ERTG #2020-02

Scoring Criteria

Prepared by the Expert Regional Technical Group of the Columbia Estuary Ecosystem Restoration Program

Prepared for the Bonneville Power Administration, U.S. Army Corps of Engineers, and NOAA Fisheries

FINAL

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Preface

In 2009, the Bonneville Power Administration (BPA) and U.S. Army Corps of Engineers (USACE) formed the Expert Regional Technical Group (ERTG) in response to the National Marine Fisheries Service's (NMFS's) 2008 Biological Opinion on the operation of the Federal Columbia River Power System. The purpose of the ERTG is to review ecosystem restoration[1] actions in the floodplain of the lower Columbia River and estuary proposed for the Columbia Estuary Ecosystem Restoration Program. The ERTG's work is directed by a Steering Committee composed of representatives from BPA, NMFS, and USACE.

As with the original Scoring Criteria (ERTG #2010-02), the purpose of the revised Scoring Criteria is to describe the criteria the ERTG uses to score proposed restoration projects. The primary revision concerns incorporating *Landscape Principles for CEERP Restoration Strategy* (ERTG #2017-02) and *Landscape Principles: Applications and Operation for CEERP Restoration Strategy* (ERTG Doc #2019-01). The Scoring Criteria are designed to provide a framework for assessing a proposed restoration project. Applying the Scoring Criteria helps foster consistency and transparency of the project review process.

The latest Scoring Criteria were prepared by the ERTG (Dan Bottom, Janine Castro, Greg Hood, Kim Jones, Kirk Krueger, and Ron Thom). A draft was reviewed by the Steering Committee (Jason Karnezis, Lynne Krasnow, Cynthia Studebaker, and Michael Turaski). The ERTG appreciates comments provided by Alex Uber (WDFW) and Katie Blauvelt, Phil Trask, and Andy Wilson (PC Trask and Associates).

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[1] As used here, the term "restoration" refers to conservation, protection, enhancement, restoration, or creation.

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Introduction

This document describes the scoring criteria the ERTG uses to assess proposed restoration projects for the Columbia Estuary Ecosystem Restoration Program. The original scoring criteria (ERTG #2010-02) have been updated and new material added regarding principles of landscape ecology. In particular, the criteria distinguish site-scale from landscape-scale connectivity and add additional criteria specific to matrix habitat restoration. The new scoring criteria address five factors:

1. Potential benefit from improved landscape-scale access/opportunity (landscape-scale; NEW)
2. Certainty of success (site-scale; updated)
3. Potential benefit from improved habitat access/opportunity (site-scale; updated)
4. Potential benefit from improved habitat capacity/quality (site-scale; updated)
5. Potential benefit from improved habitat capacity/quality (shoreline matrix habitat; NEW)

The original scoring criteria have been sorted and assigned to each of the newly distinguished types of access/opportunity, and additional new scoring criteria have been added for both site- and landscape-scale restoration connectivity. Actions such as levee breaches, channel network, re-vegetation, and large wood should be considered in light of empirical reference conditions or models based on reference conditions. The updated and the new scoring criteria reflect our improved understanding of factors that affect site-scale and landscape-scale restoration connectivity as described in *Landscape Principles for CEERP Restoration Strategy* (ERTG #2017-02) and *Landscape Principles: Applications and Operations for CEERP Restoration Strategy* (ERTG #2019-01).

Additionally, new habitat quality criteria are specified for landscape matrix habitat to supplement existing criteria for steppingstone patch habitat. Steppingstone patches consist of traditional floodplain and marsh wetland restoration, where tidal channels, side channels, and other backwaters are prominent habitat features that allow significant juvenile salmon access and residence. Significant access and residence for fish requires the presence of at least one tidal channel that is unlikely to completely dewater during low spring tides. The literature provides little guidance on the minimal wetland patch size supporting such a channel, but in Puget Sound it was as little as 1 ac for the South Fork Skagit Delta marshes and 2.3 acres for the North Fork Skagit marshes (Hood 2007[2]). Geographic variation in Puget Sound deltas (Hood 2015[3]) indicates minimum patch size in areas with lower tidal range could be an order of magnitude higher than that found in the South Fork Skagit marshes. Similar geographic variation likely exists in the Columbia River Estuary tidal-fluvial continuum, with smaller minimum patch sizes in more tidal areas and larger minimum in more fluvial areas. Given the sparse empirical evidence available and statistical confidence limits around the existing minimum patch size estimates, we have chosen 5 acres as a “rule of thumb” minimum stepping-stone patch size.

Matrix habitat consists of wetland patches less than 5 acres and shoreline riparian habitat that lies between or borders steppingstone patch habitat; it does not contain any side channels or other backwaters, so juvenile salmon residence is dependent on local river flow velocity and shoreline geomorphology.

[2] Hood WG. 2007. Scaling tidal channel geometry with marsh island area: A tool for habitat restoration, linked to channel formation process. *Water Resources Research*, Vol. 43, W03409, doi: 10.1029/2006WR005083.

[3] Hood WG. 2015. Geographic variation in Puget Sound tidal channel planform geometry. *Geomorphology* 230:98-108.

Restoration of matrix habitat can be classified as a type of Subaction 1.4 (riparian actions), which may include removal of shoreline armoring, regrading of shoreline topography to a more natural condition, planting with native riparian vegetation, adding large woody debris (as appropriate), etc., in accord with the physical processes operating in that river reach. Thus, there are two types of Subaction 1.4 and they have different measurement units: traditional riparian improvements (length; Subaction 1.4R) and matrix habitat improvements (area; Subaction 1.4M).

Project size comes up multiple times in the ERTG process. It is a variable in the calculator for benefit units and an element in the landscape- and site-scale scoring factors. Size in the landscape scale is about the likelihood of juvenile salmon migrating in the mainstem encountering and being available to enter the site. At the site scale, size is related to connectivity to access or enter the site, habitat abundance, habitat diversity, carrying capacity, residence time, and self-maintenance of restoration action over time, all of which could scale non-linearly with site size. Multiplicity for project size is intentional and appropriate because size is fundamental to a site's ecology and geomorphology.

Scoring Criteria

Scoring criteria are presented separately for each of the five factors (see list above). One factor, Landscape-scale Elements, specifically addresses landscape criteria. The other four factors are assessed at the site-scale. For a given factor, the criteria are organized by score: 1 (lowest) through 5 (highest). The higher the score, the larger the importance of the project. Attachment 1 contains a table summarizing the new landscape-scale elements criteria.

Landscape-scale Elements

5 – High connectivity and access for most species and populations; located in a mainstem area or a priority reach (see Section 4.5.2 in *Landscape Principles Applications and Operations*; based on habitat loss relative to historical conditions); located in a habitat gap > 5 km long; proximity (<0.5 km) to large tributary confluence (e.g., > 1000 cfs mean annual flow) or a significant reach transition (e.g., from fresh to saltwater; from above to below dam); steppingstone patch is large (>30 acres). High synergy with adjacent or nearby habitat or restoration project, i.e., strongly interacting such that there is greater geomorphological expression/dynamics, residence time for juvenile salmon, nutrient export, or similar non-linear (i.e., disproportional or multiplicative) benefit from the interacting sites.

4 – Intermediate connectivity and access for most species and populations; located in a mainstem area or a priority (TBD) reach; located within a habitat gap of 2.5 – 5 km; proximity to tributary or a significant reach transition (e.g., from fresh to saltwater; from above to below dam) 0.5 km – 1 km; tributary size is moderately large, e.g., 500 cfs to 1000 cfs; steppingstone patch is relatively large (20 - 30 acres). Possible or weak synergy with adjacent or nearby habitat or restoration project.

3 – Intermediate connectivity; only accessible to a few life history types or species; located in a mainstem area, lower end of tributary or a priority (TBD) reach; located in a habitat gap 1.0 – 2.5 km; proximity to tributary or a significant reach transition (e.g., from fresh to saltwater; from

above to below dam) 1.0 – 2.5 km; tributary size is medium, e.g., 100 to 500 cfs; steppingstone patch is moderate (10 - 20 acres). No synergy with adjacent or nearby habitat or restoration project, i.e., project is essentially independent from adjacent or nearby sites and there is no disproportional or multiplicative benefit, only simple additive benefit.

2 – Intermediate to low connectivity; not in a mainstem or lower end of a tributary; only accessible to specific life history types or one species; located in a habitat gap 0.5 – 1.0 km; proximity to tributary 2.5 – 5.0 km; tributary size is small, e.g., 10 to 100 cfs; steppingstone patch is small (5 - 10 acres). Possible or weak negative synergy with adjacent or nearby habitat or restoration project.

1 – Limited accessibility for specific life history types or species; located in areas far from mainstem and not in lower ends of tributaries; Gap size < 500 m; proximity to tributary > 5 km; tributary size is very small, e.g., < 10 cfs; steppingstone patch is very small (<5 acres). Negative synergy with adjacent or nearby habitat or restoration project, i.e., project reduces function of adjacent or nearby sites.

Certainty of Success (site-scale)

5 – Restoring a natural process or landforms; proven restoration method; highly likely to be self-maintaining; minimal to no risk of detrimental effects; highly manageable project complexity; minimal to no uncertainties regarding benefit to fish, minimal to no exotic/invasive species expected.

4 – Largely restoring a natural process or landforms; proven restoration method; likely to be self-maintaining; little risk of detrimental effects; manageable project complexity; little uncertainty regarding benefit to fish; minimal exotic/invasive species expected.

3 – Partially restoring a natural process or landforms; proven restoration method; potentially self-maintaining; minimal risk of detrimental effects; manageable project complexity; moderate uncertainties regarding benefit to fish; exotic/invasive species expected.

2 – Partially restoring a natural process or landforms; poorly proven restoration method; unlikely to be self-maintaining; risk of detrimental effects; moderate project complexity; moderate uncertainties regarding benefit to fish; exotic/invasive species expected.

1 – Unlikely to restore natural processes and landforms; unproven or risky restoration method; will likely require intervention to maintain; some risk of detrimental effects; excessive project complexity; excessive uncertainties regarding benefit to fish; exotic/invasive species expected.

Habitat Access/Opportunity (site-scale)

5 – High site-scale connectivity and access to site at most water level stages; simple access to project within site; converts a site’s condition from one of no or limited access to one of fully restored access. Levees are removed entirely, and the number of dike breaches/channel outlets matches or exceeds allometric predictions for the site.

4 – Intermediate between 5 and 3; increases site access significantly. Levees are lowered or removed to create lengthy gaps coincident with restored/recreated channel outlets whose number approaches allometric predictions.

3 – Partial site-scale connectivity, modestly increases site access, e.g., with few dike breaches relative to allometric predictions, dike breaches are modest in width.

2 – Intermediate between 3 and 1; unlikely to increase site accessibility, or barely increases site access.

1 – Minimal to no improvement in connectivity; clearly does not increase site accessibility.

Habitat Capacity/Quality (site-scale)

5 – Maximum habitat ecological diversity; well-developed natural disturbance regime and ecosystem functions; extensive channel and edge network and large wood (where appropriate); much prey resource production and export; no invasive species or nuisance predators; water quality/temperature excellent; increases site C/Q from near zero to near maximum site potential, site relatively large (> 100 ac); there is coincident restoration of associated/adjacent shoreline matrix habitat; length of restored matrix is at least 50% of the restored patch habitat's river border; matrix quality is similar to that described for matrix-only projects that also merit a 5 score (see below).

4 – Very good natural habitat *complexity*; natural disturbance regime and ecosystem functions; very good channel and edge network and large wood; much prey resource production and export; minimal invasive species or nuisance predators; water quality/temperature quality very good; relatively large site (30-100 ac); there is coincident restoration of associated/adjacent matrix habitat; length of restored matrix is at least 10% of the restored patch habitat's river border; matrix quality is similar to that described for matrix-only projects that also merit a 4 score (see below).

3 – Moderate habitat complexity or heterogeneity; ecosystem functioning could be improved, not at an ideal level; some channel and edge network and large wood; moderate prey resource production; moderate potential invasive species or predators; water quality/temperature moderate; modestly increases site C/Q; relatively large site (30-100 ac); there is relatively little coincident restoration of associated/adjacent matrix habitat, or restored matrix quality is moderate (see below).

2 – Moderate to low habitat complexity; moderately-developed natural disturbance regime and ecosystem functions; some channel and edge network and large wood; moderate to low prey resource production and export; moderate potential invasive species or predators; water quality/temperature quality moderate to low; unlikely to increase site C/Q, or barely increases site C/Q; small site (< 30 ac); there is relatively little coincident restoration of associated/adjacent matrix habitat, or restored matrix quality is relatively poor (see below).

1 – Simple, small habitat with little complexity; poorly developed natural disturbance regime; expected ecosystem functioning minimal; little channel edge network; moderate to poor prey

resource production; moderate to high potential for invasive species or predators; water quality/temperature poor; Clearly does not increase C/Q; small site (< 30 ac); there is no coincident restoration of associated/adjacent matrix habitat.

Habitat Capacity/Quality (shoreline matrix habitat)

5 – Fringing marsh, or low terrace with riparian vegetation, undercut banks, recruiting LWD; natural processes have full functionality, low gradient bank allows interaction with river at a wide range of tides/river stages. Matrix is lengthy, e.g., > 1000 m, or in a low-velocity embayment or backwater area that allows sufficient residence time for fish to feed and rest along the matrix shoreline or contains small channels that frequently, at most water levels, allow fish occupancy.

4 – Low terrace with riparian vegetation; natural processes generally unimpeded or with few limitations, low to moderate gradient bank allows interaction with river at most stages and/or tides. Matrix is moderately lengthy, e.g., 500-1000 m; shoreline complexity creates eddies that reduce flow velocity and increases residence time for fish to feed and rest along the matrix shoreline, or small channels are present that occasionally, depending on water levels, allow fish occupancy.

3 – Sand flat, natural process have some scope for operation, moderate gradient banks allow interaction with river at average to high river stages. Matrix of modest length, e.g., 250-500 m; low shoreline complexity, little shelter from flow, or small channels are present that infrequently, depending on water levels, allow fish occupancy.

2 – Bedrock/boulder (natural); simplified levee (steep, grassy). Natural processes have limited scope for operation, relatively high gradient bank limits interaction with river to high river stages. Matrix relatively short, e.g., 100-250 m; low shoreline complexity, little shelter from flow. No small channels present.

1 – Riprap or other artificial armoring. Natural processes are impeded, steep bank limits interaction with river to low-recurrence frequency flood stages. Matrix short, e.g., < 100 m; low shoreline complexity, little shelter from flow. No small channels present.

Attachment 1:
Summary Table for the Criteria for Landscape-scale Elements

Score	Connectivity and access for most species and populations	Location re: priority reach or area	Location re: habitat gap size	Proximity to large tributary or a significant reach transition	Tributary size (mean annual discharge)	Stepping-stone patch size	Synergy with adjacent or nearby habitat or restoration project
5	High	Yes	>5 km	<0.5 km	>1,000 cfs	>30 acres	High
4	Intermediate to high	Yes	2.5-5.0 km	0.5-1.0 km	500-1,000 cfs	20-30 acres	Moderate
3	Intermediate	Yes	1.0-2.5 km	1.0-2.5 km	100-500 cfs	10-20 acres	None or weak positive
2	Intermediate to low	No	0.5-1.0 km	2.5-5.0 km	10-100 cfs	5-10 acres	None or weak negative
1	Low	No	<0.5 km	>5.0 km	<10 cfs	<5 acres	Negative