Floodplain Habitat Assessment and Mitigation

Regional Guidance for Oregon

August 2024

FEMA Region 10

Regional Guidance
For
Floodplain Habitat Assessments
and Mitigation in Oregon

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Region 10

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An earlier version of this document that was written solely for Puget Sound was drafted in 2010 by French & Associates, Ltd., Steilacoom, ESA Adolfson, Seattle, and PBS&J, Seattle, through an arrangement with the Insurance Services Office and the Community Rating System. Extensive edits were completed by FEMA Region 10 in 2013 in a document that was written solely for Puget Sound.

The 2018 Update was prepared by CDM Smith and FEMA Region 10.

The 2024 Update was prepared by FEMA Region 10 to address the interim measures for implementing the Oregon Biological Opinion.

Acronyms

BA	Biological Assessment
BE	Biological Evaluation
BiOp	Biological Opinion
CMZ	Channel Migration Zone
DLCD	Oregon Department of Land Conservation
EFH	Essential Fish Habitat
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FWHCA	Fish and Wildlife Habitat Conservation Areas
HA	Habitat Assessment
HPA	Hydraulic Project Approval
IPaC	Information for Planning and Consultation tool
JARPA	Joint Aquatic Resources Permit Application
JPA	Joint Permit Application
NFIP	National Flood Insurance Program
NMFS	National Marine Fisheries Service
ODEQ	Oregon Department of Environmental Quality
ODSL	Oregon Department of State Lands
RBZ	Riparian buffer zone
RPA	Reasonable and Prudent Alternative
SFHA	Special Flood Hazard Area
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service

1.0 Introduction

1.1 Background

This Regional Guidance is written to assist communities in meeting the requirements and criteria of the Endangered Species Act (ESA) regarding the National Flood Insurance Program (NFIP). Those requirements are described in Biological Opinions (BiOp) issued by the National Marine Fisheries Service (NMFS) April 14, 2016, and the January 2017 errata document that supplements the BiOp for most of the State of Oregon.

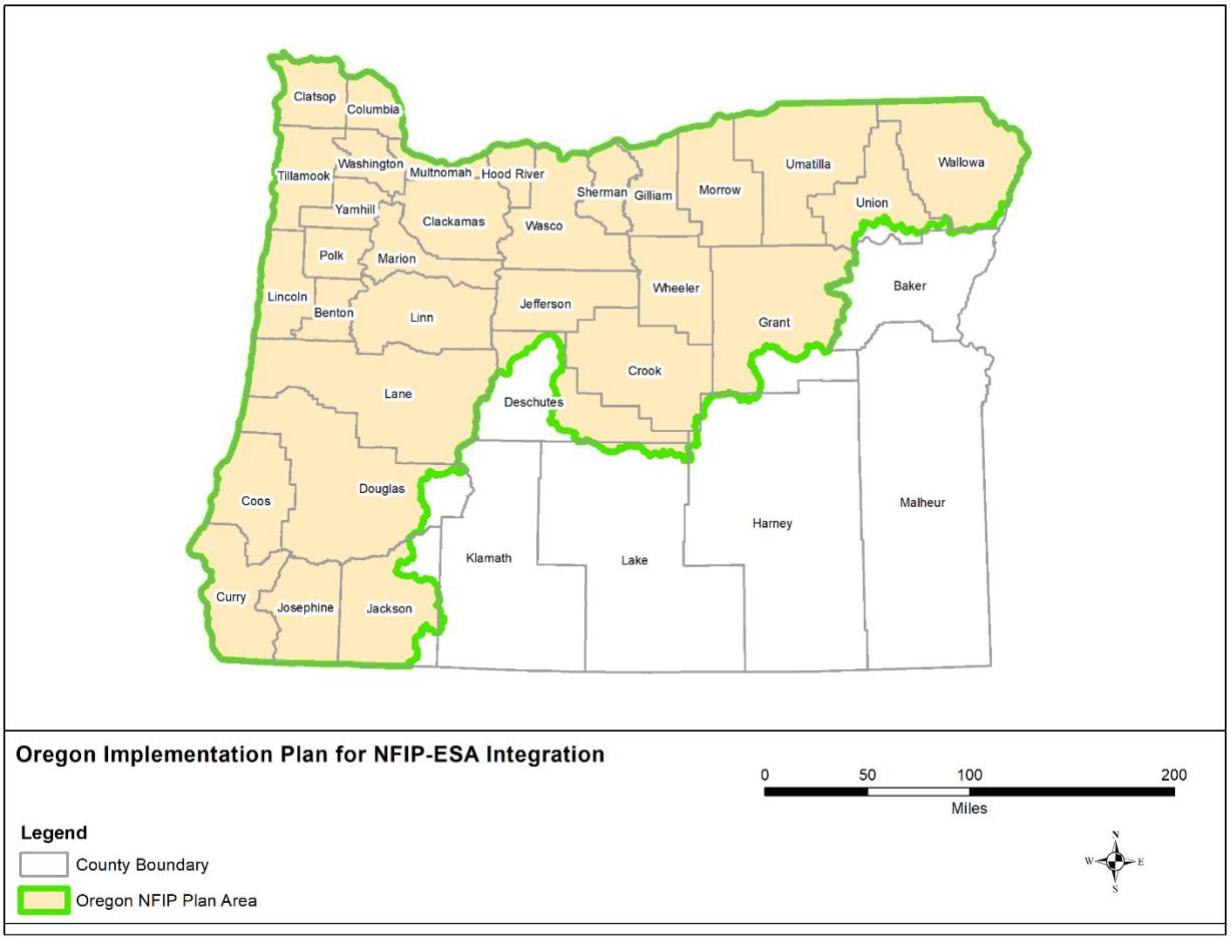

Figure 1 Oregon National Flood Insurance Program Plan Area for Endangered Species Act Integration

This guide is a companion to the BiOp for Oregon and the ESA Consultation Handbook (NMFS and USFWS 1998). It is intended to assist environmental planners, fisheries biologists, and other qualified floodplain and river management professionals who may potentially write or review habitat assessments (HAs). This document focuses on requirements specific to Oregon. It provides information on methods that communities may utilize to assess the impacts of land

management actions on ESA-listed species and their designated critical habitats within the Special Flood Hazard Area (SFHA).

This document is also designed to support the NFIP-ESA 2024 Draft Model Ordinance prepared by the Federal Emergency Management Agency (FEMA) Region 10. This guidance is offered to help communities comply with the interim measures in the Reasonable and Prudent Alternative (RPA) element 2 while FEMA works towards full implementation of the NMFS BiOp.

For further details on the BiOp's requirements, see the BiOp and RPA for Oregon. The Model Ordinance and additional guidance documents are also available from FEMA Region 10.

Communities in Oregon have two options to implement the interim measures of the BiOp: adopting the Model Ordinance under a hybrid programmatic habitat assessment approach or using a permit-by-permit approach. Sections of the Model Ordinance are referenced in this guidance to help the reader match the requirements of the BiOp with NFIP regulations. Additional references included in this guidebook are listed at the end of the document.

The RPAs set forth for Oregon under the BiOp include an expanded timeframe for implementation to account for state-wide implementation and potential changes in FEMA policy and guidance. The RPAs also allow for compensatory mitigation of adverse effects within the SFHA.

This revised 2024 habitat assessment guidance will help jurisdictions assess and document ESA compliance reviews. It is intended to be useful to those jurisdictions who are complying with the requirements of the interim elements of the RPA in Oregon through adoption of the model ordinance.

Regardless of which compliance option is selected, the objective is to avoid adverse effects and ensure no net loss to ESA-listed species and their designated critical habitats by protecting those species and the natural functions of their designated critical habitats.

The preparation of this guidance was informed by technical input from local officials, engineers, natural resource scientists, and planners. It is designed to assist qualified habitat professionals, representing both permit applicants and permit officials, in ensuring that any adverse impacts from actions occurring anywhere within the Oregon Special Flood Hazard Area will be mitigated to a no net loss standard. This guidance is focused on ESA-listed species utilizing habitats in flood-prone areas, including those areas associated with streams, lakes, and marine waters.

The 2016 BiOp and 2017 errata for the NFIP in Oregon apply to 16 ESA-listed fish species and the Southern Resident killer whale. However, the Model Ordinance and this guidance may also help guide assessment of potential impacts from project actions on bull trout (administered by the U.S. Fish and Wildlife Service [USFWS]), which are currently listed as threatened or endangered. In Oregon, bull trout are found in the Columbia River and many of its tributaries. The

assessment of impacts on other fish species that may become candidates for ESA listing may also be warranted, to ensure that project proposals adequately address their needs if they become formally listed while a project is still underway. This assessment guidance does not, however, provide details on possible methods of how to assess impacts to any ESA-listed wildlife, invertebrate, or plant species that may be present, nor impacts to their habitats.

1.2 Definitions

Three terms are used in this guidance and the Model Ordinance, that may not be the same terms used in a community's regulations: "Riparian Buffer Zone" and "development." These terms are defined in the Definitions section of the Model Ordinance Language (Section 2.0).

The **SFHA** is the land in the floodplain within a community subject to a 1% or greater chance of flooding in any given year. It is shown on the Flood Insurance Rate Map (FIRM) as Zone A, AO, AH, A1-30, AE, A99, AR (V, V1-30, VE).

The **Riparian Buffer Zone** is measured from the ordinary high water line of a fresh waterbody (lake; pond; ephemeral, intermittent, or perennial stream) or mean higher-high water (MHHW) line of a marine shoreline or tidally influenced river reach to 170 feet horizontally on each side of the stream or 170 feet inland from the MHHW. The riparian buffer zone includes the area between these outer boundaries on each side of the stream, including the stream channel. Where the RBZ is larger than the special flood hazard area, the no net loss standards shall only apply to the area within the special flood hazard area. The RBZ-fringe is the remainder of the SFHA that is outside of the RBZ.

Development is any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials. The Oregon BiOp extends that definition to include subdivision of land, removal of vegetation, other alteration of natural site characteristics (including any remnant natural characteristics existing in a degraded site), substantial repairs and improvements, and the maintenance, repair, or remodel of existing buildings, facilities, and utilities when their existing footprint is expanded.

1.3 When to Conduct a Habitat Assessment

Whenever a development project is proposed in the SFHA, the property owner must obtain a floodplain development permit from the community. Certain types of projects can be permitted relatively quickly (see "Allowed Activities" below). Unless a community's floodplain management ordinance lists a project action type as exempt from the requirement to complete an HA (see Section 1.3.1), the project applicant must complete an HA that describes the impact of the proposed development on existing floodplain and instream habitat functions and processes. The scope and detail of that assessment may vary as needed to portray possible impacts for each project. If the anticipated project effects are clearly limited in nature and extent, it may be possible to describe them in a relatively short assessment. The greater the complexity, scope, and/or risk of possible impacts to ESA-listed species or their habitats, the more likely it will be that the HA will need to be an in-depth analysis, to portray impacts and describe planned mitigation, if needed.

1.3.1 No Habitat Assessment Required

There are four general circumstances where an HA would not be required:

1. Projects that are listed as exempt from conducting a habitat assessment in the BiOp for the NFIP in Oregon. These exemptions should be listed in the community's ordinance (exempt situations are listed below).
2. Project actions that are covered under separate consultations under Section 4(d), 7, or 10 of the ESA.
3. Projects under consideration that have already been covered by a full programmatic habitat assessment of all current and reasonably foreseeable future conditions throughout a jurisdiction. (When such an assessment already exists, and the project clearly fits within the nature and scope of those project types that were addressed by it, then the jurisdiction need only document and track how they evaluated its eligibility for coverage by that assessment).

1.3.1.1 No HA Required and No Floodplain Permit Required:

Communities may allow the following activities in the floodplain without requiring a floodplain development permit, provided all applicable federal, state, and local requirements are met. A floodplain permit is not required because these activities do not meet the NFIP definition of "development." Note: local community regulations may be more restrictive than the minimum standards (44 CFR 59).

- Routine maintenance of existing landscaping that does not involve grading, excavation, or filling.
- Removal of noxious weeds, hazard trees, and replacement of non-native vegetation with native vegetation.
- Normal maintenance of above and below ground utilities and facilities, such as replacing power lines and utility poles.

- Normal road maintenance, such as filling potholes, repaving, installing signs and traffic signals, but not including any expansion.
- Normal maintenance of a levee or other flood control facility, as prescribed in the operations and maintenance plan for the facility. Normal maintenance does not include repair from flood damage, any expansion of the prism, face or toe expansion, or the addition of material for protection or armor.
- Plowing and other normal farm practices (other than new structures or filling) on legally existing agricultural areas. Clearing additional land for agriculture will likely require a floodplain development permit and an HA.

1.3.1.2 Floodplain Permit Required and No HA Required

Communities may allow the following activities in the floodplain without an HA, provided a floodplain development permit is obtained and all applicable federal, state, and local requirements are met.

- Normal maintenance, repairs, or remodeling of structures, such as re-roofing and replacing siding, provided such work does not constitute a substantial improvement or repair of substantial damage. To comply, the cost of such work must be less than 50 percent of the market value of the structure(s).
- Activities with the sole purpose of creating, restoring, or enhancing natural functions associated with floodplains, streams, lakes, estuaries, marine areas, habitat, and riparian areas , provided the activities meet federal and state standards and do not include structures, grading, fill, or impervious surfaces.
- Development of open space and recreational facilities, such as parks, trails, and hunting grounds, that do not include structures, fill, impervious surfaces, or removal of more than 5 percent of the native vegetation on the portion of the property located in the SFHA.
- Repair to onsite septic systems, provided ground disturbance is the minimal necessary and best management practices (BMP) are utilized to prevent stormwater runoff and soil erosion.
- Projects that have already received concurrence under another permit or other consultation with the Services, either through Section 7, Section 4d, or Section 10 of the ESA, that addresses the entirety of the project in the floodplain. Examples of other such permits include but are not limited to a U.S. Army Corps of Engineers (USACE) 404 permit.
- Repair of an existing, functional bulkhead in the same location and footprint with the same materials when the Ordinary High-Water Mark (OHWM) is still outside of the face of the bulkhead.

Projects that require a federal permit under Section 404 of the Clean Water Act would likely need to go through an ESA consultation process led by the USACE Regulatory Branch. The Section 404 permit process includes consultation with the U.S. Fish and Wildlife Service (USFWS),

and/or NMFS when a project may influence a federally listed species. Such consultation is required under Section 7 of the ESA. If a project has gone through this Section 7 process with USACE then a local HA would not be required.

A project is deemed to comply with the ESA if a permit applicant has prepared a Biological Evaluation (BE) or a Biological Assessment (BA) and has received concurrence from USFWS and/or NMFS as applicable for the species potentially present (via either a Letter of Concurrence or a BiOp) that covers the full scope of the proposed action. In such cases the additional HA requirements of this guidance are not required (see Section 7.7 of either of the Model Ordinances).

1.4 Habitat Assessment Overview

The habitat assessment needs to describe any impacts to habitat functions due to actions occurring within any part of the SFHA in the BiOps action area communities. The assessment must demonstrate that there will be no net loss to habitat functions in the SFHA.

The impact of a project on habitat functions and processes may be complicated to determine because there is often little or no information on the site's baseline (pre-project) natural features. A habitat assessment is needed to identify those natural functions and to complete an analysis that estimates what effects the proposed action will have on ESA-listed species and their critical habitats.

If the assessment finds that an adverse effect may occur due to impacts from the proposed action on ESA-listed fish species, Southern Resident killer whales, or their designated critical habitats, then the permit applicant must prepare a plan identifying the steps that the applicant will take to modify the proposed action to avoid adverse effects. Avoidance measures should be applied as the first priority. Then, measures to minimize or fully mitigate any unavoidable adverse impacts must be developed and applied to the project. Jurisdictions must be able to document the details of the mitigation plan and identify which mitigation measures are required rather than recommended. They must also be able to monitor and document the implementation and measure the effectiveness of the plan, track any enforcement actions taken, and provide that information to FEMA, if requested.

Any actions that would adversely affect ESA-listed species or their critical habitats within the BiOps action area SFHA must be fully mitigated. In the required descending order of preference, the mitigation sequence is avoidance, minimization, and mitigation. Applicants must explain and document why all preferable forms of mitigation were not practicable before proposing less preferable forms (e.g., mitigation over avoidance).

1.5 Preparing and Reviewing a Habitat Assessment

This guidance provides a step-by-step approach to complete a HA when an assessment is needed. The approach described in the following sections should provide sufficient information to assess

and document the likely effects of a proposed project, but it does not have to be followed exactly as described. However, if a different approach is followed, it must provide sufficient data and analysis to describe baseline conditions and likely effects on ESA-listed species and their designated critical habitat. It must conclude with an effects determination that is well supported by that analysis.

This guidebook is not intended to represent comprehensive instructions for how a jurisdiction should complete a comprehensive "programmatic" HA of existing conditions and impacts of community's regulations across its entire jurisdiction (e.g., conditions within all watersheds in a jurisdiction). However, it helps describe the information that would be needed to complete such an extensive and inclusive programmatic assessment. Communities may conduct programmatic assessments with differing approaches based on their unique land uses, regulatory structure, available maps and data, and community goals. Communities may request technical assistance from FEMA when they draft programmatic habitat assessments or review assessments prepared by others for projects within their jurisdictions.

The guidance is also not intended to provide complete instructions for documentation and justification of how a jurisdiction's existing regulations (and any planned changes to those regulations) comply with all the terms and conditions within the RPAs of the BiOp. It will be the responsibility of the jurisdiction to explain and document that information. This guidance is primarily intended to assist applicants in preparing an HA under the permit-by-permit approach listed in the Pre-Implementation Compliance Measures (PICM). Applicants may seek assistance from their local jurisdiction in preparation of the HA. If the project is complex, it is recommended that applicants begin with conceptual development plans and conduct a preliminary assessment before investing in detailed project plans and specifications. Continued communication with community staff will also help identify issues before significant time and/or money is spent on a project that may require additional mitigation measures or needs to be redesigned or abandoned. It may be appropriate for some communities with limited staff to request assistance from their neighboring jurisdictions, Tribes, or other partners to help assess the adequacy of draft HAs written on their behalf. This guidance document allows for flexibility in the format of many aspects of the HA. Reviewers of draft HAs should be familiar with the range of formats that adequately portray and interpret fisheries population and habitat survey data.

A permit applicant should weigh the cost of preparing an assessment and mitigation plan, should one be needed, against the cost of locating the project outside the SFHA. It may cost less in time and money to simply avoid the SFHA

2.0 Conducting the Assessment

The process to adequately identify and address the impacts a proposed project may have on habitat within the floodplain is described in the following sections. In circumstances where an approved habitat assessment (Steps 1 through 4) determines that if no impacts on habitat functions

associated with ESA-listed species will occur, development of a mitigation plan is not necessary. However, most activities within the SFHA that require a HA are highly likely to have impacts on habitats associated with ESA-listed species. The first few steps are to describe the project area, area of potential effects (which may be larger), and whether any listed species potentially occur in that area. If ESA-listed species potentially occur within the area where project effects may occur, then the potential impacts on those species must be determined. When habitat impacts are identified, a mitigation plan must be prepared for the project, in accordance with Steps 5 and 6.

2.1 Step 1. Describe the Project Area

The project area is generally the parcel or parcels being developed. In some cases, the project may extend to a larger area, such as when a road to the parcel is to be built or improved, or when the effects of several interrelated or interdependent proposed land development actions are considered together. Step 1 should produce two documents – the project area description and a project area map.

2.1.1 Project Area Description

If an Oregon State Joint Permit Application (JPA) form has been prepared for the project, it will include the general project area description information that would be included as part of the habitat assessment. An approval under Section 401 of the Clean Water Act is required from the Oregon Department of Environmental Quality (ODEQ) and/or a removal-fill permit is required from the Oregon Department of State Lands (DSL). However, the JPA may not adequately describe all the natural functions, and habitat support processes, species distribution characteristics, hydrologic variables, and/or water quality effects that need to be addressed in a habitat assessment. At a minimum, an Oregon State JPA form would include the following information:

- **Location information:**
    - Street address
    - City and County
    - Township, section, and range
    - Latitude and longitude
    - Tax parcel number(s) of the project location
    - Type of ownership of the project (Federal, State, or locally owned public lands; tribal lands; privately owned lands)
- **Water resource information:**
    - Watershed name
      Watershed Assessment Unit or HUC12 codes. Information on Oregon's Watershed

Assessment Units can be found at the Oregon Department of Environmental Quality (DEQ) Oregon 2024 Integrated Report Frequently Asked Questions and the mapping webpage at:
Oregon Explorer HUC codes for the Pacific Northwest region can be found at the U.S. Geological Survey site: https://water.usgs.gov/GIS/wbd_huc8.pdf.

- Names and descriptions of the water bodies in which work will occur, including water type. For more information on water type and a map that designates the types for major water bodies, see the Oregon State Water Resources Department water typing page:
(http://www.oregon.gov/ODF/Documents/WorkingForests/WaterClassificationTechNote1.pdf)

- Coastal Management Areas are associated with the coasts of Oregon, as managed by the Oregon Coastal Zone Management Program.

- Critical Areas associated with streams, designated by the local jurisdiction pursuant to the Transportation and Growth Act in Oregon. Critical areas management information should include the critical areas designation and a description of the extent of jurisdiction.

- **Fish and Wildlife Habitat Areas**

  - Designated Goal 5 resources include riparian areas, wetlands, wildlife habitat, and natural areas in or near the project area.

2.1.2 Project Area Map

The second item needed for Step 1 is a map, drawn to scale that shows the following:

- Parcel(s) boundaries
- Full analysis area
- Area of the finished project (including roads)
- Any additional area(s) that will be disrupted during construction (including access routes, staging areas, and areas to be re-graded or filled)
- All water bodies
- Site topography, soils, and geology
- Fish and Wildlife Habitat Conservation Areas/Goal 5 resources
- Existing native vegetation by vegetation community zones. For example, a map could distinguish areas with existing coniferous forest cover from areas with shrub cover and areas with grass cover.
- Boundaries of the following regulatory areas (see Section 3 of the Model Ordinance)

  - Special Flood Hazard Area

- Floodway (if available)
- Riparian buffer zone (RBZ)
- Channel Migration Zone (CMZ) (where available)

- Depths of the 10- and 100-year floods at representative locations. These only need to be provided when flood data is available from existing studies for the community.

2.2 Step 2. Describe the Project Area's Habitat

In Step 2 of the habitat assessment, the applicant describes the existing habitat conditions of the project area. Tasks 2.2.1 and 2.2.2 of Step 2 are largely based on existing scientific information regarding species use and current habitat functions in the project area.

2.2.1 Background Research

In order to adequately describe current population and habitat conditions, Step 2 starts with a review of existing sources of information relevant to threatened or endangered species and their habitats in or near the project area. There may be thorough inventories already available. The following sources should be checked, and appropriate sections referenced as needed:

- Critical areas inventory maps, best available science consistency studies, flood control and floodplain management plans, watershed analyses, and habitat studies that may be available from the community's planning or environmental protection department.
  - The following sources may be helpful: Conservation Strategy Areas; Coastal Zone Management Program
- Natural area studies that may be available from the community's parks and/or natural resources departments.
- NMFS distribution of threatened and endangered Species (www.nwr.noaa.gov)
- NMFS designated critical habitat maps (www.nmfs.noaa.gov/pr/species/criticalhabitat.htm)
- USFWS Information for Planning and Consultation tool (IPaC) at https://ecos.fws.gov/ipac/location/index
- USFWS critical habitat maps (http://criticalhabitat.fws.gov/ and (www.fws.gov/pacific/bulltrout/)
- USFWS National Wetland Inventory mapper (https://www.fws.gov/wetlands/data/Mapper.html)
- USFWS and NMFS habitat recovery plans, when published for ESA listed species in the project vicinity
  - USFWS: (www.fws.gov/pacific)

- NMFS: (www.nwr.noaa.gov)

- U.S. Department of Agriculture, Natural Resource Conservation Service soil survey maps (http://websoilsurvey.nrcs.usda.gov/app/)
- Oregon Department of Fish and Wildlife threatened and endangered species list (http://www.dfw.state.or.us/wildlife/diversity/species/threatened_endangered_candidate_list.asp)
- Oregon Department of Fish and Wildlife Crucial Habitat Database (http://dfw.state.or.us/maps/compass/data.asp)
- Oregon State Department of Environmental Quality Water Quality Assessment (http://www.oregon.gov/deq/wq/Pages/WQ-Assessment.aspx)
- Oregon Native Fish Conservation and Recovery Plans
- Stream surveys conducted by tribes or federal, state, or local agencies. Such surveys may contain detailed information on habitat conditions and fish species presence from redd surveys or from snorkeling or electroshocking surveys. Other recent projects near the project area may also have collected stream survey or other habitat data.

2.2.2 Protected Species Identification

The review of the existing research should identify all federally listed species, designated critical habitats, Essential Fish Habitat (EFH) as defined by the Magnuson-Stevens Fishery Conservation and Management Act, affected EFH species, and Fish and Wildlife Habitat Conservation Areas or Conservation Strategy Areas, that occur in or near the project area. Species or habitats that have the potential to be negatively impacted on a direct, indirect, or cumulative basis by proposed ground-disturbing actions need to be described. The appropriate spatial and temporal scales for each form of potential impact must also be identified and briefly explained. Further discussion of potentially measurable or observable impacts, and the appropriate spatial and temporal scales for an effects analysis is presented later in this guidebook.

The table below is an example of how species presence and ESA status of populations and Critical Habitat could be presented. Additional columns could also be inserted to list the status of EFH and other categories when present and convenient to describe in a tabular format.

Occurrence of Listed Species and Critical Habitat in or Near the Project Area. (Sample Display)				
Common Name	Scientific Name	ESA Status	Jurisdiction	Critical Habitat
Lower Columbia River Chinook salmon	*Oncorhynchus tshawytscha*	Threatened	NMFS	Yes
Lower Columbia River coho salmon	*O. kisutch*	Threatened	NMFS	Yes
Lower Columbia River steelhead	*O. Mykiss*	Threatened	NMFS	Yes
Southern Resident killer whale	*Orcinus orca*	Endangered	NMFS	Yes

Table 1. Sample Species Status Table for a Habitat Assessment

Check with the NMFS and USFWS data sources described in Section 2.1 of this document to obtain general maps of the distribution of ESA-listed or proposed species, listed critical habitats, and any areas designated Essential Fish Habitat. Please note that the maps of potential fish distribution at these websites are not necessarily the most detailed or accurate maps that exist. The regional or local offices of NMFS, USFWS, tribes, or local land management agencies may be able to provide more accurate maps based on recent fish and habitat surveys, including known migration barriers.

EFH species are managed by NMFS. On the west coast of the United States there are three EFH salmon species that potentially occur in freshwater systems, namely pink, coho, and Chinook salmon. If project actions may potentially negatively impact estuarine and marine systems, numerous species of ground fish and coastal pelagic fishes that are listed under EFH may also need to be considered.

This task should summarize the biological and ecological information that will be needed for the habitat assessment. Appropriate information on species life histories, habitat, and distributions, as well as other data necessary for species survival or possible recovery, must be included to provide sufficient background for the analyses in later sections. It is important to note that even though the 2016 BiOp for Oregon focuses on salmon and EFH species managed by NMFS, all threatened or endangered plant and animal species in or near the project area need to be addressed. If other ESA-listed species are present or are potentially present, it may be necessary to conduct additional surveys and assessments beyond those described in this guidance.

Several sources of existing information are listed above in Section 2.2.1. When a document contains relevant information, that information can simply be cited by page-specific reference. Other sources include the locally developed Best Available Science (BAS) documentation reports; the state's Growth Management Act that requires each community to prepare such

reports for their critical area standards. Additional references are provided below as examples of the general format and guidance on how some agencies conduct biological assessments.

- The U.S. Army Corps of Engineers' ESA *Consultation Initiation Template* (USACE 2007) [http://www.spk.usace.army.mil/Portals/12/documents/regulatory/pdf/ESA_Template_Guidance. pdf]

- *Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Watershed Scale* (NMFS 1996). [http://www.nwr.noaa.gov/Publications/Reference-Documents/upload/matrix_1996.pdf]

- Oregon Department of Transportation *Biological Assessment and Guidance Document* (ODOT 2005). [http://cms.oregon.gov/ODOT/HWY/GEOENVIRONMENTAL/docs/BAWritingDocument.pdf]

Currently, the Northwest Region of NMFS does not formally recommend use of any specific template for Biological Assessments (other than the 'Analytical Process' for some specific land management actions like timber sales on Federal lands). The Region instead allows the potential use of a variety of formats.

HAs must describe existing habitat and species population conditions for each ESA-listed species that may occur in the area of potential effects. The HA should describe the habitat functions that potentially support ESA-listed species in or near the action area. It must then describe the potential impacts of the proposed actions on individuals of each species, populations of those species, and their habitats. The detail and extent of each assessment will vary by the nature and scope of the proposal and the potential for negative impacts.

This section's narrative should include, but not necessarily be limited to, descriptions and discussions of the following topics:

i. Factors of decline
   a. Historical pressures on the species
   b. Current pressures on the species
   c. Limiting factors for recovery of the species
ii. Local empirical information (if available)
   a. Current local population information
   b. Ongoing monitoring programs (if any)
   c. Population trend of the species

A summary of the habitat needs for each protected species should follow its description. This section of the narrative should identify and describe the key factors that are important to each

protected species. These factors include the Primary Constituent Elements (PCEs) for those species with designated critical habitat. PCEs are the key habitat components that an ESA-listed species needs to survive in an area (see example in the box). For each listed species, PCEs are described in the corresponding Federal Register publication for its designated critical habitat. The PCEs must be described when critical habitat may potentially be affected. In those cases where designated critical habitat is not present near the project action area, describing the available habitat in terms of the PCE components is still a recommended means to concisely describe existing habitat features. Not all PCEs for a species may apply to a project. In the example below, PCEs related to the ocean environment would not apply to the project if the project area is on a freshwater stream.

Example Primary Constituent Elements

(Chinook salmon and steelhead trout, 50 CFR Part 226, Federal Register / Vol. 70, No. 170 / Friday, September 2, 2005)

1. Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development.
2. Freshwater rearing sites with water quantity and floodplain connectivity
3. Freshwater migration corridors free of obstruction
4. Estuarine areas free of obstruction
5. Nearshore marine areas free of obstruction
6. Offshore marine areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation.

2.2.3 Site Investigation

Tasks 2.2.1 and 2.2.2 give the applicant guidance on where to look and what to look for regarding species potentially present at the site. Following completion of the first parts of Step 2, a site visit is usually needed to determine if there are habitat areas in the project area with which identified species have a "primary association." "Habitats of primary association" include critical habitat components (which could be PCEs), which, if altered, may reduce the likelihood that the listed species will be able to continue to live and reproduce in the area over the long term. A site visit and determination of site-specific conditions is generally necessary to determine what actual impacts on ESA-listed species, EFH, and associated habitats may occur from a proposed project.

For example, identification of Chinook salmon habitat areas of primary association should look for those PCEs listed in the box. A description of the riparian and instream habitat conditions that exist both upstream and downstream of the project action area would also be needed.

This description of existing baseline habitat functions must, at a minimum, include those habitat functions that are listed in the BiOp on the NFIP in Oregon. These functions are described in the next section on the habitat narrative. In addition, it is especially important to note the locations

and distances from the proposed project area relative to any stream reaches that may potentially support ESA-listed species or contain designated critical habitat.

The description of habitat and general conditions in the project area should also identify existing modifications to the project site within the floodplain, including existing structures, roads, impervious areas, and graded or filled areas. Any existing modification that has impaired habitat functions and/or habitats of primary association should be described (as discussed in the next section). If the project includes activities to restore the habitat in these modified areas, it could help the assessment conclude that there will be no adverse effects on habitat due to the project (see also Task 2.3.3 of Step 3).

The Oregon Department of Fish and Wildlife, through its conservation strategy includes additional actions that have the potential to result in impaired habitats. The site investigation should look for and describe these modifications when they are present. In general, actions that have the potential to result in impaired habitats involve one or more of the following:

- coastal development and associated construction
- shoreline armoring
- alteration of hydraulic regimes
- dredging and dredged materials disposal
- aquaculture
- global climate change
- habitat isolation
- the removal of riparian vegetation (except for the removal of noxious plants)

Furthermore, RPA element 2 identified in the Oregon BiOp requires communities within the implementation plan area to identify a riparian buffer zone (RBZ) that is measured 170 feet horizontally from the ordinary high-water mark of perennial or intermittent streams, including the area between these outer boundaries on each side of the stream, including the stream channel or 170 feet inland from a MHHW. Development in the RBZ must adhere to additional performance standards to comply with NFIP-ESA integration efforts as outlined in section 2.5.3.

2.2.4 Habitat Narrative

The findings of the field investigation are used to prepare a description of the habitat areas of primary association that will need to be protected. The narrative for this part of the assessment report needs to describe the presence and existing quality of the natural features that relate to the PCEs for all the species and habitat areas that were identified in Tasks 2.2.2 and 2.2.3. The habitat narrative must include descriptions of the site's floodplain storage capabilities, water quality, and riparian vegetation. As described in the final paragraph of Task 2.2.2, PCEs are the key habitat components required for an ESA-listed species, as identified in the final rules that were published in the Federal Register when a species was listed. The narrative must identify what habitat

functions are still relatively intact and which are impaired by previous site and/or area (e.g., sub-watershed, watershed, or basin scale) modifications.

The BiOp for the NFIP in Oregon states that within the SFHA all development impacts on natural floodplain functions must be mitigated. The mitigation standards should identify the specific development activities that require mitigation including the following activities.

1) The addition of fill, structures, levees, or dikes, which reduces flood storage and fish refugia, impedes habitat forming processes, and increases flow volume and velocity. The latter erodes stream banks and beds and alters peak flow timing, which increases the risk of injury to redds, fry, and alevin.

2) The addition of impervious surfaces, which reduces hyporheic function and stream recharge, increases stormwater runoff, pollutant loading, water temperature, velocity, and scour, and modifies peak and base flows.

3) Vegetation removal, which reduces shade, detrital input, velocity refuge, and habitat complexity, and increases stormwater runoff and erosion.

4) Bank armoring, which reduces instream habitat values and impedes habitat forming processes.

The site investigation and resulting habitat narrative must also include a description of the proposed action and existing habitat conditions even when the action is outside of the High Hazard Area.

It is possible that there may be limited information available from the sources identified in Tasks 2.2.2 and 2.2.3. The habitat narrative must note the sources of data and information, and clarify which statements are based on scientific reports and data, and which statements are based on the professional opinion of the author. This is one of the most vital aspects of the assessment, and is required for reviewers to evaluate the basis and relative confidence of statements, related to current conditions and estimated environmental effects.

The variables listed below should be considered to ensure that the assessment covers all the required factors. In most cases, the analysis scale will be small and only address a small contiguous action area. However, some projects may include multiple sites in multiple watersheds. The extent and detail needed for the assessment will vary by the nature, scope, and scale of the proposed action. In many cases, the project will not have the potential to affect many (or any) of the habitat functions listed below. When that is the case, the assessment simply needs to clarify why the project does not have any significant potential to degrade some or all variables. The list below is intended to assist jurisdictions in considering all possible impacts on aquatic habitat and ESA-listed fish species, due to major land management actions. The list includes questions that should be answered in the HA with additional guidance on how to address them.

Primary Constituent Elements (PCEs)

These are identified in the final rules that designate critical habitat for listed threatened and endangered species (see the NMFS and USFWS critical habitat map links within the References and Resources section to access final rules for ESA listed species). For example, for an inland site with Chinook salmon habitat (see box on page 18), the first three sections of the habitat narrative would cover freshwater spawning sites, freshwater rearing sites, and freshwater migration corridors. In those cases where designated critical habitat is not present near the project action area, describing available habitat in terms of the PCE variables is still recommended to concisely depict key habitat features. Even if designated critical habitat is not present on a site, there still may be suitable habitat for the species and the species may be present. If suitable habitat is present, then the potential for impacts to the species from project activities needs to be evaluated. The distance and locations of the nearest designated critical habitat, relative to the project area also need to be listed, so that the potential for projects to impact these mapped areas can be evaluated (e.g. via sediment transport). Water quality, floodplain connectivity and storage, and riparian vegetative community are three PCEs of particular importance within the Oregon implementation plan area, as they have been identified as key floodplain functions by the 2016 BiOp.

Water Quality

- Does the proposed action include any activities (e.g. grading, stormwater, or road construction) that may have any potential to cause measurable degradation to water quality variables within the action area, and how was this assessed?
- If so, which water quality variables would be affected? Water quality variables that should be considered include: turbidity, pH, total dissolved gas (percent of saturation), bacteria, toxics, and pollutants. In Oregon, the numeric standards for turbidity, pH, total dissolved gas, and bacteria vary by location depending on the state's designated uses for salmon and charr fish species listed for the river reach in question (i.e., spawning, rearing, and/or migration). These states have also adopted narrative criteria to supplement the numeric criteria for some variables. The narrative criteria are statements that describe the desired water quality goal, such as waters being "free from" pollutants including oil and scum, color and odor, and other substances that can harm people and fish.
- Is there any potential for the project to result in not meeting state water quality standards for any water quality variables (over any temporal scale) within the defined action area? If so, which variables? How was the action area selected, and how was the assessment conducted?

  Reaches of streams that are known to be impaired and to not meet water quality criteria for one or more variables are required to be listed under section 303(d) of the Clean Water Act (CWA). If a river reach is not included on one of these lists, it does

not necessarily ensure that it meets all water quality standards for all variables. It may simply mean that no sampling (if any has occurred) has demonstrated that it does not meet standards. Data on water quality variables may be extremely limited or non-existent for many streams and river reaches. Water body segments only become listed via documented and repeated violations that are estimated to have likely been human-caused.

Jurisdictions in Oregon should advise the Oregon Department of Environmental Quality regarding any water quality data that they are aware of, in addition to what is cited in the current 303(d) list for a specific river reach. Information on the 303(d) list is found at: Department of Environmental Quality : EPA Approved Integrated Report : Water Quality : State of Oregon.

Water body segments (i.e., stream reaches, lakes, marine waters) that appear on the 303(d) list require the preparation of a plan to restore water quality, which often takes the form of a Total Maximum Daily Load (TMDL) study. Habitat assessments should include consideration of the status of water quality in the project action area and evaluate whether the project proposal has any potential to further degrade any variables, including any that are already listed as not meeting State standards.

- If there is any potential for degradation of any water quality variables, what are the estimated effects on ESA-listed fish species and/or their designated critical habitats within the action area, and how was this assessed? In addition, what is the maximum estimated spatial scale, and maximum time period when any possible impacts on ESA-listed fish species and/or their designated critical habitats might occur?

Water Temperature and Dissolved Oxygen

- Does the proposed action include any actions or regulations that may cause measurable changes in water temperature or changes in levels of dissolved oxygen (DO) in any locations, and how was this assessed?
- If there is any potential for measurable impacts, is there any potential for water temperature or DO (over any temporal scale) to not meet State water quality standards within the action area(s)? [see Water Quality section above for hyperlinks to standards in Washington and Oregon].
- If there is any potential for measurable impacts, what is the estimated effect (at all temporal scales) on ESA-listed fish species, and how was this assessed?
- If there is the potential for measurable impacts, what is the maximum estimated spatial scale and locations (including any downstream effects) and maximum time period when impacts on ESA-listed fish species may occur?

Low Flow Hydrologic Regimes (including hyporheic flows)

- Does the proposed action include any actions that could potentially cause changes to the magnitude, duration, or recurrence intervals of low summer baseflows at any locations, over any temporal scale, and how was this assessed?
- If there is any potential for changes, what impact would those changes have on ESA-listed fish species or their designated critical habitats in the project action area, and what is the maximum estimated spatial and temporal scale of those effects?

High Flow (flood) Hydrologic Regimes

- Does the proposed action include any actions that could potentially cause changes to the magnitude, duration, or recurrence intervals of the 10-, 50-, or 100-year flood flows in any location, and how was this assessed?
- If there is any potential for changes in flood flows, what effect would those changes have on ESA-listed fish species and/or their designated critical habitats in the project action area, and what is the maximum estimated spatial and temporal scale of those effects?

  Site flood dynamics and hydrology must be assessed to varying degrees, to ensure that the analysis is adequate and appropriate, for the nature of the proposed action and the habitat resources potentially at risk. Flood flow depths, volumes, velocities, and flow paths have an important effect on the way habitat is formed. The habitat assessment narrative should describe these factors with an emphasis placed on the effects of flood events on habitats. Tributary streams, seeps, stormwater outfalls, waterways that pass through the project site, and other water sources should be identified and described. This discussion may rely on and reference other flood and site hydrology studies prepared for the project and should be focused on how flood dynamics and hydrology impact local habitat areas.

  A semi-quantitative or qualitative assessment of water quantity should usually be sufficient for projects limited in scope, scale, and overall potential to result in negative impacts on ESA-listed fish populations and their critical habitats. Projects with more potential for measurable or observable negative impacts will sometimes require more rigorous examination of hydrologic or sediment regimes, based on best available data, including correlations to existing gage stations. They may also require more intensive field surveys and possibly 1- or 2- dimensional flow modeling to describe water velocities, likely extents of inundation, and possible changes to instream and riparian habitat due to future flood events.

Flood Velocities

- Does the proposed action include any actions that could potentially cause increases in water velocities in streams or rivers during high flow events, and how was this assessed?

- If there are any potential for increases in high flow velocities, is there also any potential for measurable increases in streambed or stream bank shear or velocities in fish habitat units (e.g., pools, glides, side-channels) that provide refugia for ESA-listed species from high velocities within the channel over any temporal scale at any locations? How was this estimated?
- If there is any potential for changes in flood velocities, what impact would those changes have upon ESA-listed fish species and/or their designated critical habitats in the project action area, and what is the maximum estimated spatial and temporal scale of effects?

Sediment Delivery (erosion) and Sediment Regime (in-stream transport)

- Does the proposed action include any actions that could potentially increase rates of surface erosion, delivery of sediments to water bodies, or total loading (volumes) of sediment transported in rivers that provide habitat for ESA-listed species? How was this assessed?
- If there is any potential for sediment increases, what impact would those changes have on ESA-listed fish species and/or their designated critical habitats in the project action area, and what is the maximum estimated spatial and temporal scale of those effects?

Stream Substrate

The quality, quantity, and general distribution of substrate particle size needs to be described in those cases where there is the potential for spawning, rearing, feeding, or refugia substrate habitat to be degraded by project actions. In some cases, this may include impacts from transport of sediments downstream from the project site.

If the proposed action has the potential to deliver significant quantities of fine-sediments to stream reaches in designated critical habitat or in those areas that may otherwise provide potential habitat to ESA-listed species, the percent fines (e.g. per ?) would need to be estimated and the analysis methods described. This information is required to describe current habitat conditions and estimate how (if) any additional inputs of fine sediments may degrade the current quality of stream substrate habitat.

In those cases where sediment impacts may be a significant concern, it may also be necessary to fully describe current substrate conditions in those stream reaches that could be impacted. If this is the case, the description should include the general range of substrate types that currently exist across each different channel type in potentially affected stream reaches.

The specific questions that need to be addressed are:

- Does the proposed action include any actions that could potentially cause increased rates of aggradation of fine or coarse sediments on potential substrates

for spawning, feeding, rearing, or migration? How was this assessed?

- If there is any potential for increased sedimentation, what impact would those changes have on ESA-listed fish species and/or their designated critical habitats in the project action area, and what is the maximum estimated spatial and temporal scale of effects?

Floodplain Connectivity and Storage

Disconnecting a river from its floodplain impacts several other functions that directly affect the quality and quantity of habitat that supports ESA-listed species. Disconnection affects the potential for natural lateral migration and hydrologic connectivity between the stream and its floodplain. It also affects groundwater systems and the production and utilization of organic matter by riparian and aquatic communities.

Hydrologic connections provide temporary storage of floodwaters, while also providing key off-channel habitats and a source of water during dry summer base-flow periods. Many urbanized watersheds have lost these functions to varying degrees. If the stream is largely disconnected from its floodplain, the stream ecosystem cannot maintain its biological diversity, nor can it recover from major episodic disturbances. Some of these diverse habitat types also provide refuge from high velocity flows during flood events (see discussion below).

The habitat assessment needs to describe the current condition of floodplain connections and processes. This can usually be accomplished in a brief narrative via a combination of a site visit and examination of aerial photography and FIRM maps (if they exist). Some of the conditions that should be noted include, but are not necessarily limited to, the extent of the channel migration zone, general channel geometry in potentially affected stream reaches, including the distribution and size of riffles and pools, and identification of any side-channels and tributaries. Specific questions that need to be addressed include:

- Does the proposed action include any actions that could potentially affect the extent and level of the connection of stream channels to their floodplain? How was this assessed?
- If there is any potential for changing the extent or level of floodplain connectivity, what impact would those changes have upon ESA-listed fish species and/or their designated critical habitats in the project action area, and what is the maximum estimated spatial and temporal scale of effects?

Refugia for ESA-listed Fish Species from High Velocity Flows

- Does the proposed action include any actions that could potentially affect the location, extent, or quality of refugia from high velocity flows available for ESA-listed fish

species in side channels and other areas across the floodplain when over-bank flows occur? How was this assessed?

- If there is any potential for changes in the extent or quality of refugia, what impact would those changes have upon ESA-listed fish species and/or their designated critical habitats in the project action area, and what is the maximum estimated spatial and temporal scale of those effects?

Riparian Vegetative Community

The riparian vegetation along a stream provides many functions including bank stability, food input to streams, nutrient cycling, potential for recruitment of large woody debris to streams, shade, buffering of sediment and pollutants. The habitat assessment should include, but not necessarily be limited to, a description of existing conditions throughout any mapped channel migration area. Freshwater riparian conditions should be characterized by describing conditions as they relate to the riparian habitat functions. The habitat functions affected by riparian communities include water temperature control, recruitment of large woody debris, filtering of sediment and pollutants, erosion control, bank stability, and influence on microclimatology.

Characterization of marine shoreline conditions should be consistent with guidance from state agencies, such as the Oregon's Department of Land Conservation and Development (DLCD) Coastal Management Program. Questions that should be addressed include:

- Does the proposed action include any actions that could potentially degrade the quantity or quality of the riparian vegetative community? How was this assessed?
- If the project has any potential to affect riparian vegetation, describe the general species, sizes, areas, and percent cover of the existing levels of riparian vegetation as well as the percent cover resulting from the proposed action.
- If there is any potential for degradation of the riparian vegetative community, how would:
    - The extent, rate, and quality of nutrient cycling, buffering, food input from terrestrial sources to streams (i.e. allochthonous food), and recruitment of large woody debris be impacted?
    - The extent and quality of bank stability and stream shading to be impacted?
- If there is any potential for degradation of some of the functions that the riparian community provides, what impact would those changes have on ESA-listed fish species and/or their designated critical habitat in the project action area, and what

is the maximum estimated spatial and temporal scale of those effects?

2.2.5. Habitat Area Map

Once all habitat areas of primary association are identified and described, they should be delineated on a map. The map should be at the same scale as the project area map (Task 2.1.2) to facilitate comparison of the habitat to be protected with the extent of the Special Flood Hazard Area, Floodway, the riparian buffer zone, and other relevant features such as watercourses and wetlands.

2.3 Step 3. Describe the Project

There are two key parts of the project that need to be described at this stage of the assessment report: 1) the final project, i.e., what the area will look like and how it will be used when the project is completed; and 2) the construction process that will be followed to get there. The description of the final project should be covered first. Measures taken by the proponent to avoid, minimize, replace, or compensate (the descending order of preference of the mitigation sequence) for degradation to the habitat functions must be described in enough detail to allow assessment of all the effects of the proposed action. It needs to be clear whether each measure is required, or if it is only recommended. It can't be assumed that recommended actions will occur, so their potential positive impacts should not be part of the assured result.

As described for Task 2.1.1, if an Oregon State JPA form has been prepared for the project, it will include general project description information, but usually additional information will be needed for the habitat assessment. More information regarding the Oregon application process and JPA form template can be found at the Oregon Department of State Lands website at: http://www.oregon.gov/DSL/WW/Pages/Permits.aspx.

If the information that is already being provided in the JPA includes the level of detail described in this guidance, then the community may accept the application form as sufficient for the project description. If a JPA has not been prepared for the project, the project area description should, at a minimum, include the information included in Tasks 2.3.1 and 2.3.2 of this section.

2.3.1 Final Project

All features of the proposed completed project must be described. This includes, but is not necessarily limited to:

- A summary of the project, including all features that will be present when construction is finished
- Project category (industrial, commercial, residential, institutional, transportation, recreational, maintenance, agriculture, or environmental restoration)
- A description of the general design, location relative to nearest water bodies, and general dimensions of the footprints of any structures and facilities including, but not

necessarily limited to: buildings, boat launches, docks, pilings, fences, roads, bridges, culverts, trails, roads, or paved areas

- Detailed descriptions of all structures or facilities that would potentially impact water bodies or wetlands including, but not necessarily limited to: aquaculture, buoys, mining, bank stabilization, channel modifications, culverts, dams, levees, ditches, fishways, moorage, or outfall structures
- Above and underground utilities
- Water supply
- Wastewater disposal
- Stormwater management facilities
- Non-native landscaping

The level of detail needed for these descriptions will vary according to the nature, scope, and scale of the project, and its location relative to ESA-listed species and their potential habitats. Assessments should include as much information as is needed to adequately describe and estimate potential environmental effects. In some cases, there may be little or no potential for adverse effects; therefore, in those cases, it may require relatively less information and discussion to document potential effects.

Project details, nearby stream courses, and any key floodplain features need to be mapped, and those features should be shown on the project area map(s) (Task 2.1.2). Maps should show how project details relate to stream conditions appearing on the habitat area map(s) (Task 2.2.5).

There should also be a description of:

- Any ongoing activities that will be conducted at the site after construction is complete.
- Any ongoing activities that will affect adjacent areas, including, but not necessarily limited to, increases in traffic, stormwater runoff from the site, and noise, and changes air quality.

2.3.2 Construction Process

At a minimum, the description of the construction methods should cover the following points:

- Land clearance (areas to be cleared and native vegetation that will be removed)
- Any work in-water, including a description of the methods and materials used
- Grading and filling
- Stormwater management measures to be taken during construction
- Utility installation (including any on-site wastewater treatment)
- Methods and techniques for construction of structures, including buildings, roads,

bridges, paved areas, retaining walls, shoreline modifications, and types of equipment to be used

- Construction phasing and anticipated construction timing
- Mobilization and staging plans
- Temporary construction access and staging areas

Maps and a timeline should be included to show where and when each activity will occur.

2.3.3 Protection Measures

There are several federal, state, and local regulatory requirements that require development projects to include measures that avoid, minimize, replace, or compensate for negative effects on populations or habitat functions due to project impacts. The applicant may propose additional measures. The habitat assessment must list the protective measures that will be implemented and clarify which are required and which are recommended. All required and recommended measures should be described. They could include, but are not necessarily limited to, the examples below:

- Preserving a setback area from any disturbances, or any other measures that avoid negative impacts on ESA-listed species or their habitats.
- Drainage/erosion control plans to be implemented during construction.
- Post-construction stormwater and erosion control plans.
- Use of low impact development techniques (which may eliminate or reduce runoff from areas to be developed).
- Any other measures that minimize negative impacts on ESA-listed species or their habitats.
- Actions to implement wetland mitigation plans.
- Any other measures proposed to reduce potential negative impacts during or after construction is complete, such as sedimentation basins, should be included and described as part of the project design and included in the project timeline.
- Compensatory storage provisions to replace lost floodplain storage[1] that demonstrate that they will not potentially strand fish.
- Any other forms of on-site or off-site compensation for degradation of habitat functions that support ESA-listed species.
- A description of any adaptive management program that will be utilized. This should

[1] Compensatory floodplain storage requirements are included in Section 7.6 of the Model Ordinance. This section requires that compensatory storage areas must be graded and vegetated to allow fish passage during flood events without creating fish stranding sites. Areas of compensatory flood storage should be designed to create floodplain habitat whenever feasible. Compensatory storage should not be used in areas prone to avulsions because lowering floodplain elevations or digging pits in these areas may increase the probability of an avulsion.

include, but not necessarily be limited to, a description of what monitoring would be conducted to track both implementation and effectiveness of mitigation measures, what would trigger adaptive measures, what those measures would be, and what method will be used to determine if they are sufficient and successful.

Adaptive management refers to a structured, iterative process intended to enable decision-making under conditions that include some uncertainty. The goal is to reduce that uncertainty over time by monitoring project site conditions before, during, and after construction, as well as the effectiveness of project design elements and mitigation measures. Possible components of an adaptive management plan include, but are not necessarily limited to, the following topics.

- How monitoring and resultant possible changes in project management (e.g., variations in mitigation measures) are based on spatial and temporal scales of analysis that are appropriate for the project in question, and how the basis for those scales is explained. This includes the location(s), duration, and frequency of monitoring.
- Why the variables selected for monitoring are appropriate and practical to track project impacts and the effectiveness of best management practices and mitigation measures.
- How monitoring results can and will be used in a direct way to decide what, if any, changes need to be made to achieve the desired future condition for the project. For many projects the desired future condition is obvious and can be easily stated. For more complex projects, the minimum parameters needed to adequately define the desired future condition will need to be determined and clearly described.
- How adaptive changes to the project would be based on existing best management practices and best available science to the greatest extent possible.

2.4 Step 4. Assess the Environmental Effects

The habitat assessment must analyze the direct and indirect effects of the proposed action on ESA-listed species and their aquatic, riparian, and floodplain habitat areas identified in Step 2, as well as the cumulative effects of future actions that are reasonably certain to occur. Primary factors to be considered in the assessment include, but are not necessarily limited to, the following considerations:

- The proximity of the action to individuals of the species present, habitat management units, or designated critical habitat units. This includes assessing the likelihood of measurable or observable impacts on fish or their designated critical habitats based on the relative location(s) of the action and nearby populations and habitats. For example, habitats located well downstream of an action that is expected to deliver significant volumes of sediment to a stream near the project site may still be measurably impacted

if those sediments may be routed (transported) downstream to areas of concern. The appropriate temporal and spatial scales of analysis will vary by the variables of concern and nature of the project and must be described in the assessment.

- The spatial distribution of an action over one or more action areas or sub-watersheds. The analysis should consider the accumulated effects of impacts in multiple locations and/or cumulative effects due to the combination of project effects added to the effects of other nearby, reasonably foreseeable future, non-federal actions.
- The timing of the proposed action relative to sensitive periods of the lifecycles of any potentially impacted ESA-listed species, and how that timing may result in negative impacts.
- The nature, scale, scope, and duration of the effects of the proposed action on the sub-population size, growth and survival, life cycle, diversity, isolation, and genetic integrity of ESA-listed species that could potentially be affected. Assessments should include as much information as is needed to adequately describe these population variables. In some cases, there may be little or no potential for adverse effects with respect to these variables, so relatively little discussion will be needed.
- The nature, scale, scope, and duration of the effects of the proposed action on the PCEs of any designated critical habitat, including any direct, indirect, interdependent, interrelated, or cumulative effects. In freshwater systems, PCEs generally include adequate water quality, water quantity, and substrate (free of fine sediments) for spawning, incubation, and larval development, floodplain connectivity for rearing, and stream channels free of man-made obstructions (obstructions may include physical, water temperature, or chemical barriers). The habitat assessments should include as much information as is needed to adequately estimate potential effects on these habitat variables. In some cases, there may be little or no potential for adverse effects on these variables, so relatively little discussion will be needed.
- There are three potential categories of effect on designated critical habitat that relate to the duration of the effect: 1) a short-term events where effects reduce to negligible levels soon after construction activities cease; 2) actions that may result in sustained long-term negative effects that are measurable or observable after the proposed action is completed; and 3) actions that cause permanent changes, resulting in a new threshold (condition) for some population or habitat functions of an a ESA-listed species and/or its critical habitat. Note that ‘Short-term’ effects will never persist more than one year beyond the duration of construction duration (e.g., removal of native vegetation due to construction that is replaced within one year), and in the case of significant inputs of sediment or pollutants, may not persist for more than a few hours to a few days at most.
- The frequency of any negative impacts due to the proposed action, described as the mean number of events per an appropriate time basis for the proposed action. This rate must then be compared against best available data on the estimated recovery rates of

any potentially affected species to assess how those species would likely be impacted by multiple disturbances (if such occurs). The duration of each event may vary. A recurring event of short duration will in some cases result in a smaller net impact than a single event of a much longer duration, but the opposite may also be true depending on the nature of the disturbance.

- The severity of any negative effects on ESA-listed fish or their designated critical habitats that may potentially occur due to the actions of the proposed project. In this context severity is not analogous to intensity or scale, but it is closely related. With a "severe disturbance," affected fish would take a longer time to recover, due to both the intensity of effects as well as the cumulative effects of the other variables described above.

2.4.1 Types of Environmental Effects

The References and Resources section at the end of this document lists resources that have additional guidance for the assessment of environmental effects. The habitat assessment should assess direct, indirect, and cumulative effects.

Direct effects: According to ESA rules and regulations, direct effects occur at or very close to the time of the action itself. Examples include, but are not limited to: construction noise disturbance, loss of habitat, or sedimentation that results from the construction activity. Direct effects include the effects of interrelated actions. Such actions are part of the proposed action and depend on the proposed action for their justification. Direct effects also include interdependent actions, which are activities that have no independent utility apart from the action under consideration. Neither interdependent nor interrelated actions would occur 'but for' the implementation of the proposed action.

The discussion of direct effects must include information on the temporal and spatial limits of the effects, species tolerances, severity of effect, mortality, and other forms of take (including harm) and expected habitat loss as a result of the proposed action. Identification of the appropriate estimated temporal and spatial scales of potential impacts are key to assessing environmental consequences. It is recommended that a table or list of appropriate scales for each pertinent issue (e.g., possible erosion and delivery of sediments to stream channels, water pollutants, changes in instream or riparian habitat, changes in hydraulics, etc.) be created to document appropriate scales of analysis for the nature and location of the proposed action. Habitat assessments only need to address those habitat functions and processes that the project has the potential to affect, while also explaining (as briefly as is practicable) why those are the only functions that may be impacted.

The direct impacts a project might have on a habitat area include, but are not limited to:

- Permanent clearing and grading of any habitat area
- Temporary clearing and grading of any habitat area during construction
- Permanent structures, pavements, etc., constructed within or placed within a habitat

area

- Modification of a stream channel or side channel, including bank stabilization measures and removal or changes to large woody debris (other than stream restoration efforts)
- Diversion of water that will change the hydrologic or sediment regime in the project action area

Indirect effects: Indirect effects are also caused by or result from the proposed action; however, they are likely to occur later in time. They may occur outside of the area directly affected by the action. Indirect impacts include, but are not limited to:

- Disrupting high or low stream flows, including impacts from stormwater runoff
- Contributing to sedimentation that fills in substrate
- Blocking a corridor that connects habitat areas
- Increases in water temperature or degradation of chemical or biologic water quality parameters through removal of riparian vegetation or other actions
- Disturbance of riparian vegetation (for example, clearing vegetation to the edge of a forested riparian area)
- Moving or removing large woody debris
- Destabilizing banks or altering natural lateral or vertical channel migration or channel forming processes
- Degrading wetland areas through disturbance of adjacent vegetation or modification of hydrology

Cumulative effects: Under the National Environmental Policy Act (NEPA) cumulative effects include the lingering effects of past and current actions (as depicted in the environmental baseline) that overlap in time and space with the proposed action, as well as estimates of the effects of future state, federal, tribal, local, or private actions that are reasonably certain to occur in the action area. However, under the ESA's distinct definition, cumulative effects include the effects of foreseeable future state, tribal, local, or private actions that are reasonably certain to occur in the project action area, but federal actions (i.e. actions permitted or partially funded by one or more federal agencies) are not part of the assessment nor are any past projects.

Project assessment cannot be segmented under either NEPA or ESA. It is not permitted to break the project down into small segments that may have low levels of impacts when considered separately. The entire scope of the direct, indirect, interdependent, and interrelated actions must be considered, including any possible lingering effects that may overlap with other reasonably foreseeable projects that could result in cumulative effects in the area(s) defined for analysis.

Permit officials are required to review the cumulative effects of all projects when the proposed action has the potential to produce any measurable or observable negative effects. The cumulative effects section should not simply be a list of other projects. It must in some manner describe the estimated accumulated impacts of future projects that are reasonably certain to occur, superimposed upon the baseline of current conditions and the expected impacts of the proposed action.

2.4.2 Report Format

There is no single required format for a NFIP habitat assessment, but such assessments must contain sufficient information and analysis to fully describe the impacts of the proposed action on ESA-listed species and their habitats. Similarly, neither NMFS nor USFWS (often jointly referred to as the 'Services') requires a specific format that biological assessments must follow. The main reference that the Services refer to and recommend applicants fully comply with is the Consultation Handbook (NMFS, USFWS 1998). Endangered Species Consultation Handbook (noaa.gov)

The Handbook is a large document that includes chapters and appendices that stress the contents (versus format) needed in a biological assessment, along with examples of such assessments. However, there are also several examples of formats sometimes employed by various agencies that may be helpful for jurisdictions to reference as they can supplement the recommendations in this guidance. One format often used in the Pacific Northwest is the Matrix of Pathways and Indicators (NMFS 1996 and USFWS 1998). This approach assesses both the current condition and the estimated effect of the proposed action on 18 'indicators' of population and habitat conditions that fall under six broader 'pathway' categories. This approach is useful because it breaks down the assessment into a repeatable, manageable number of specific topics.

The only significant difference between the NMFS and USFWS versions is that the suggested thresholds for when the current condition of an indicator is 'properly functioning', 'at risk', or 'not properly functioning' varies between the Services. The narrative for the matrices emphasizes that these specific threshold metrics do not need to be used and can be replaced by other metrics that are more appropriate for the watershed in question, if the deviation can be explained.

The outline below is a variation on the U.S. Army Corps of Engineers (USACE) Biological Assessment Template guidance regarding how to describe the effects of a proposed action in a biological assessment. It is included in the Endangered Species Section of USACE Permit Guidebook online resource at: http://www.nws.usace.army.mil/Missions/CivilWorks/Regulatory/PermitGuidebook.aspx. All the components of this USACE outline must be covered in some manner, but the format may vary.

A. Direct effects
    1. First PCE (e.g., freshwater spawning sites)
    2. Second PCE (e.g., freshwater rearing sites)

3. Third PCE (e.g., freshwater migration corridors)
4. Additional PCEs as appropriate
5. Essential Fish Habitat designated by the National Marine Fisheries Service
6. Fish and Wildlife Habitat Conservation Areas
7. Vegetation communities and habitat structures
8. Water quality
9. Water quantity, including flood and low flow depths, volumes, and velocities
10. The channel's planform pattern and migration processes
11. Spawning substrate, if applicable
12. Floodplain refugia, if applicable

B. Indirect effects - see the list on the previous pages of this document and include consideration of indirect effects with respect to items A.1 through A.12, above, that are applicable to the proposed project
C. Effects from interdependent and interrelated actions
D. Cumulative Effects
E. Effects determinations – see following section
F. Summary

2.4.3 No Net Loss Determination

Actions in the SFHA of the implementation plan area will have a May Affect -- Not Likely to Adversely Affect (NLAA) determination. However, the RPAs set forth in the 2016 BiOp and 2017 errata allow for compensatory mitigation of adverse effects within the SFHA through abidance with no net loss standards. No net loss is a standard where adverse impacts must be avoided or offset through mitigation so that there is no net change in function from the condition when development begins. The no net loss standards ensure that the implementation of the NFIP avoids jeopardy of listed species and adverse modification of habitat, including essential fish habitat (EFH) under the jurisdiction of NMFS within the plan area. They apply to three floodplain functions (i.e., floodplain storage, water quality, and riparian vegetation) essential to the survival of the 16 ESA-listed fish species and Southern Resident killer whale in the plan area.

2.4.4 Preparing the Mitigation Plan

The following sections (Steps 5 and 6) provide guidance on preparing a mitigation plan, including reference to any other pertinent habitat-specific restoration and mitigation guidance materials developed for the area under consideration. The final objective of floodplain habitat mitigation is to ensure that there is no adverse effect on quality or quantity of natural habitat functions and processes within the Special Flood Hazard Area through no net loss standards. Step 6, Task 2.6.1

of this guidance provides guidance on mitigation objectives to achieve no net loss, including specific requirements for mitigation within riparian buffer zones and through the remainder of the SFHA.

For many development proposals, the permit conditions and mitigation actions required to meet other local and state permit requirements may also provide sufficient mitigation for the impacts identified through Step 4 of this guidance. In such instances, permit conditions and required mitigation actions may overlap to serve as mitigation for impacts on floodplain habitats, as required by the local floodplain management ordinance. However, the conditions and mitigation proposed, must be sufficient to mitigate for all floodplain habitat impacts, in order to meet the objective of no adverse effect on habitat for ESA-listed species.

2.5 Step 5. Review Mitigation Alternatives (Mitigation Sequencing)

There are three major types of mitigation approaches to rectify an adverse effect. In descending order of preference and effectiveness they are: avoidance, minimization, and mitigation. This mitigation sequence hierarchy requires minimization of those impacts that can't be avoided and directs that any impacts remaining after taking steps to minimize shall be fully mitigated. On-site, in-kind compensation is preferred over off-site and/or out-of-kind compensation. The necessity for use of the latter must be explained and justified. Successful mitigation is dependent upon adequate monitoring of both the actual (versus planned) implementation of mitigation measures as well as the effectiveness of those measures to accomplish the stated objectives in the Mitigation Plan (see Step 6 below). The results of that monitoring may trigger adaptive management to accomplish those goals.

2.5.1 Avoidance

Avoidance of adverse effects is the preferred approach. FEMA recommends that new land development actions remain outside of the SFHA. Avoidance prevents additional adverse effects on aquatic and riparian habitats, while also precluding any risks to public safety and property from increased frequency, duration, or magnitude of flooding that would possibly result from further development in the floodplain. Avoidance also largely eliminates the expense of adhering to no net loss within the SFHA. The permit applicant should strongly consider relocating or redesigning proposed projects to minimize the impacts on floodplain habitat functions and the corresponding need for a mitigation plan.

Communities should consider disincentivizing development within the floodplain. Many communities currently use a variety of strategies to encourage conservation of sensitive areas by allowing for development at a more intense level in other areas. These measures are usually implemented through provisions of a zoning ordinance or separate development regulations. Here are three incentives for floodplain conservation that some jurisdictions use:

1. Providing density incentives to individual property owners: A density incentive or

density credit system would allow specified land uses to occur at a more intense level within the portion of a parcel outside of the floodplain as compensation for conservation of flood-prone areas within the parcel. For example, if a 20-acre parcel is zoned for one acre lots and half of the parcel is in the floodplain, the community might consider allowing the ten "dry" acres to be developed with half acre lots, allowing the developer to still construct 20 homes. This would allow for a higher density of development in a portion of the property and would require the remaining, high-habitat-value floodplain to be conserved as a dedicated tract. This strategy is similar to the approach of clustering development, which is provided as a case study in Figure 6-3 of the FEMA 480 manual "Floodplain Management Requirements" and is often used in planned unit developments. Under either the density incentive or density credit approach, the overall project does not exceed the development density allowed by the zoning district.

2. Transfer of development rights: Transfer of development rights (TDR) programs allow for the transfer of development density from one parcel of land (with some conservation value, such as a floodplain or wetland) to another parcel or area that is planned for higher density development. Implementation and administration of TDR systems has proven challenging in many circumstances due to the required coordination in establishing density receiving and density giving areas and the required negotiation to set density credit values. However, a community, regional, or watershed-based TDR system may be a successful strategy for floodplain avoidance.
3. Tax relief for conservation lands: Tax relief is a financial incentive proven to help discourage development of sensitive lands. Such systems could provide an additional venue to encourage conservation of floodplain lands. However, tax relief systems generally do not provide permanent protection for natural resources as they often are terminated when the property ownership transfers.

2.5.2 Minimization

If the entire project cannot avoid some development within the SFHA, it may be able to minimize the physical area and magnitude of impacts on the three floodplain functions. Some ideas for minimizing impacts include:

- Elevating structures in the SFHA on posts and piers to reduce the amount of fill/structure volume below the BFE.
- Reducing the amount of new impervious surface and using pervious surfaces where possible.
- Reducing the number of trees with a dbh of 6 inches or larger to be removed.

Many adverse effects result from degradation of natural processes or functions caused by actions during the construction period. Some best management practices to avoid these types of problems include, but are not necessarily limited to:

- Perform all work in dry weather and/or during the dry season.
- Incorporate erosion and sedimentation control measures.
- Use vegetable oil-based hydraulic fluids in all equipment working in water.
- Prepare and train crews on a spill prevention and pollution control plan and require that all equipment needed to contain a possible spill is available on-site before construction activities begin.
- Store, stage, and refuel equipment outside the riparian buffer zone.
- Inspect equipment daily for leaks.
- Time specific phases of work to occur during "species work windows," when the species are not present or will not be affected.

2.5.3 Mitigation

Mitigation must be conducted for any loss to floodplain storage, water quality, and riparian vegetation in the SFHA. This is commonly measured through an increase in fill or structures below the BFE, an increase in impervious surfaces, and the removal of trees 6 inches dbh or higher. Mitigation may include both natural methods (e.g., replanting of trees) or engineered methods (e.g., green infrastructure) depending on the floodplain function impacted.

Mitigation is recommended to occur on the same site and reach as which the impact occurs. Mitigation that does not occur within the same reach as where impacts occurred is subject to higher ratios that increase mitigation required to achieve no net loss. Mitigation must occur within the same watershed (i.e., within the same 10-digit hydrologic unit code area) and the same jurisdictional boundaries as the impact. For communities within the plan area of Oregon's BiOp, FEMA requires that all development in the SFHA to be mitigated to achieve no net loss of the natural floodplain functions of floodplain storage, water quality, and vegetation through the ratios below.

Basic Mitigate Ratios	Undeveloped Space (ft^3)	Pervious Surface (ft^2)	Trees (6"<dbh≤20")	Trees (20"<dbh≤39")	Trees (39"<dbh)
Floodway and/or RBZ	2:1	1:1	3:1	5:1	6:1
RBZ-Fringe	1.5:1	1:1	2:1	4:1	5:1
Mitigation multipliers					
Mitigation onsite to Mitigation offsite, same reach	100%	100%	100%	100%	100%
Mitigation onsite to Mitigation offsite, different reach, same watershed (5^{th})	200%	200%	200%	200%	200%

Table 2: Mitigation Ratios Required to Achieve No Net Loss

Mitigation multipliers of 100% result in the required mitigation occurring at the same value described by the ratios above, while multipliers of 200% result in the required mitigation being doubled.

- For example, if only 500 ft^2 of the total 1000 ft^2 of required pervious surface mitigation can be conducted onsite and in the same reach, the remaining 500 ft^2 of required pervious surface mitigation occurring offsite at a different reach would double as a result of the 200% multiplier.

In instances where pervious surface replacement is not possible, mitigation can be achieved through infiltration of stormwater using low impact development (LID) or green infrastructure practices (e.g., rain gardens, bioswales). Or, where pervious surface replacement is not possible, due to impermeable soils or high-water tables, then through stormwater detention, to ensure no increase in peak volume of flow, followed by treatment to minimize pollutant loading.

In addition to higher mitigation ratios established by the no net loss standards, development in the RBZ is subject to the following conditions and performance standards:

- Habitat restoration activities in the RBZ are considered self-mitigating and are not subject to the no net loss standards described above.
- Functional-dependent uses are subject to the no net loss standards for development in the RBZ. Ancillary features in the RBZ (including manufacturing support facilities) are subject to the beneficial gain standard in addition to no net loss standards.
- Any other use of the RBZ requires a greater offset to achieve no net loss of floodplain functions, on top of the no net loss standards described above, through the beneficial

gain standard.

- Under FEMA's beneficial gain standard, an area within the same reach of the project and equivalent to 5% of the total project area within the RBZ, shall be planted with native herbaceous and shrub vegetation and designated as open space.

2.5.4 Select the Best Approach

Selecting the best mitigation approach for the proposed project is an iterative process. Avoidance should be considered first as the preferred choice. If work must be done in a sensitive area, the project proponent should consider the costs of restoration and compensation. If those costs are too high, then avoidance should be reconsidered.

Selecting the best mitigation approach should be done in conjunction with the local, state, and federal regulatory offices for technical assistance regarding the discussion of preliminary project designs and assessment of environmental effects. Assistance from these sources, as well as possible review and assistance from neighboring tribal representatives, can greatly aid in designing an appropriate sequence of mitigation of actions. Early and periodic meetings with appropriate regulatory agencies will increase the likelihood that a mitigation plan will meet all regulatory requirements and can reduce total project costs and the probability of schedule delays during the approval process.

2.6 Step 6. Prepare the Mitigation Plan

2.6.1 Objective

As noted in Step 5, the objective of the mitigation plan is to assure that actions are taken to sufficiently and appropriately mitigate for negative impacts on ESA-listed populations and the natural functions and processes that support their habitats. The mitigation plan needs to provide sufficient detail to demonstrate how this will be done, using avoidance, minimization, replacement (rectify), and/or compensatory measures.

For all mitigation, the final plan (construction level detail) should not be drafted until the local permitting office(s), in coordination with state and federal agencies, as necessary, has agreed that the conceptual mitigation plan would meet the objectives. Coordination with local permitting officers will ensure that the scope of the planned mitigation will be commensurate with the scale of the impacts and will meet the objectives identified above.

2.6.2 Format

Many communities have established formats that they have used to document mitigation plans within environmental or biological assessments. These formats are likely adequate for purposes of the NFIP. In Oregon, refer to Chapter 3 of *Wetland Mitigation Banking Guidebook for Oregon: Approval Process and Documentation*. For detailed guidelines regarding what to include in a mitigation plan.

Here is an example mitigation plan outline:

1. Introduction, background, objectives
2. The project area, with map (taken from Step 1 of the assessment)
3. The project area's habitat, with map (taken from Step 2 of the assessment)
4. Project description (taken from Step 3 of the assessment)
5. Impact on habitat (taken from Step 4 of the assessment)
6. Alternatives considered (taken from Step 5, this should note why some alternatives, especially avoidance, were not selected)
7. Mitigation concept (an overall explanation of the measures)
8. Construction measures
    a. Grading plan, with existing and post-construction topographical maps
    b. Construction methods (e.g. equipment to be used)
    c. Construction schedule
9. Permanent measures
    a. Surface water management
    b. Vegetation plan
    c. Permanent buffer areas
    d. Etc.
10. Post-construction monitoring and maintenance plan
11. Bond arrangements

2.6.3 Minimum Standards

At a minimum, the mitigation plan's components 7, 8, 9, 10, and 11 of the outline above, should be consistent with the mitigation guidance requirements of the Army Corps of Engineers, and Chapter 3 of *Wetland Mitigation Banking Guidebook for Oregon: Approval Process and Documentation*. In Oregon, mitigation plans must also be consistent with the community's critical areas regulations or Goal 5 implementation plans. If there are inconsistencies between these requirements, the standards that provide the highest level of environmental protection and the greatest likelihood of mitigation success take precedence.

3.0 Reviewing Habitat Assessments and Mitigation Plans

This section provides guidance for the local permit official. The following strategies may be used to ensure that habitat assessments and mitigation plans are prepared by a qualified individual or company and meet the intent of the Model Ordinance and this guidance.

Establishing a List of Qualified Professionals: The community could provide a list of qualified professionals who have experience in the area to developers and landowners. Another strategy for ensuring that qualified professionals are used could include developing qualification criteria for authors of habitat assessments and mitigation plans; see the box below for an example of qualifying criteria.

Public Comment Period: After habitat assessments and mitigation plans are submitted, the permitting official may require a public comment period before assessment conclusions and/or mitigation plans are approved. This approach could include a requirement that a public notice be posted in a publication of record. The intent of the public comment period would be to ensure that interested third parties would have ample opportunity to review and comment on proposed projects. This could alert the local permit official to issues or impacts not adequately addressed by an assessment or mitigation plan.

Third Party Review: The community may establish a system of third-party review(s) by qualified consultants or agencies. Third party review is frequently implemented by local jurisdictions for other environmental permits and approvals. The cost of third-party review could be passed on to the applicant. This may require establishment of a third-party review system in the local ordinance. Establishing a system of third party review could augment internal review within the local jurisdiction. Another option that may work for certain jurisdictions could be formalizing a system of internal review where qualified staff would determine the adequacy of submitted materials.

Example Qualification Criteria

The following criteria could be used by a community as part (likely not all) of the minimal criteria needed to conduct habitat assessment to ensure assessments and mitigation plans are prepared by a qualified consultant:

Reports and plans shall be prepared by persons who have a minimum of a bachelor's degree in wildlife or fisheries habitat biology, or a related degree in a biological field from an accredited college or university with a minimum of four years' experience as a practicing fish or wildlife habitat biologist.

Qualifying criteria should include further specifications for all wildlife, fisheries, habitat, and environmental professionals that could be relied upon to address the broad array of habitats and conditions that occur in flood-prone areas.

3.1 Review Checklists

Permit staff could develop a review checklist for assessment and mitigation plan submittals. A checklist would likely need to be tailored to specific types of development activity due to the site

and habitat-specific nature of habitat assessments and mitigation plans. See the worksheet attached to this guidance document for an example of a review checklist.

4.0 References and Resources

4.1 Federal and State Regulations and Guidance

National Flood Insurance Program- Endangered Species Act Integration in Oregon, FEMA Region 10. https://www.fema.gov/about/organization/region-10/oregon/nfip-esa-integration

CRS Credit for Habitat Protection, FEMA, 2010. http://training.fema.gov/EMIWeb/CRS/

Endangered Species Consultation Handbook, National Marine Fisheries Service, 1998. https://media.fisheries.noaa.gov/dam-migration/esa_section7_handbook_1998_opr5.pdf

Endangered Species Act (ESA) Section 7(a)(2) Jeopardy and Adverse Modification of Critical Habitat Biological Opinion, ESA Section 7(a)(2) "Not Likely to Adversely Affect" Determination, and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Implementation of the National Flood Insurance Program in the State of Oregon. April 14, 2016. https://media.fisheries.noaa.gov/2022-01/2016-04-14-fema-nfip-nwr-2011-3197.pdf

Mitigation guidance and JPA permit information, Oregon State Department of Lands. http://www.oregon.gov/DSL/WW/Pages/Permits.aspx

National Flood Insurance Program Floodplain Management Requirements A Study Guide & Desk Reference for Local Officials, FEMA 480, 2005. https://library.floods.org/cgi-bin/koha/opac-detail.pl?biblionumber=5219

4.2 Maps and Databases

Critical habitat maps:

National Marine Fisheries Service: http://www.nmfs.noaa.gov/pr/species/criticalhabitat.htm

U.S. Fish and Wildlife Service: http://criticalhabitat.fws.gov/

Forest Water Typing System, Oregon State Water Resources Department. http://www.oregon.gov/ODF/Documents/WorkingForests/WaterClassificationTechNote1.pdf

Threatened and Endangered Species List, Oregon Department of fish and Wildlife. http://www.dfw.state.or.us/wildlife/diversity/species/threatened_endangered_candidate_list.asp

Oregon Natural Heritage Program, Oregon State University Institute for Natural Resources. http://inr.oregonstate.edu/orbic

Washington and Oregon State Soil Survey data, see the USDA Natural Resource Conservation Service maps or online *Web Soil Survey*. http://websoilsurvey.nrcs.usda.gov/app/

Regional Guidance for Hydrologic and Hydraulic Studies in Support of the Model Ordinance for Floodplain Management under the National Flood Insurance Program and the Endangered Species Act, FEMA Region 10, 2010. https://www.fema.gov/pdf/about/regions/regionx/draft_handh_guide.pdf

4.3 Water Quality and Quantity

Section 401 Water Quality Certification: Post-Construction Stormwater Management Plan Submission Guidelines, State of Oregon Department of Environmental Quality, 2016, https://www.oregon.gov/deq/wq/wqpermits/Pages/Section-401.aspx

Standards for surface water quality in Oregon State, Department of Environmental Quality. http://www.oregon.gov/deq/wq/Pages/WQ-Standards.aspx

Routine Road Maintenance | Water Quality and Habitat Guide, Best Management Practices, State of Oregon Department of Transportation, 2020. http://www.oregon.gov/ODOT/GeoEnvironmental/Pages/Stormwater.aspx

Oregon State Water Quality Assessment, Department of Environmental Quality. http://www.oregon.gov/deq/wq/Pages/WQ-Standards.aspx

Water level data:

- U.S. Geological Survey: http://wa.water.usgs.gov/data/

4.4 Mitigation

Engineering with Nature − Alternative Techniques to Riprap Bank Stabilization, FEMA Region 10, 2009. https://www.fema.gov/pdf/about/regions/regionx/Engineering_With_Nature_Web.pdf

Habitat Conservation Planning Handbook, US Fish & Wildlife Service and National Marine Fisheries Service, 1996. https://www.fws.gov/library/collections/habitat-conservation-planning-handbook

Pu*rpose of Mitigation and Mitigation Steps in Oregon State,* Oregon State Department of State Lands. http://www.oregon.gov/dsl/WW/Pages/Mitigation.aspx

Wetland Mitigation Banking Guidebook for Oregon: Approval Process and Documentation, Oregon Division of State Lands, 2000, http://oregonexplorer.info/data_files/OE_topic/wetlands/documents/mitbank_guidebk.pdf

A Guide to the Removal-Fill Permit Process: Compensatory Mitigation Planning, Oregon Division of State Lands, 2016, https://www.oregon.gov/dsl/wetlands-waters/Documents/Removal_Fill_Guide.pdf

Oregon Aquatic Habitat: Restoration and Enhancement Guide, Oregon Plan for Salmon and Watersheds, 1999, https://digital.osl.state.or.us/islandora/object/osl:16552

4.5 Additional References

Invasive species information: Oregon Department of Agriculture. http://www.oregon.gov/ODA/programs/Weeds/Pages/AboutWeeds.aspx

Low Impact Development, Oregon Environmental Council. http://www.oeconline.org/tag/low-impact-development/