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August 30, 2012

MEMORANDUM

TO: Fish and Wildlife Committee Members

FROM: Patty O'Toole, Program Implementation Manager

SUBJECT: Presentation on the Columbia Estuary Ecosystem Restoration Program (CEERP)

In its final recommendations (July 2011) for the [Review of Research, Monitoring and Evaluation and Artificial Production Projects](#) the Council called for "the responsible entities to complete an estuary-wide synthesis prior to the initiation of the review of habitat actions." The Bonneville Power Administration (Bonneville) and Corps of Engineers (Corps) responded to this recommendation and submitted the *Columbia Estuary Ecosystem Restoration Program* (CEERP) for ISAB review to meet the Council's recommendation. The CEERP consists of three related documents: a synthesis memorandum, the 2012 strategy report and the 2012 Action Plan.

At the time of the July 2011 review the Council was concerned that there appeared to be a lack of coordination and communication among different activities in the estuary, and especially a lack of a sufficiently developed framework for linking actions and effectiveness monitoring and evaluation. One illustration of the problem: Program implementation includes two habitat projects to address the Biological Opinion habitat needs (*CREST Estuary Habitat Restoration* (2010-004-00) and *Columbia Land Trust Estuarine Restoration* (2010-073-00)). Both received unfavorable reviews in 2010 from the ISRP. The Panel recognized the importance of these projects for the FCRPS Biological Opinion's habitat restoration effort in the estuary. Yet it was unclear to the ISRP how these two projects actually fit into an overarching approach to the estuary linking habitat restoration actions to limiting factors and management decisions to monitoring and evaluation activities. Bonneville and the Corps propose that the CEERP will meet the needs of the Council to address an overarching framework need. Revised CREST and CLT project proposals will be submitted for ISRP review later this fall during the review of habitat proposals.

At the September Fish and Wildlife Committee meeting Ben Zelinsky and Julie Doumbia from Bonneville will present an overview of the Columbia Estuary Ecosystem Restoration Program (CEERP).

The CEERP documents have been submitted to the Independent Scientific Advisory Board for their review. The ISAB may have this review completed in time to present their findings at the September Fish and Wildlife Committee meeting.

No decision is requested, this is an informational item.



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Columbia Estuary Ecosystem Restoration Program (CEERP)

Presentation to Fish Committee
Sept 11, 2012



Outline



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- Overview of CEERP
- 2013 Strategy Report (SR)
- 2013 Action Plan (AP)
- 2012 Synthesis Memorandum (SM)



Part I: Overview of CEERP



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- Goal and objectives
- Drivers
- Scope
- Adaptive management framework



CEERP Goal and Objectives



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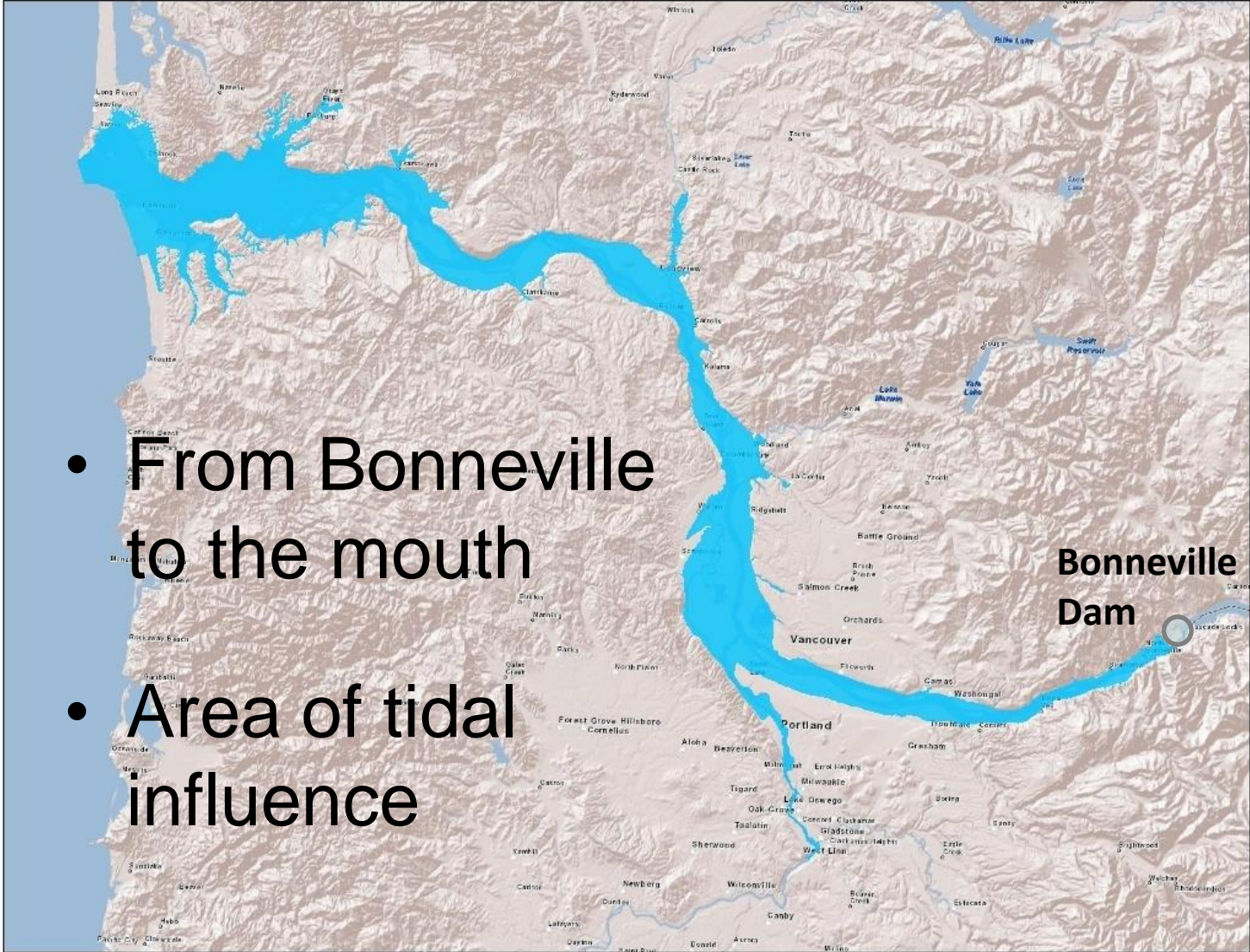
- Goal
 - understand, conserve, and restore ecosystems in the Lower Columbia River Estuary (LCRE)
- Objectives
 - Increase the opportunity for access by aquatic organisms to and for export of materials from shallow-water habitats
 - Increase the capacity and quality of estuarine and tidal-fluvial ecosystems
 - Improve ecosystem realized functions (growth, condition, fitness)



Geographic Location



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- From Bonneville to the mouth
- Area of tidal influence



Drivers



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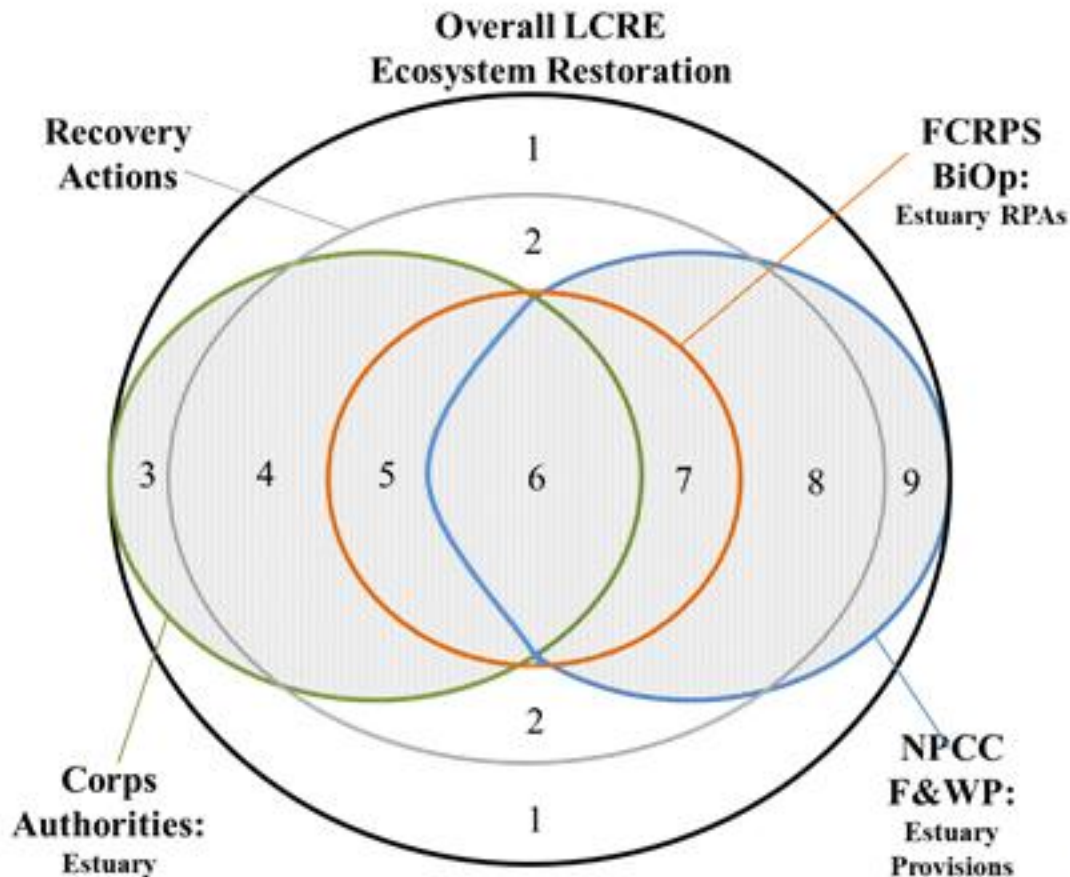
- **Northwest Power and Conservation Council Fish and Wildlife Program** (Council 2009) – the Council’s program has strategies for estuary habitat reconnections, long-term effectiveness monitoring, estimation of juvenile salmon survival rates, impacts from estuary stressors, and partnerships.
- **Water Resources Development Acts** (Sections 206, 536, and 1135) and the Lower Columbia River Ecosystem Restoration General Investigations Study – the Corps has authorities to restore LCRE ecosystems under various federal laws.
- **Biological Opinions** (BiOps) for operation of the Federal Columbia River Power System (FCRPS) (NMFS 2000, 2004, 2008, 2010) – LCRE habitat restoration is an offsite mitigation action to help hydrosystem operations avoid jeopardizing ESA-listed salmonids.



CEERP Scope



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- Legend:** LCRE restoration funded by...
- 1 = Entities besides the BPA and Corps for ecosystem restoration,
 - 2 = Entities besides the BPA and Corps for recovery actions for listed fish
 - 3 = Corps outside BiOp and recovery
 - 4 = Corps outside BiOp
 - 5 = Corps for BiOp
 - 6 = BPA+Corps for BiOp
 - 7 = BPA for BiOp
 - 8 = BPA outside BiOp
 - 9 = BPA outside BiOp and recovery

- *CEERP covers everything BPA and the Corps fund in the Estuary*
- *The best actions/strategies will support multiple programs/objectives*



Adaptive Management Framework



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Part 2: 2013 Strategy Report



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- SM informs management decisions/strategy
- Restoration Strategy/Priorities
- RME Strategy/Priorities



Mill Road



Restoration Strategy



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- **Primary** – restore hydrologic reconnections to improve access and capacity (dike modification)
- **Secondary** - improve the quality of existing habitats (planting, invasive removal)

This strategy comes from multiple complimentary sources



Expert Regional Technical Group (ERTG)



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- Estimate survival benefits units (SBU) for ocean- and stream-type juvenile salmon
- Called for in the 2008 FCRPS Biological Opinion – RPA 37



ERTG Guidance → Strategy



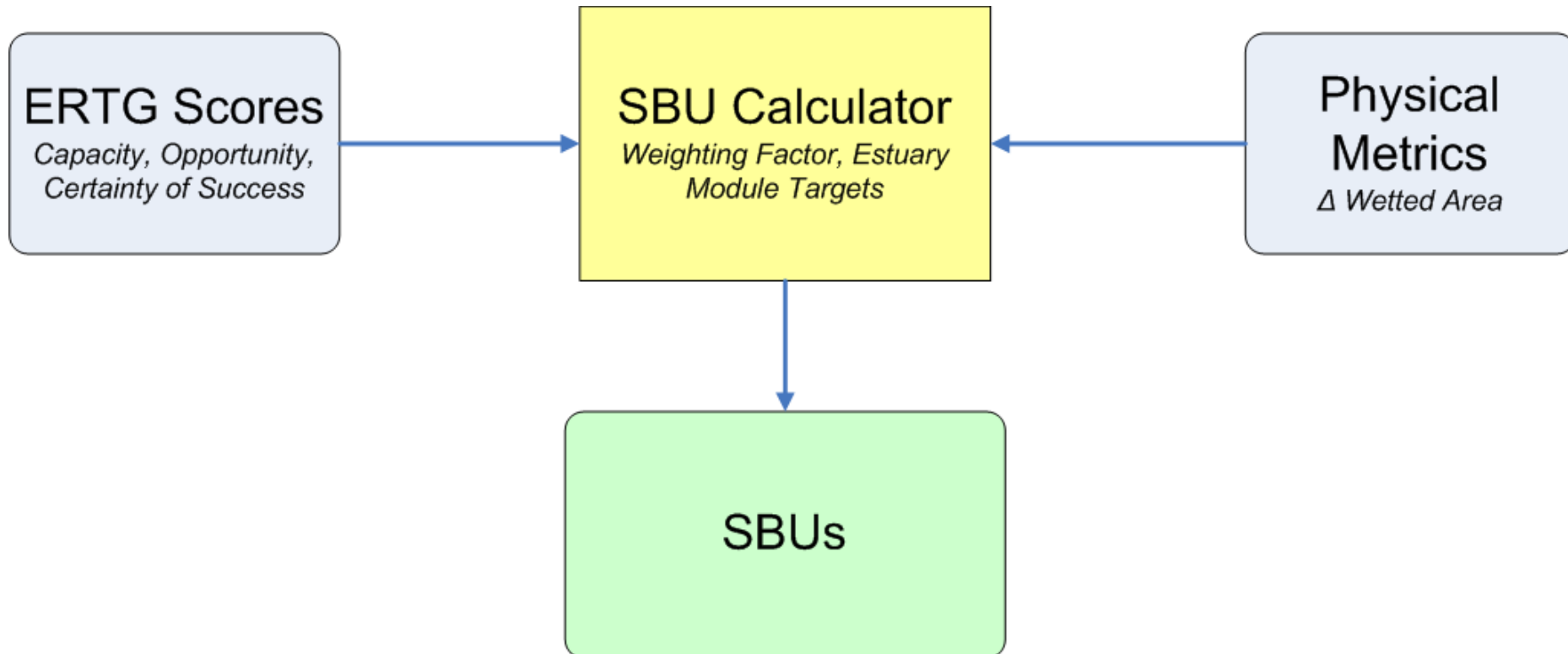
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- Bigger area is better than smaller area
- Close to the main stem is better than farther away
- Restoring remnant channels is better than excavating new ones
- Natural processes are preferred over engineered processes
- A holistic perspective from a landscape scale is better than narrow, site-specific perspective.



Columbia Stock Ranch

What is an SBU?



An estimate of the benefit a habitat project will provide for juvenile salmon

Coarse Filter for Planning

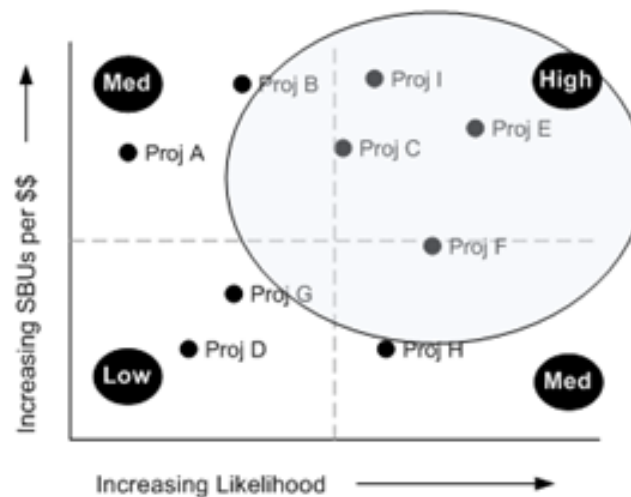
1) Identify Opportunities



2) Prioritize



3) Assign



Project Name	Sponsor
Tier 1 (Immediate):	
Project C	Sponsor A
Project E	Sponsor B
Project I	Sponsor E
Tier 2 (Next):	
Project B	Sponsor B
Project A	Sponsor C
.....

- Project Identification Meetings
- Completed on 9/14-15

- Identify priority projects
- In any given year, find balance between restoration and acquisition to ensure consistent progress toward SBU goals

- Assign projects based on sponsor contacts, strengths and capacity to deliver



Additional Technical/Strategic Resources



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- Characterization of Disturbance Regimes (Estuary Partnership 2012)
- Habitat Change Analysis (Estuary Partnership 2012)
- Habitat Suitability Index Model (Estuary Partnership 2012)
- Inventory and Map of Tidally Impaired Floodplain Habitat (Estuary Partnership 2012)
- Application of the Ecosystem Classification System (Simenstad et al. 2011)
- Landscape Planning Framework (Simenstad et al. 2011)
- Guide to the Lower Columbia River Ecosystem Restoration Program (Estuary Partnership 2012)



RME Strategy and Prioritization



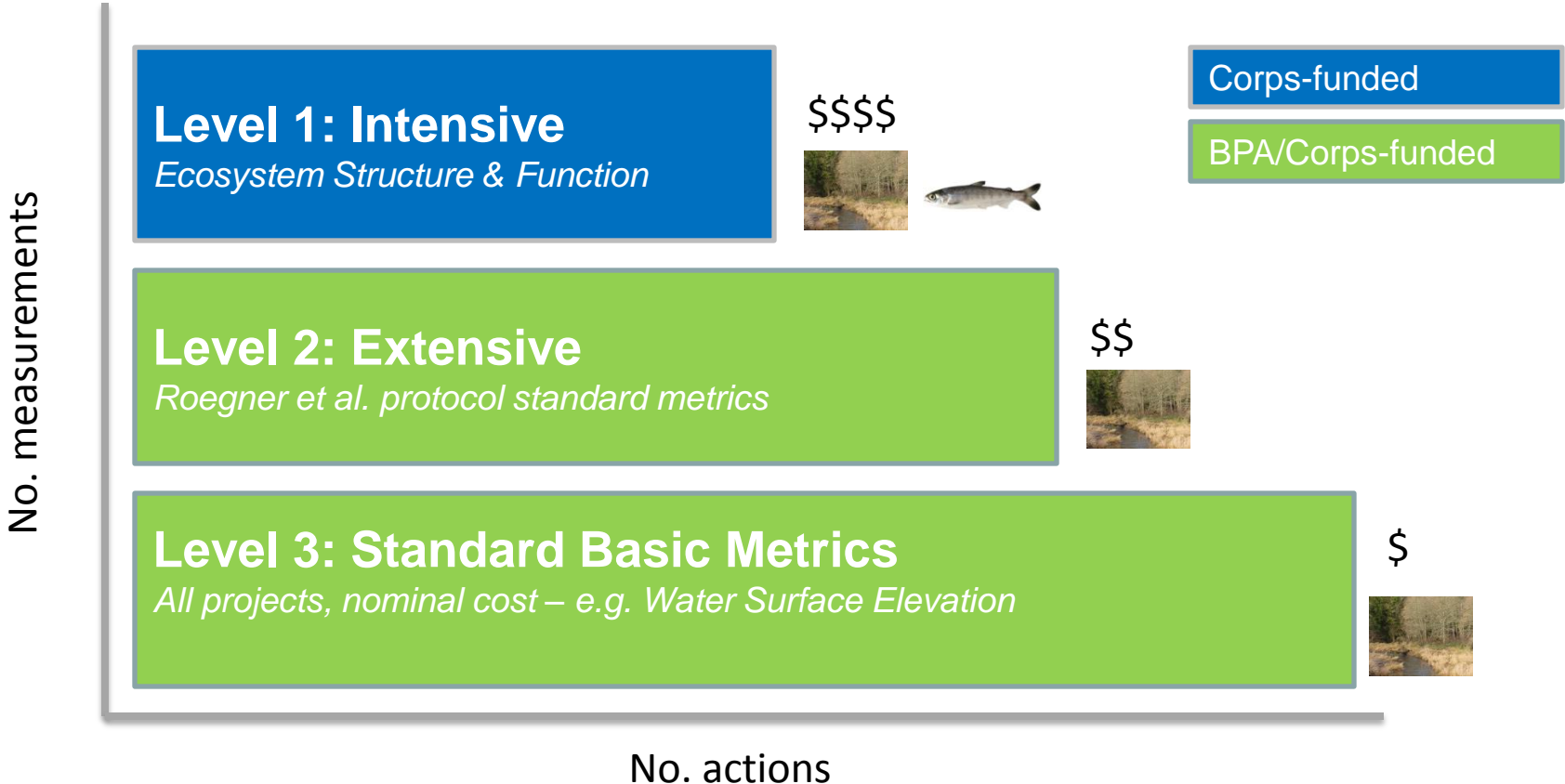
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Which habitat restoration actions yield the greatest benefit to juvenile salmon at the least cost?

Action Effectiveness & Ecosystem Function

- Habitat access/opportunity
- Habitat capacity/quality
- Habitat realized function relevant to juvenile salmonids
 - Juvenile salmon growth, condition, and survival

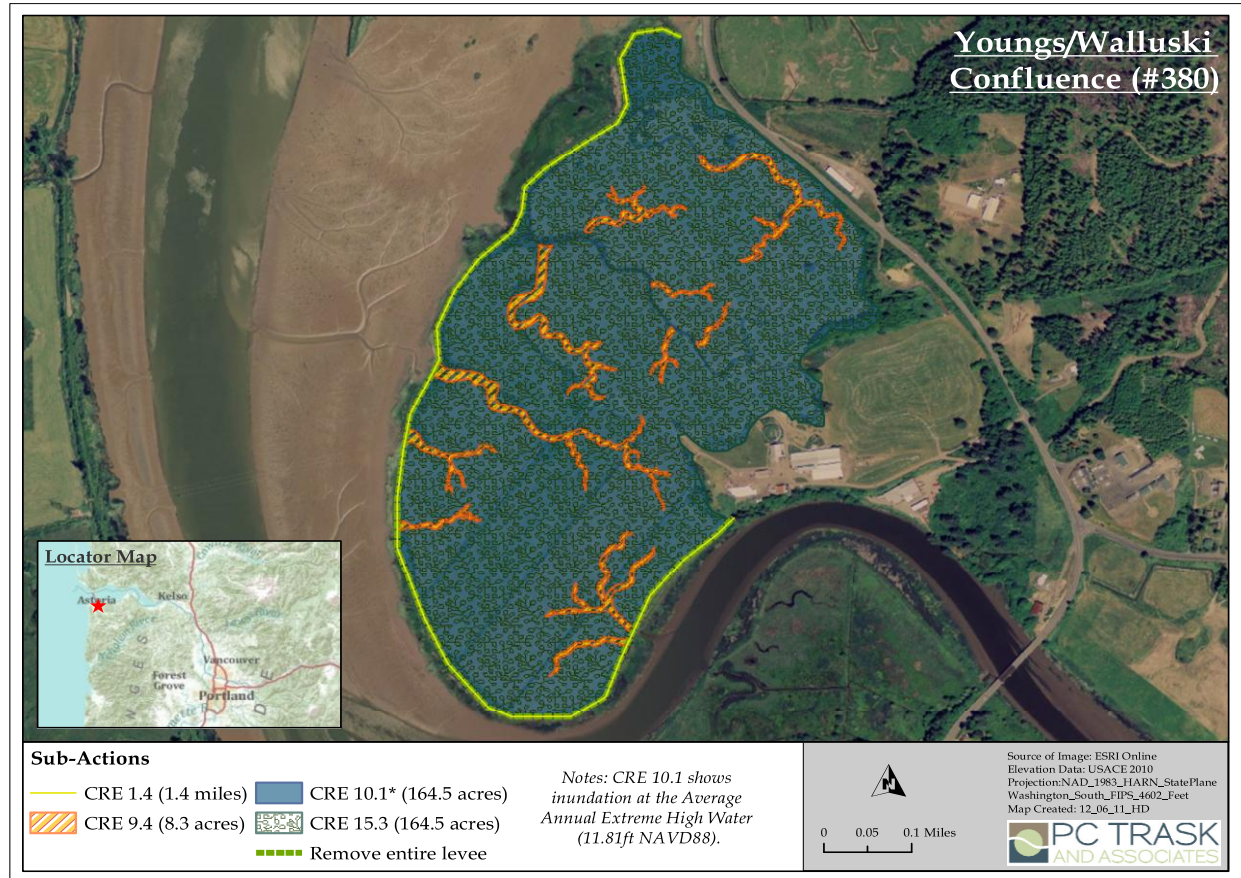
Action Effectiveness Strategy



The top priority for our RME program is to evaluate the effectiveness of our restoration actions - informs prioritization of habitat projects and FCRPS RPA requirements

Part 3: 2013 Action Plan

- Reporting schedule
- 2013 Project lists





Reporting Schedule



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For 2013, the schedule for the main CEERP deliverables is as follows:

- August 2013 – 2013 Synthesis Memorandum
- August 2013 – draft 2014 Strategy Report and draft 2014 Action Plan
- October 2013 – 2014 Strategy Report
- October 2013 – 2014 Action Plan



Part 4: Synthesis Memo



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Synthesized RM&E results from 1990-current, including:

- Salmon and estuarine ecology
- Habitat restoration
- Change in ecosystem conditions
- Proposed recommendations
 - Habitat actions
 - RM&E



Four Key Questions

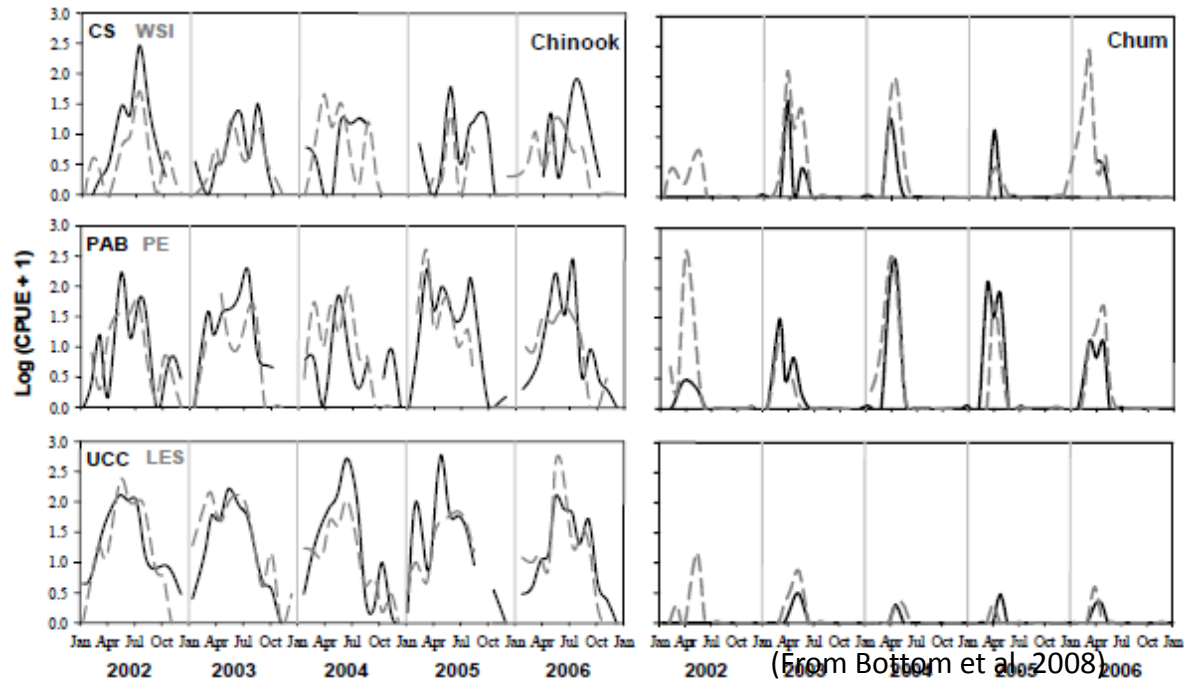


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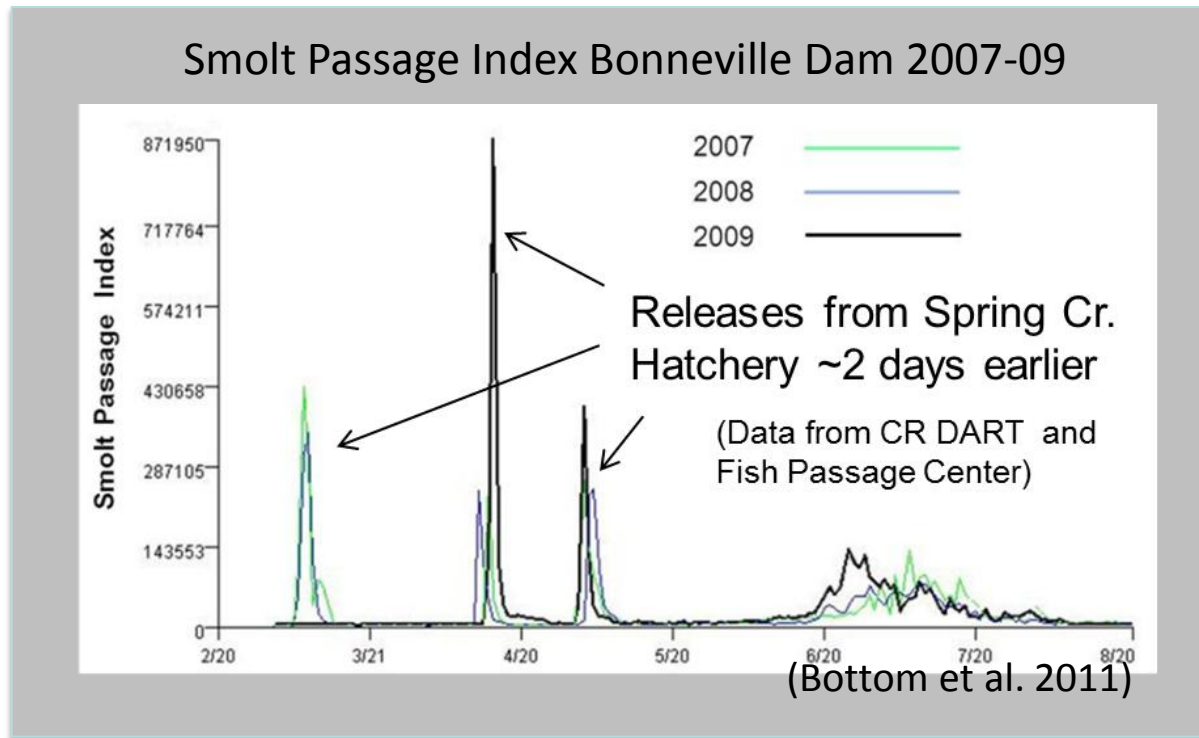
1. What are the contemporary patterns of juvenile salmon habitat use in the estuary, and what factors or threats potentially limit salmon performance?
2. Do factors in the estuary limit recovery of at-risk salmon populations and evolutionarily significant units (ESUs)?
3. Are estuary restoration actions improving the performance of juvenile salmon in the estuary?
4. What is the status of the estuary? Are estuarine conditions improving, declining?

Contemporary Patterns of Juvenile Salmon Habitat Use

- 10 studies of salmon habitat associations since 2002
- Subyearling Chinook occur year round
- Chum migrate primarily Feb – May or June
- Yearling Chinook, coho, and steelhead primarily use main channels in the spring
- Subyearling coho rare in the main-stem estuary but often use tidal fresh tributaries



Hatchery Effects on Contemporary Patterns of Salmon Habitat Use



- To a large extent hatchery releases drive abundance, stock composition, size distribution, and life history in the estuary
- The influence of hatchery production on the success of estuary restoration is unclear



Action Effectiveness: Benefits



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- Hydraulic reconnections enhance access opportunity
- Temperature
- Prey availability



Marsh Macro-detritus Organic Matter Export

(Woodruff et al. 2012)



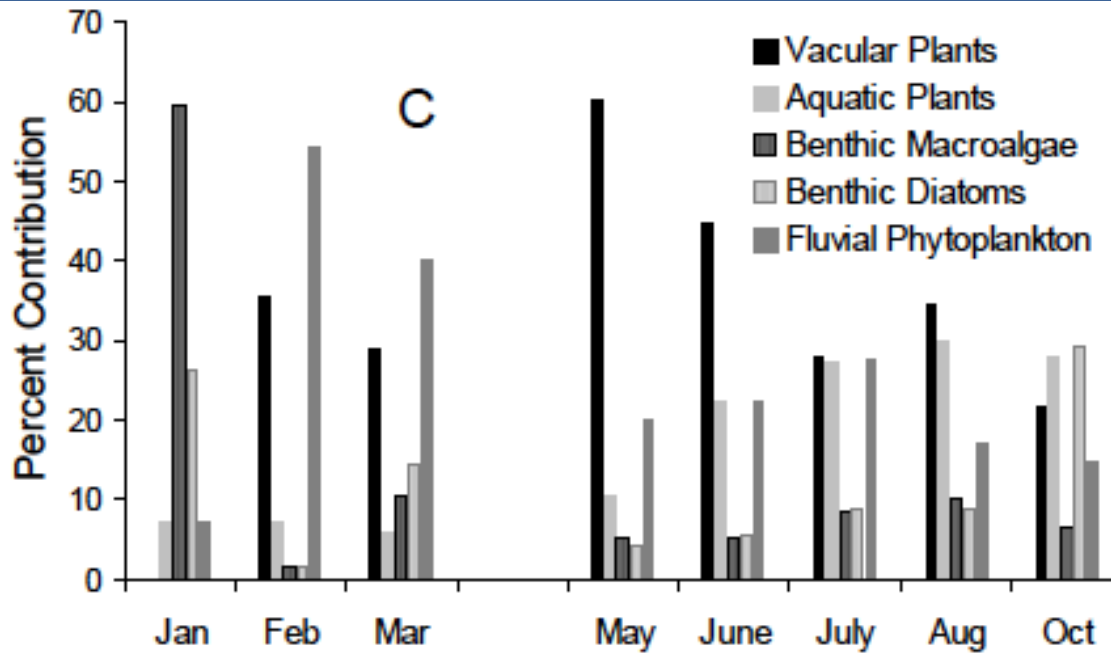
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- Restored wetland contributes OM and salmon prey
- Sampling indicates source and sink functions depend on hydrology
- 50% of the POM exported reaches the estuary over a distance of ~7km
- Restoring sites in Grays River (237 acres) could be exporting 391 metric tons (dry wt) (~431 tons) of marsh macro-detritus annually
- ~180 “Kandoll-equivalent” projects needed to restore 100% of historic macrodetritus

Salmonid Food Webs

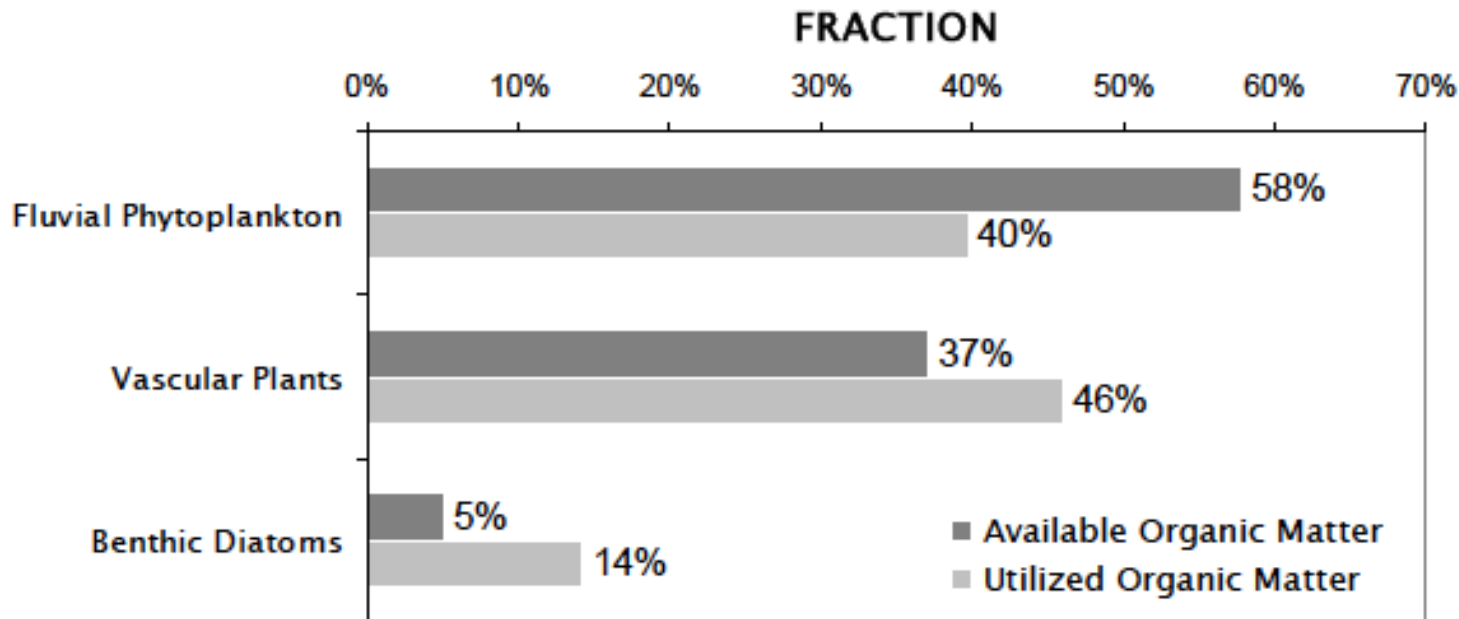


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Disproportionate selection for marsh detritus and benthic diatom organic matter (Bottom et al. 2008)

Ecosystem alteration...*possible* diminished ability to support Chinook salmon (Maier and Simenstad 2009)



Status of the Estuarine Ecosystem



- Habitat change analysis (Marcoe 2012)
 - Total loss = 118,961 acres (48,142 ha)
- Considered eight ecosystem attributes indicative of ecosystem integrity; climate change





Summary of Ecosystem Condition



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- Floodplain Wetlands
- Hydrology
- Water Properties
- Food Web
- Benthos
- Ecosystem Processes
- Biodiversity
- Stressor Level (anthropogenic)



Climate Change



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- River Flow
 - Diking/flow regulation caused 62% reduction in SWH available to juvenile salmonids (Kukulka and Jay 2003)
 - With lower flows, access further limited
- Increase in Water Temperature
 - Constrain use of shallow water habitats
 - Affects rate of biological and ecological processes
- Sea Level Rise
 - Intermediate increase of 0.3 to 0.9m by 2100
 - Floodplain wetlands occur of ~1m elevation range