ECOSYSTEM RESTORATION IN THE LOWER COLUMBIA RIVER AND ESTUARY: THE ROLE OF THE EXPERT REGIONAL TECHNICAL GROUP (ERTG)

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Purpose of the ERTG is…

- To assign survival benefits units (SBUs) for ocean- and stream-type juvenile salmon from estuary habitat actions being implemented by the BPA and USACE in response to the 2008/2010 Biological Opinion on operation of the Federal Columbia River Power System.

- Although extensive improvements have been made to dam passage for juvenile fish, these alone are not meeting recovery targets.

- Focus is now on enhancing survival through estuarine floodplain, tidal wetland and surge plain habitat restoration, enhancement, creation, conservation and protection…i.e. reactivating the floodplain.

- The recovery plan specifies goals for the number of survival benefit units (SBUs) associated with estuary restoration actions.

- The ERTG was formed by the Steering Committee: USACE (Blaine Ebberts), BPA (Ben Zelinsky), NMFS (Lynne Krasnow)
The ERTG Members Represent a Variety of Complimentary Experience

- Salmonid biology and ecology in PNW estuaries
- Fisheries management
- Ecology of estuarine habitats
- Geomorphology of estuarine ecosystems
- Restoration ecology
- Adaptive management
- Experimental design in aquatic ecosystems
Floodplain habitat loss has been extensive.
Tidal brackish and Freshwater Emergent Mashes Covered Large Areas
Restoring and Reconnecting Floodplain Habitats is the Focus of the Restoration Program…

As did Tidal Forested Swamps
Total loss = 118,961 acres (48,142 ha)
Flow Regulation has altered the amplitude and duration of the Spring-Summer pulse event (1878-1903 vs 1970-1999)
The Main Things Wrong in the System are…

- Overbank flows now rare and floodplain inaccessible to fish
- Reduced delivery of nutrients, organic matter, salmon prey, large wood
- Habitat forming and maintaining processes muted/altered
- Impact on food webs
- Diking and conversion of wetlands
- Results is that ~60-70% of floodplain unavailable to juveniles
Our Process for reviewing projects includes..

- A philosophy of being transparent, science-based, documented, repeatable.

- A monthly meeting to visit sites, hear presentations, advise proponents, discuss issues, score projects.
ERTG Developed a Semi-quantitative Process to Predict Effects of Actions…

- How much benefit will a proposed project action contribute to salmonid survival, and ultimately restoration of federally listed salmonid populations? (i.e., what is the survival ‘bump’ from a project?)
- How does this benefit translate into SBU’s?
- ERTG improved a poorly specified yet legally constrained methodology to make it reproducible and standardized.
- Process relies on regional research and monitoring, an organizing model, and expert opinion.
Elements of the ERTG Process are...

- **Template** for LCRE Habitat Restoration Projects – *standard format for all proposed projects; Specifically addresses topics related to scoring.*

- **Scoring Criteria**, which defines the criteria and the scoring process –
  - opportunity for fish to access or be served by the project,
  - capacity of the project to support salmonids (on and off site), and
  - the probability that the project will meet its goals

- **Calculator** – *a simple model that uses criteria scores to calculate survival ‘lift’ for juveniles provided by the projects*
Assigned Survival Benefit Unit =
Total Module SBU * GP * SP * HAP * HCP * WF

Total Possible SBU for that Subaction from the Estuary Module

GP = Goal Proportion = \frac{Project Goal}{Total Module Goal}

SP = Success Proportion = \frac{Mean Success Score}{5}

HAP = Habitat Access Proportion = \frac{Mean Access Score}{5}

HCP = Habitat Capacity Proportion = \frac{Mean Capacity Score}{5}

Weighting Factor = \frac{Optimal Fish Density}{Module Fish Density}
The BiOP Specified Subaction Types and Goals that the ERTG Adjusted...

<table>
<thead>
<tr>
<th>Module CRE</th>
<th>Description</th>
<th>Module Goal (acres or miles)</th>
<th>Module Fish Production (#/acre or mile)</th>
<th>Computed Module Fish Density (#/m²)</th>
<th>ERTG Optimal Fish Density (#/m²)</th>
<th>Weight*</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRE-1.4</td>
<td>Restore and maintain ecological benefits in riparian areas</td>
<td>28</td>
<td>2,500</td>
<td>0.625</td>
<td>0.1</td>
<td>0.16</td>
</tr>
<tr>
<td>CRE-9.4</td>
<td>Restore degraded off-channel habitats</td>
<td>6,000</td>
<td>25</td>
<td>0.006</td>
<td>0.1</td>
<td>16.7</td>
</tr>
<tr>
<td>CRE-10.1</td>
<td>Breach or lower the elevation of dikes and levees</td>
<td>5,000</td>
<td>65</td>
<td>0.016</td>
<td>0.1</td>
<td>6.25</td>
</tr>
<tr>
<td>CRE-10.2</td>
<td>Remove tide gates to improve the hydrology between wetlands and the channel</td>
<td>2,000</td>
<td>35</td>
<td>0.009</td>
<td>0.05</td>
<td>5.56</td>
</tr>
<tr>
<td>CRE-10.3</td>
<td>Upgrade tide gates</td>
<td>1,000</td>
<td>50</td>
<td>0.0125</td>
<td>0.025</td>
<td>2.0</td>
</tr>
<tr>
<td>CRE-15.3</td>
<td>Remove invasives</td>
<td>10,000</td>
<td>2.5</td>
<td>0.0006</td>
<td>0.0006</td>
<td>1.0</td>
</tr>
</tbody>
</table>
We Employ Three Criteria\textsuperscript{1} for Scoring Projects Which are Graded from Low to High (Scale = 1-5)

\textbf{Opportunity/Access}

- Connectivity for most species and life history types; Priority sites on the mainstem; Unencumbered access

\textsuperscript{1}Based on - Simenstad and Cordell (2000); Thom et al. (2011)
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- **Capacity/Quality**
  - Complexity; Disturbance regime; Channel/edge network; Prey production and export; Invasive species and nuisance predators; Water quality/temperature; Size

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- **Certainty of Success**
  - Natural processes/landforms; Proven method; Self maintaining; Risk of detrimental effects; Project complexity; Certainty of fish benefit; Risk of exotic/invasive species

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Dibblee Point Restoration Plan

**Sub-Actions**
- CRE 1.4 (.4 miles)
- CRE 9.4 (1.1 acres)
- CRE 10.1 (.2 acre)
- CRE 10.2 (12.1 acres)
- Inundation at 2 year flood = 14.1 ft
- CRE 15.3 - Emergent and Riparian Plant Zone (2.1 acres)
- Large wood installation

Current topography affected by barrier removal = 11.2 acres at 2-year flood.

Additional inundated acreage as result of excavation = .9 acres at 2-year flood.

Elevation in ft NAVD88
- High: >30 ft
- Low: <0 ft

CREST
PC TRASK AND ASSOCIATES

Terrain Model: USACE 2010
Excavation extent: ESA
Projection: NAD_1983_UTM_Zone10
Elevations in ft NAVD88
Map Created: 20130503_HD
North Unit Barriers

- 3 barriers at Ruby, Millionaire and Widgesea/Deep Lakes
- 10 additional constraints

Geomorphic Catena
- Deep channel
- Permanently flooded
- Intermittently exposed
- Volcanogenic delta affected by Col. R. floods
- Floodplain channel
- Floodplain
- Wetland
- Lakebed
- Lakeshore
- Natural levee
- Terrace
- Tributary (minor)
- Tributary fan
- Tributary valley (outside floodplain)

Private Inholding
- Lake/pond
- Floodplain
- Wetland
- Natural levee

North Unit - Landscape Features

Datasets: North American Datum 1983
Projection: Lambert Conformal Conic
Locke et al., USGS and University of Washington
Base map: FESI Online
Map Created: 06/01/2013, AM

Example Project 2
Access?  
Capacity?  
Certainty?

North Unit - Landscape Features

Datum: North American Datum 1983  
Projection: Lambert Conformal Conic  
Ecosystem Classification: USGS  
and University of Washington  
Basemap: ESRI Online  
Map Created: 04/22/2013 AM
We Developed a Floodplain Lake Conceptual Model to Organize the Understanding of These Systems and Reveal Uncertainties
<table>
<thead>
<tr>
<th>Restoration Projects and Subactions Reviewed by ERTG (as of July 2013)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of projects reviewed</strong></td>
</tr>
<tr>
<td><strong>Number of projects scored</strong></td>
</tr>
<tr>
<td><strong>Number of subactions scored:</strong></td>
</tr>
<tr>
<td><strong>Riparian restoration (1.4)</strong></td>
</tr>
<tr>
<td><strong>Channel restoration (9.4)</strong></td>
</tr>
<tr>
<td><strong>Complete levee breach (10.1)</strong></td>
</tr>
<tr>
<td><strong>Removal of tide gate (10.2)</strong></td>
</tr>
<tr>
<td><strong>Upgrade tide gates (10.3)</strong></td>
</tr>
<tr>
<td><strong>Remove invasive species (15.3)</strong></td>
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</tbody>
</table>
Guidance Documents and Work Products are Developed to Address Issues, Inform Proponents, and be Transparent

- Project template
- Scoring criteria
- History of process and calculator
- Feedback on calculator
- Subaction guidance
- Meeting notes and SBU reports
- Uncertainties affecting scoring
- Elevation for delineating effective action area
- Floodplain Lake Considerations (drafted)
- Habitat creation (next)
In Summary, the ERTG…

- Developed a reproducible, standardized, defensible, transparent process
- Reconciled SBU calculations through best available science
- Utilizes ecosystem-based principles of ecosystem structure, processes and functions
- Can improve the process with new information
- Continues efforts to deal with nuances
- Continues efforts to make the process clear to proponents
Thanks for listening

Contacts for more information:

- Blaine Ebberts for copies of ERTG documents (blaine.d.ebberts@usace.army.mil)