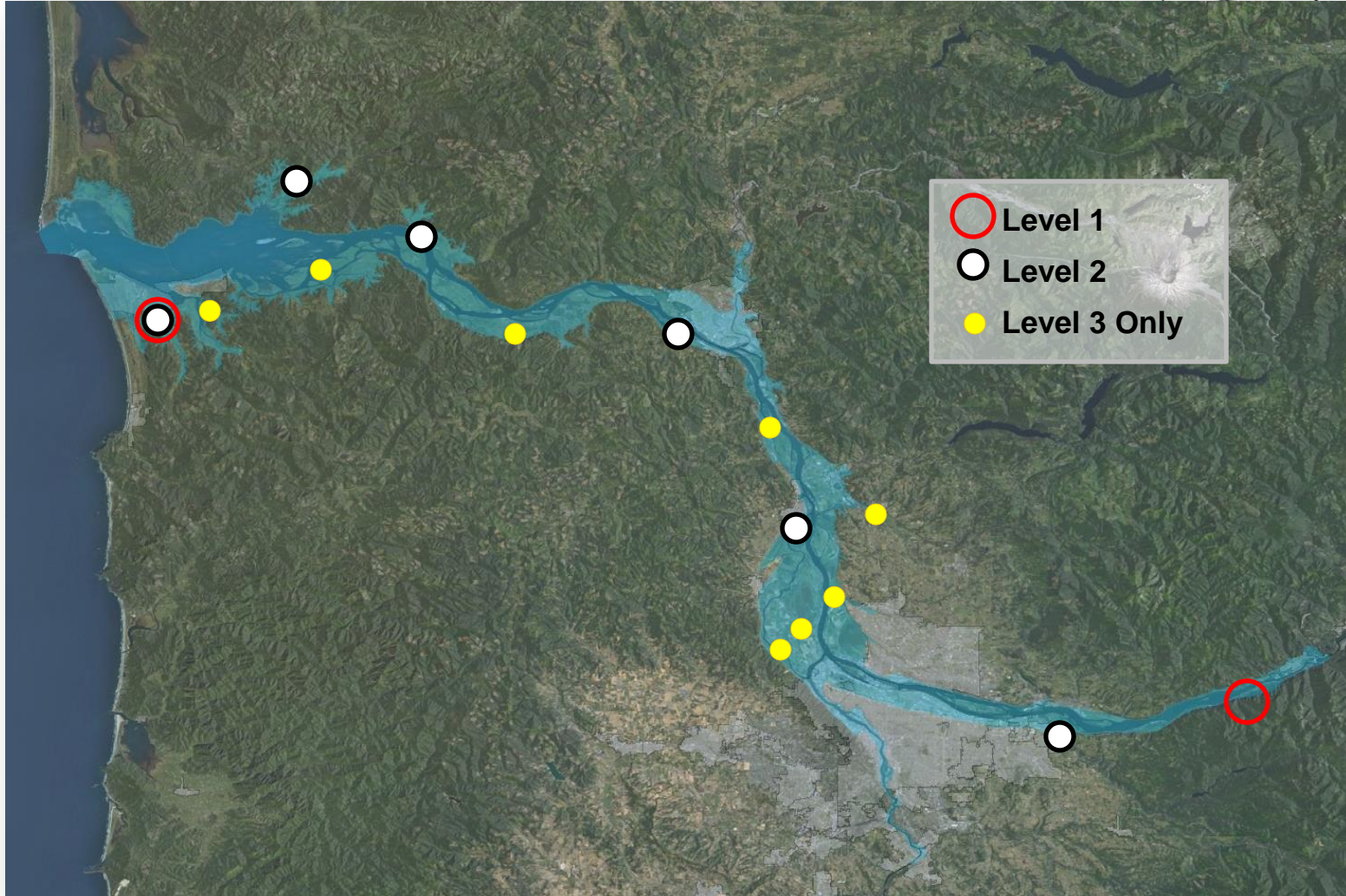
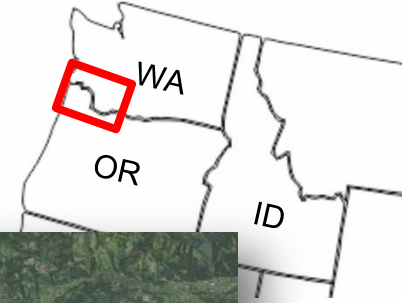
- (3) Addresses an ERTG uncertainty
- (2) Preliminary SBU
- (2) Type of restoration action
- (1) No. actions proposed in same reach
- (1) Amt. previous AEMR in that reach

➤ Final Ranking QA/QC

- Incl. management application adjustments or project delays, etc.



2013 Implementation



**New AEMR Design**

Technical Elements

Prioritization & Implementation

Application in CEERP

Tracking Results

- Hypothesis > Response Metric(s) > Actual Response(s) Over Time

- Standard data collection protocols
 - Compare metrics at different sites
 - Data reduction procedures

- Common database for AA projects



New AEMR Design
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Adaptive Management

- Updates to Strategy Report and Action Plan





Summary

- Integrated AA habitat program
- Improved linkages between RM&E, implementation of estuary habitat actions
 - Use current/future implementation needs to prioritize AEMR topics + sites
- Improved efficiency of program resources to infer results across sites





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**A Programmatic Plan for Restoration
Action Effectiveness Monitoring and
Research in the Lower Columbia River
and Estuary**

Prepared by O. Johnson, C. Coaker, J. Doumbia, J. Eger, J. M. Schwartz, R. Swanson, and C. Studebaker

This document presents a plan for a programmatic approach to action effectiveness monitoring and research (AEMR) that regional stakeholders can implement to support the Columbia Estuary Ecosystem Restoration Program (CEERP) and the broader estuary restoration effort. The "action" and habitat restoration projects in the lower Columbia River and estuary (LCRE). The objective of AEMR is to determine the success of restoration actions at the landscape and reach scales in terms of improved ecosystem functionality, especially as it relates to juvenile salmon performance. The work is being conducted in the CEERP action management framework (BPA Corp 2011), within which restoration actions are implemented, AEMR is conducted, and results are analyzed, synthesized, and reported to decision makers to inform, adjust to, and improve the program strategy and subsequent restoration actions in the next cycle. AEMR is essential to the adaptive management process and the restoration effort.

Regional stakeholders, such as restoration project sponsors, can use this programmatic approach to provide context for their project-specific AEMR effort. Stakeholder goals include using AEMR to determine if their restoration actions were successful in meeting the project's objectives, identify opportunities to increase project effectiveness, and improve effectiveness in AEMR efforts. These project-specific goals align with broader goals of CEERP programs, restoration efforts, and the collective success of multiple restoration projects conducted across landscapes, the state of Washington, and the Pacific Northwest. AEMR is essential to the adaptive management process and the restoration effort.

¹ Pacific Northwest National Laboratory (PNNL)
² Lewis Clark State University (LCSU)
³ Bonneville Power Administration (BPA)

⁴ U.S. Army Corps of Engineers, Portland District (Corps)

⁵ Action-effectiveness monitoring is the specific restoration monitoring of action outcomes, whereas action-effectiveness research is more general research to understand and improve the effectiveness of restoration actions.

⁶ CEERP is an acronym created in 2011 for the use of BPA Corp. officials to refer to the LCRE action plans that resulted in the 2012 Action Columbia River Project (ACRP) Strategic Action Plan (SAP) (BPA 2012) and are in compliance to subsequent PCRP BiOp, ReConnect[®] Plan and WRIA 8 Program, and various Corps restoration activities.

(For full document, please send us an e-mail)