Lower Columbia River Estuary Partnership

Criteria for Identifying and Prioritizing Habitat Protection and Restoration Projects on the Lower Columbia River and Estuary*

Ecosystem Criteria

1) Habitat Connectivity (0-10 points)

This criterion recognizes that habitat connectivity is a landscape level concept. It emphasizes linkages between habitat areas that provide a variety of functions for ESA-listed salmonids at various stages of their life cycle (juvenile, yearling, and adult) and that gradual alteration of landscapes through natural succession and retrogression allow species that require a variety of habitat components to disperse and survive. In the Lower Columbia, historic changes have limited or cut off listed salmonids' access to resources needed for their development and migration. Specific emphasis on species with narrow ecological requirements, such as salmonids, will be prioritized. Upland habitat areas adjacent to drainage ways, existing protected/restored sites, and areas offering diverse habitat types, function, and successional stages should also be considered.

Guidance Questions:

- How will the project protect/reconnect processes important to shaping estuary habitat structure and function?
- What is the project's position or linkage to existing functioning habitats in the surrounding landscape?
- Is the project linked to or does it build off other protection or restoration projects upstream/downstream?

2) Areas of Historic Habitat Type Loss (0-10 points)

Land use activities such as diking, filling, pile dike field development, and shoreline hardening have removed many of the shallow, peripheral wetlands along the Lower Columbia, isolating the river from its floodplain. This criterion recognizes that historic wetland types such as emergent and forested wetlands, particularly important for salmonids, have been greatly diminished. These habitats promote networks of physical complexity such as shallow, dendritic channels and backwater sloughs. NMFS' Northwest Fisheries Science Center has emphasized the need to connect historic habitats that have been disconnected from the mainstem system that are important to ESA-listed salmonids.

Guidance Questions:

- What estuarine habitat type(s) will be restored/conserved?
- What is the historic salmon use of the site and/or surrounding area?
- How will the project aid in allowing the full expression of salmonid life history diversity?

3) Improvement in Ecosystem Function (0-10 points)

This criterion acknowledges that some restoration actions can result in greater enhancement of ecosystem functions than others. This criterion emphasizes that location of a project may in some cases be more important than the size of the project. This is especially the case for dike removal projects that can open backwater habitat for salmonid access. This criterion also emphasizes the need to closely evaluate the quality and long-term sustainability of the project.

Guidance Questions:

- What estuary habitat functions will be improved from the restoration treatment (i.e., food web support, sediment retention, organic matter export, salmonid habitat, nutrient exchange, etc)?

4) Adequate Size and Shape (0-10 points)

Size refers to reach length and the size of the potential habitat within a reach. In general, larger size enhances habitat stability, increases the number of salmonid species that can potentially use the site, makes it easier to find by migratory species such as salmonids, and increases within-habitat complexity.

Guidance Questions:

- What is the overall size (acres or stream miles) of the project site?
- What is the state of the current drainage network at the site (i.e., how much of the historic tidal condition is intact versus artificially manipulated?)
- What is the condition of the project site's immediate surrounding habitat?

5) Level of Complexity (0-5 points)

This criterion refers to the number and interspersion of different types of habitats within a given restoration reach or area. As the number of habitats increase, so do the number of salmonid species that can occupy an area, and the number of functions supported by an area. Higher complexity potentially results in higher biodiversity. It is recognized that some restoration efforts, such as a chum channel, may not strive for habitat complexity.

Guidance Questions:

- How are ecological processes expected to manifest in site changes and overall habitat structure over time (e.g., number of habitat types and distribution)?

6) Accessibility for Target Species (0-10 points)

Accessibility refers to unencumbered access by Columbia River ESA-listed salmonid species that utilize estuary habitat. Projects that allow or enhance access of these species to important habitats or would potentially enhance the feeding, rearing, and refuge functions of the site are preferred. This criterion acknowledges the need to restore habitat for those threatened and endangered species whose populations are at precariously low numbers and who might benefit from improved near-shore habitat conditions.

Guidance Questions:

- What ESUs, and specific populations (if known), will benefit from the project?
- Have the ESUs (and populations) expected to benefit from the project been identified in recovery plans as being a high priority for recovery?

- How will salmonids use the site (i.e., spawning, rearing, refuge)?
    - Is there adequate information (literature, data, etc) supports the proposer's position that the identified ESUs (and populations) will benefit from the project?

Implementation Criteria

1) Use Natural Processes to Restore and Maintain Structure over Habitat Creation (0 - 5 points)

This criterion recognizes that restoration measures should attempt to re-establish the dynamics of estuarine hydrology, sedimentology, geomorphology and other habitat-forming processes that naturally create and maintain habitat, rather than implanting habitat structures at inappropriate or unsustainable locations. Restoration tasks should initiate or accelerate natural processes. Nearly all manifestations of restoration are accomplished by these processes and not by the direct artifice of the restoration. Complex engineering manipulations to create new habitats or to enhance existing habitats can introduce levels of uncertainty about the ecological impacts of such actions and/or the application of the results to other locations.

Restoration methods such as dike, levee, pile dike, and tide gate removal should receive first priority for restoration since historic habitat features of the surrounding area may still be intact. Areas that require minor alterations and maximize ecosystem function and processes offer a higher certainty of outcomes and may be more cost-effective and self-sustaining. Weight should be given to tidegate improvements with access to quality stream channels where dike breaching is not an option. For purposes of setting natural processes rapidly in motion, some artificial manipulation may be required; if so, the best ecological engineering practices should be applied in implementing restoration projects, using all available ecological knowledge and maximizing the use of natural processes to achieve goals.

Guidance Questions:

- What is the likelihood that the project will be self-maintaining over time?
- If the proposal is for the design stage of a project, how will the design work with existing processes of the surrounding landscape to achieve ecological goals?
- What level of engineering or manipulation will be required to re-establish estuarine processes and habitats?
- Are there over-arching issues that will constrain the success of the project (e.g., flow management that limits inundation, known toxic contaminants, etc)?

2) Community Support and Participation (0 - 5 points)

Developing partnerships among communities, organizations, individuals and agencies is a critical element to long term estuary restoration success. The following are considerations regarding this criterion:

A. Choose projects with local support that are popular and visible, and have political and environmental education components.
B. Visible, local partners (i.e., those that are technically capable/and can facilitate discussions between local project sponsors and Federal/State agency representatives) are needed to build community support for habitat restoration and protection projects.
C. Select habitat restoration and protection projects that are linked to community/watershed councils' goals and objectives.

D. Look for synergy with existing projects, spatially and biologically, and those with community support and ecological output; that involvement requires creativity and flexibility on the part of all involved to look for ecological, social, and economic incentives when identifying potential projects.
E. Depending on the stakeholder and/or landowner, social and economic considerations may be as important as environmental considerations when choosing potential habitat restoration and protection projects.

Guidance Questions:

- What is the level of community support for the project?
- What other entities are partners on the project?
- Is there an outreach component with the project?
- Has the project been identified in a watershed plan or any other community plan?

3) Potential for Self Maintenance and Certainty of Success (0-10 points)

Self-maintenance addresses the ability of a site to persist and evolve toward a natural (historical) habitat condition without significant on-going human intervention. Conditions for controlling factors in the reach and in the management unit must be appropriately developed and maintained. Self-maintenance means that the habitat can persist and develop under natural climatic variation, and that the system has a natural degree of resilience to natural perturbations. This criterion relies on needing to know the historical conditions and factors and how they relate to current conditions.

Guidance Questions:

- Is there a long term management or restoration plan for the site?
    - If not, will one be developed?
- Given the surrounding habitat conditions, what is the likelihood of long term project success?
- Is there a long term maintenance required, and is so, are plans for needed funding in place?
- How likely is project success given current stressors (i.e., flow management) on the lower river and estuarine ecosystem?

4) Potential for Improvement in Ecosystem Function While Avoiding Impacts to Healthy and Functioning Ecosystems (0-5 points)

Projects may have competing restoration goals, and while attempting to improve some ecosystem functions, others may be impaired or lost. This criteria stresses that restoration actions should achieve proposed benefits while avoiding the long term or permanent degradation of other ecological functions of natural habitats or broader ecosystems. Restoration actions should avoid replacing one naturally functioning habitat with another, even if the replacement is perceived to benefit salmon. In particular, activities that further reduce the estuarine tidal prism or impair other large-scale estuarine processes (e.g., circulation, salinity intrusion) or attributes should be avoided.

Guidance Questions:

- What impacts to current habitat will result from the restoration project?

5) Avoid Sites Where Irreversible Change Has Occurred (0-5 points)

Many aquatic ecosystems within the Estuary have been so heavily modified that the fundamental processes responsible for historic conditions have been significantly altered, in some cases irrevocably. In the Lower Columbia River, freshwater volume has been reduced or the natural flow

cycle altered, inputs of sediments and detritus have changed, and tidal flow has been compromised. In some cases, restoration of historic conditions in their original location or state is simply no longer attainable without restoration of historic processes.

Reconstructing the historical river, tidal floodplain and estuarine structure does not necessarily guarantee restoration success; it only decreases uncertainty. Historic templates often provide the framework for restoration goals, as well as a perspective on how ecosystems have been incrementally degraded. At the minimum, the modified capacities of natural processes to support restoring habitats under present conditions must be well understood to develop realistic restoration goals. In some instances, ecological engineering may be necessary to compensate for diminished processes, but such approaches should be used to initiate self-sustaining restoration rather than as an artificial "fix" requiring long-term maintenance.

Guidance Questions:

- What risks exist to the potential success of the proposed project?
- Will the physical geography and socioeconomic setting of the project allow for project success (i.e., projected development, other land use needs)?

6) Capacity of Sponsor/Partnership (0-5 points)

Restoration projects are often complex and costly. To effectively implement and monitor a restoration project over the long term it is necessary that the sponsor and project partners have the capacity to successfully manage the project and achieve success. This criterion will consider an organization's record of project management, its technical expertise, and financial stability.

Guidance Questions:

- What is the capacity of the sponsoring organization to successfully implement the project and for any long term maintenance requirements?
- Has the sponsor adequately resolved or have a realistic plan to resolve potential issues with the affected community?
- What is the project sponsor's experience with similar projects?
- Does the sponsor have the technical expertise to effectively implement the project?
- Has a plan been identified to obtain the necessary funding for the project? If so, please describe the expected matching contributions from other funding sources.
- What is the status (pending, approved, not yet begun) of the permits expected to be required for the project?

7) Project Context Within Broader Management and Planning Objectives (0-5 points)

This criterion recognizes that within the Lower Columbia system there are a number of management plans and objectives that articulate specific restoration and conservation recommendations. Some of these include; NOAA's estuary module and recovery plans, Northwest Power and Conservation Council's Subbasin Plans, Lower Columbia Fish Recovery Board priorities, Oregon's Coastal and Estuarine Land Conservation Plan, North American Waterfowl Management Plan, the Columbia Land Trust's Land Conservation Priorities and the Bonneville Power Administration (BPA) and Corps of Engineers (Corps) implementation of the proposed action for the Federal Columbia River Power System biological opinion. The proposed action includes BPA's implementation of projects through their Fish and Wildlife Program and the Corps Section 536 of the Water Resources Development Act or other authorities. In evaluating proposed restoration projects, considerations

should be made to coordinate with these initiatives to minimize duplication of services or contradictory endeavors.

Guidance Questions:

- Was the project identified in a recovery plan, watershed assessment, or other planning document?
- What threats or limiting factors will the project address?

Monitoring Criteria

1) Monitoring and Evaluation (0-5 points)

Monitoring and adaptive management are essential components of habitat restoration projects. Restoration designs should be monitored and, based on the concept of adaptive management, altered if necessary to achieve desired endpoints. To evaluate the success of restoration projects, both baseline monitoring and long term effectiveness monitoring plans for restoration sites should be developed. An effectiveness monitoring plan should indicate whether restoration is progressing as intended, so that if it is not, the project can be altered or redesigned to better achieve project goals. Determining the effectiveness of restoration activities can benefit from comparisons to relatively unaltered reference habitats in close proximity to the restoration site. Comparing reference sites with restoration sites helps promote a better understanding of the relationship between habitat restoration activities and changes in habitat structure and function, resulting from the restoration activity. Projects should be designed as explicit tests of restoration actions that will be evaluated, and if shown to be effective, can be replicated at other locations throughout the lower river. Monitoring data and project results should be shared in an effort to improve habitat restoration efforts throughout the region.

Guidance Questions:

- Has baseline monitoring for the project been completed (or is it planned)?
- Has a long term effectiveness monitoring plan been established for the site?
- Are standardized data collection protocols (i.e., Roegner et al., 2009) being used?
- Have specific restoration goals and monitoring standards been identified that will allow project managers to gauge project performance and, if needed, implement changes based on adaptive management?
- Has a reference site for the project been identified?
- How closely does the reference site's condition match the restoration goal to be achieved?
- How will the data be managed to allow for adequate analysis of the results?
- How will the information be used (i.e., education, future restoration design)?
- Is there a plan for disseminating the data throughout the region?

* These criteria are derived in part from:

- **Guiding Ecological Principles For Restoration of Salmon Habitat in the Columbia River Estuary**, Charles ("Si") Simenstad, Dan Bottom
- **An Ecosystem-based Approach to Habitat Restoration Projects with Emphasis on Salmonids in the Columbia River Estuary** - Johnson, G.E., R.M. Thom, A.H. Whiting, G.B. Sutherland, N. Ricci, J.A. Southard, B.D. Ebberts, and J.D. Wilcox. September 30, 2003.
- **Proceedings of the Lower Columbia River and Estuary Habitat Conservation and Restoration Workshop**, Astoria, Oregon - 2001