1 # 2. EVALUATION METHODS

2 ## 2.1 ANALYTICAL FRAMEWORKS USED

3 The potential effects of the proposed action were evaluated by first defining the effects pathways
4 from individual project elements and the elements of any interrelated and interdependent actions.
5 These include project elements or actions with effects to habitat, individuals, and populations.
6 Effect pathways include soil, air, water, vegetation, and river substrate.

7 Project impacts were further evaluated by considering the potential exposure of each species to
8 an effect pathway and the species' expected response. Similarly, project impacts to critical
9 habitat were evaluated by considering the potential exposure of each primary constituent element
10 (PCE) to disturbance and the expected effect to habitat function. The analysis considered:
11 proximity of each action to listed species and habitat; distribution of the species and habitat
12 within the action area; timing and duration of the exposure; the nature of the effect (e.g.,
13 harassment, displacement, injury, mortality); and the disturbance frequency, intensity, and
14 severity. Both short-term and long-term effects were considered. Finally, the analysis considered
15 the resultant potential exposure to species and PCEs in the context of the limiting factors
16 described within the recovery plans for each basin or the Technical Review Team reports.

17 Environmental performance measures were developed with the goal to avoid or minimize
18 adverse effects to individuals and habitat. These best management practices (BMPs) and impact
19 avoidance and minimization measures are included as a nondiscretionary part of the
20 proposed action.

21 ## 2.2 INFORMATION GATHERING

22 The project team conducted literature reviews and field reviews of listed species and aquatic,
23 riparian, and terrestrial habitat features and conditions within the project area. Existing data,
24 including previously prepared environmental reviews, biological assessments, biological
25 opinions, and peer-reviewed literature, were also gathered and incorporated into the analysis.

26 The following process was used to collect fish, wildlife, and botanical resource data:

27 1. Collected a list of species and their habitats within the project area. These data were
28   obtained from the Oregon Natural Heritage Information Center (ORNHIC); USFWS;
29   NMFS; WDFW; the Washington Department of Natural Resources, Natural Heritage
30   Program (WDNR-NHP); StreamNet; and WDFW's SalmonScape.

31   • Procured species lists every 3 to 6 months from NMFS and USFWS (see
32   Appendix L).

33   • Contacted federal, state, and local agencies, and local biologists and experts. These
34   communications are cited as personal communications in the occurrence and effects
35   sections of this BA. Citations for these communications are provided in the reference
36   section of the BA and include the date, name, and title of the contacted source.

37   • Conducted a scientific literature review of studies, plans, and reports prepared by
38   local, state, and federal agencies and private organizations for information on species
39   and habitats that may occur within the project area.

2. Determined listed species habitat requirements.

   - Examined studies, plans, and reports and consulted with local biologists and federal, state, and local agencies.

   - Determined if critical habitat is designated or proposed for each listed species potentially occurring within the action area. Identified and evaluated PCEs potentially occurring in action area for species with designated or proposed critical habitat.

3. Determined existing habitat types and their associated species.

   - Obtained aerial photography to identify habitat types.

   - Obtained geographical information system (GIS) maps of habitats, documented species locations, locally protected zones, critical habitats, and other ecological features. Such resource classifications include EFH (NMFS), regionally significant habitat (Metro), ESH (DSL), priority habitats (WDFW), critical areas (City of Vancouver), and environmental zones (City of Portland).

4. Conducted field reconnaissance in the appropriate seasons to assess the presence of listed botanical species and all species' associated habitats within the project area and the role the habitats play in the species' life histories.

   - Conducted windshield surveys for habitats classified as non-urban, based on the Johnson and O'Neil (2001) species/habitat matrix.

   - Quantified habitat types and boundaries.

   - Used the Johnson and O'Neil (2001) species/habitat matrix to determine the species most likely to be present in these habitats.

   - Conducted rare plant surveys using the intuitive controlled method (BLM 1998).

5. Characterized aquatic and terrestrial habitats for features important to listed species.

   - Evaluated streams for their potential to support fish and other aquatic resources.

   - Aquatic characteristics of interest included water quality, substrate composition, bank stability, channel condition, fish passage, and riparian conditions. Surveyed riparian corridors for fish and wildlife habitat elements at the I-5 crossing of the Columbia River, North Portland Harbor, and Columbia Slough. Burnt Bridge Creek was surveyed where it runs parallel to I-5 at the northern boundary of the project area. Surveyed habitat elements include vegetation type and density; stream characteristics; and piers, footings, riprap, and other structures below the ordinary high water line (OHW).

6. Compiled lists and maps of observed listed species, habitats, protected habitats, and rare plants.