



Floodplain Habitat Assessment and Mitigation

Regional Guidance for the Puget Sound Basin

2013



FEMA Region 10

Regional Guidance
for
Floodplain Habitat Assessment and Mitigation
in the Puget Sound Basin

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Contents

Introduction.....	1
Background.....	1
Definitions	2
When to Conduct a Habitat Assessment.....	3
Allowed Activities	7
Conducting the Assessment	9
Step 1. Describe the Project Area	9
1.1. Project Area Description.....	9
1.2. Project Area Map.....	10
Step 2. Describe the Project Area’s Habitat.....	11
2.1. Background Research	11
2.2. Protected Species Identification.....	13
2.3. Site Investigation	15
2.4. Habitat Narrative.....	16
2.5. Habitat Area Map.....	23
Step 3. Describe the Project	23
3.1. Final Project.....	24
3.2. Construction Process.....	24
3.3. Protection Measures.....	25
Step 4. Assess the Impact.....	27
4.1. Types of Impacts.....	28
4.2. Report Format	31
4.3. Effects Determination	32
4.4. Assessment Report.....	34

Preparing the Mitigation Plan	34
Step 5. Review Mitigation Alternatives (Mitigation Sequencing).....	34
5.1. Avoidance	35
5.2. Minimization.....	36
5.3. Restoration	37
5.4. Compensation	38
5.5. Select the Best Approach(es).....	38
Step 6. Prepare the Mitigation Plan	39
6.1. Objective.....	39
6.2. Format.....	40
6.3. Minimum Standards.....	41
Reviewing Habitat Assessments and Mitigation Plans.....	42
References and Resources.....	43
Federal and State Regulations.....	43
Maps and Databases.....	43
Water Quality and Quantity.....	44
Mitigation.....	45
Additional References.....	45

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- City of Auburn
- City of Carnation
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Introduction

Background

This Regional Guidance is written to assist communities in meeting the requirements and criteria of the Endangered Species Act (ESA) in regard to the National Flood Insurance Program (NFIP). In the Puget Sound Basin of Washington those requirements are described in a Biological Opinion (BO) issued by the National Marine Fisheries Service (NMFS) on September 22, 2008.

This guide is a companion to the BO for Puget Sound and the Consultation Handbook (NMSFS 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. This document focuses on requirements specific to the Puget Sound Basin in Washington State, but it may also be useful in other areas of the country. 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 100-year floodplain. Once NMFS completes a BO for the NFIP in Oregon (a draft BO is expected in late summer 2013), FEMA Region 10 will prepare separate guidance on habitat assessment and mitigation that focuses on requirements throughout Oregon.

This document is also designed to support the NFIP-ESA Model Ordinance that was written as one option to comply with the NMFS BO for the NFIP in the Puget Sound Basin, which was prepared by FEMA Region 10. The Model Ordinance includes a BO Checklist which provides a summary of what is required of communities to abide by the ESA under the NFIP. For further details on the BO's requirements, see the Model Ordinance *Introduction* section and the Biological Opinion text in Appendix E of the Model Ordinance.

Communities in Puget Sound have the option of adopting the Model Ordinance (Door 1) or ensuring that their existing regulations fulfill all the requirements of the 2008 BO under either a checklist or programmatic habitat assessment approach (Door 2 options), or via a permit-by-permit approach (Door 3). Sections of the Model Ordinance are referenced in this guidance to help the reader match the requirements with the BO and NFIP regulations. Additional references included in this assessment are listed at the end of the document.

The most frequent use of the earlier draft version (2010) of this guidance was to assist communities in preparing or reviewing permit-by-permit (Door 3) NFIP submittals. This revised 2013 guidance will also assist jurisdictions to assess and document ESA compliance reviews for variances issued for projects in Puget Sound, and should be useful to those jurisdictions who are complying with the requirements of the BO via Door 1 or Door 2. One of the options under the Door 2 approach is conduct a full 'programmatic' habitat assessment of all the conditions, regulations, and reasonably foreseeable future land actions across an entire analysis area. The content and format of these full programmatic habitat assessments may differ due to variations in: existing regulations; current baseline habitat conditions; and the relative potential for negative impacts to ESA-listed species and their designated critical habitats due to possible future land development actions. In all cases, regardless of what compliance option is selected, the objective is to avoid adverse effects to ESA-listed species and their designated critical habitats by

protecting the natural functions and processes that support those habitats that are described in this document.

This guidance was prepared with technical input from local officials, engineers, natural resources scientists, and planners. It is designed to assist qualified habitat professionals, representing both permit applicants and permit officials to ensure that new development within the Protected Area will not adversely affect the populations or habitats of species listed by the ESA as threatened or endangered, and that any adverse impacts from action occurring beyond the Protected Area will be mitigated to the maximum extent practicable. These listed species utilize habitats in flood-prone areas, including those areas associated with stream, lake, and marine waters.

The 2008 BO for the NFIP in Puget Sound applies to fish species and marine mammals that are listed as threatened or endangered that are administered by the NMFS. The Model Ordinance and this guidance may, however, also help guide assessment of the potential impacts of project actions on bull trout (administered by USFWS) since they are also currently listed as threatened. Bull trout are widely distributed in the upper reaches of many watersheds in Puget Sound. The assessment of impacts to other fish species that become candidates for listing, or proposed to be listed, may also be warranted to assure that project proposals adequately address their needs in the event that 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.

Definitions

Four terms are used in this guidance and the Model Ordinance for the Puget Sound Basin that may not be the same terms used in a community's regulations: the "Special Flood Hazard Area" (SFHA); "Regulatory Floodplain"; the "Protected Area," and "development." These terms are introduced in the Definitions section of the Model Ordinance (Section 2), and the first three are also defined in more detail in Sections 3.1, 3.2 and 3.4 of the Model Ordinance.

The Regulatory Floodplain is comprised of the combination of SFHA and the Protected Area, where:

- The SFHA is the area subject to flooding by the base flood (as determined and mapped for each community by FEMA within flood insurance studies and accompanying Flood Insurance Rate Maps (FIRMs)); and
- In Puget Sound the 'Protected Area' consists of those lands that lie within the outermost boundary of the total area comprised by the floodway, and the riparian habitat zone (RBZ), and the channel migration area (CMZ).

An example of how the Regulatory Floodplain, the SFHA, and Protected Area interrelate is shown on the next page. A community's ordinance may use a different term to delineate the same or a larger area in order to reach the same objective of addressing adverse effects to aquatic and riparian habitat in the most sensitive areas. Since these terms are used throughout this

guidance, the reader may also wish to refer to the full definitions included in Sections 2 and 3 of the Model Ordinance.

A fourth term is also used throughout this document. In Section 2, the Model Ordinance for Puget Sound defines “development” as

“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, storage of equipment or materials, subdivision of land, removal of more than 5% of the native vegetation on the property, or alteration of natural site characteristics”.

When to Conduct a Habitat Assessment

Whenever a development project is proposed in the Regulatory Floodplain 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 a habitat assessment, the project applicant must complete an assessment 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 habitat assessment will need to be in-depth to portray impacts and planned mitigation (relative to outside of the Protected Area).

In the Puget Sound Basin no short- or long-term adverse effects to ESA-listed species or their designated critical habitats are allowed to occur within the floodway or the riparian buffer zone (RBZ), except as is conditioned under some limited exceptions. This requirement extends beyond the RBZ to the outer extent of the channel migration zone (CMZ), or throughout the 100-year floodplain in those locations where a CMZ has not been mapped. As noted above, the Protected Area is the greater of the floodway, RBZ, and/or the CMZ. Within the Protected Area adverse effects can’t be minimized, rectified, or compensated for, they must be avoided. Beyond the Protected Area any actions that would adversely affect ESA-listed species or their critical habitats must be fully mitigated. In descending order of preference, the mitigation sequence is avoidance, minimization, rectify (replacement), and/or in-kind or out-of-kind compensatory mitigation.

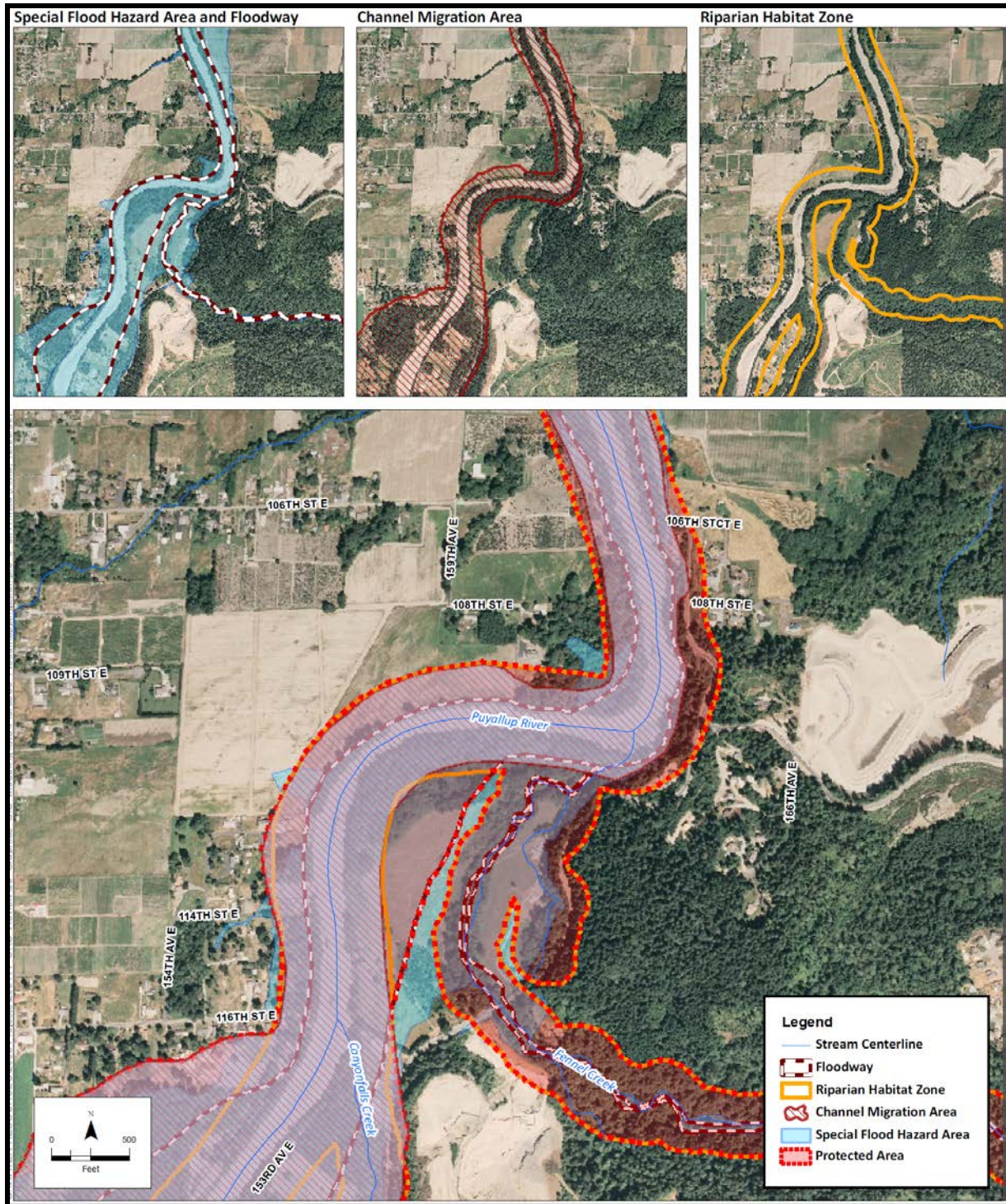
The habitat assessment needs to describe any impacts to habitat functions due to actions occurring both within the Protected Area as well as beyond it in the remainder of the 100-year floodplain. The assessment must demonstrate that there will be no short- or long-term adverse effects due to actions within the Protected Area, with the limited exceptions listed below. Actions that located within the Protected Area that would potentially result in adverse effects to ESA-listed species or their designated critical habitats must either be redesigned to avoid those effects, or the project can’t be permitted.

Under the Model Ordinance (Door 1) option in Puget Sound, an adverse impact on flooding is prevented through the ordinance requirements for a floodway or encroachment analysis (Section 7.5 of the Model Ordinance), and for providing compensatory storage for any lost flood-storage capacity (Section 7.6). The impact of a project on habitat functions and processes is more complicated 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 upon ESA-listed species and their critical habitats (Section 7.7 in the Model Ordinance).

There are only four circumstances where a habitat assessment would not be required:

1. Projects that are listed as exempt from conducting a habitat assessment in the BO for the NFIP in Puget Sound. These exemptions must be listed in the community's ordinance.
2. Project actions that are covered under separate consultations under Section 4(d), 7, or 10 of the ESA.
3. When the project under consideration has 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 that it was covered by that assessment.
4. If a jurisdiction adopts all the requirements within the NMFS BO for the NFIP in Puget Sound into their local ordinances, and requires compliance of all conditions on every land parcel within the FEMA regulatory floodplain, habitat assessments for individual projects are not required to be completed.

It should be noted that projects requiring a federal permit under Section 404 of the Clean Water Act would likely need a consultation process through the U.S. Army Corps of Engineers Regulatory Branch. The Section 404 permit process includes consultation with the U.S. Fish and Wildlife Service (USFWS), and/or NMFS. Such consultation is required under Section 7 of the ESA.



This graphic shows the relative locations of the floodway, riparian habitat zone, and the channel migration area, the determinants of the Protected Area. The Regulatory Floodplain includes all of the SFHA and all of the Protected Area. Enforcing the ordinance throughout the Regulatory Floodplain is needed to comply with the Endangered Species Act. A community can receive CRS credit if the Regulatory Floodplain extends beyond the SFHA.

Source: Pierce County, 2007, GeoEngineers, 2005; USDA, 2006 (Air Photo)

If a permit applicant has prepared a Biological Evaluation (BE) or a Biological Assessment (BA) and has received concurrence from USFWS or NMFS (via either a Letter of Concurrence or a BO) that covers the full scope of the proposed action, the project is deemed to comply with the ESA. In such cases the additional habitat assessment requirements of this guidance are not required (see Section 7.7.A of the Model Ordinance).

If it is determined that a habitat assessment is needed, a recommended step-by-step approach to complete that assessment is described in this guidance. This process will provide sufficient information to assess and document the likely effects of the proposed project, but the approach does not have to be followed exactly as described. If a different approach is followed it must, however, provide sufficient data and analysis to describe baseline conditions and likely effects on ESA-listed species and their designated critical habitat, and conclude with an effects determination that is well supported by that analysis. The process recommended in this guidance is summarized in the flow chart on the following page. Steps 1 – 4 comprise the basic habitat assessment for a project.

It is not intended to represent comprehensive instructions for how a jurisdiction should complete a ‘programmatic’, comprehensive habitat assessment of existing conditions and impacts of community’s regulations across its entire jurisdiction (e.g. conditions within all of the watersheds in a jurisdiction) , but it helps describe the information that would be needed to complete such an extensive and inclusive programmatic assessment. Some communities may conduct such programmatic assessments with differing approaches based on their land uses and regulatory structure, data and GIS-covers available, and goals. Some jurisdictions in Puget Sound have completed such assessments, and parties interested in seeing those examples can contact FEMA to receive information regarding who to contact to request copies (they are property of the jurisdiction and hence permission to receive a copy must come from that jurisdiction).

If the assessment finds that an adverse effect may occur due to impacts from the proposed action, then the permit applicant must prepare a plan that identifies the steps that the applicant will take to modify the proposed action to avoid any adverse effects to ESA-listed fish species or their critical habitats if action occurs within the Protected Area, or to fully minimize and compensate for any adverse impacts if the action occurs beyond (outside) the Protected Area in the remainder of the 100-year floodplain (Section 7.8 in the Model Ordinance and Steps 5 – 6 in this document). Jurisdictions must be able to document their mitigation plan and identify what are required versus recommended mitigation measures. In some manner they must also be able to monitor and document (track) the implementation and effectiveness of the plan, and any enforcement actions taken, and be able to provide that information to FEMA if requested.

Communities can request technical assistance from FEMA when they draft programmatic habitat assessments, or review those prepared by others for projects within their jurisdictions. Applicants under the permit-by-permit approach (Door 3) may seek assistance from the jurisdiction for preparation of the assessment. If the project is complex, it’s recommended that the applicant begin with conceptual development plans and conduct a preliminary assessment before they invest in detailed project plans and specifications. Continued communication with community staff will also help identify problems and solutions before significant time and/or

money is spent on a project that may require additional mitigation measures, or need to be redesigned or abandoned. It may be necessary for some communities with limited staff to request assistance from their neighboring jurisdictions, tribes, or other partners to help assess the adequacy of draft habitat assessments written on their behalf. This guidance document allows for flexibility in the format of many aspects of the assessment. Review of draft assessments will require some familiarity of the range of formats that adequately portray and interpret fisheries population and habitat survey data.

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

Allowed Activities

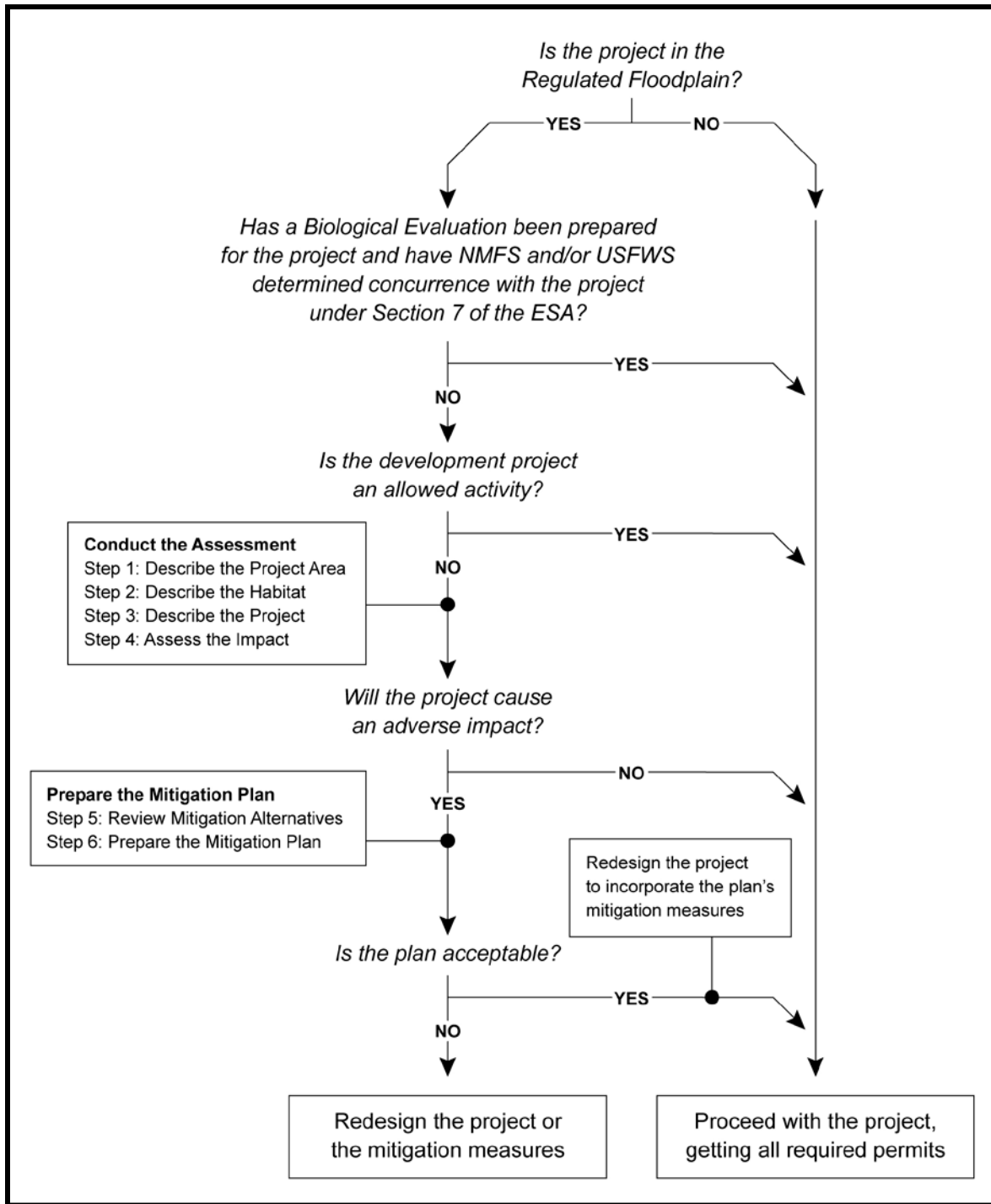
As described earlier, a habitat assessment is not required for certain limited activities if they are listed as exempt under the NFIP BO, and are specified by the community's floodplain management ordinance, or if the project is covered by an existing ESA consultation.

The general exemptions are limited to:

- a) Repair or remodel of an existing building in its existing footprint, including buildings damaged by fire or other casualties;
- b) Removal of noxious weeds;
- c) Replacement of non-native vegetation with native vegetation;
- d) Ongoing activities such as lawn and garden maintenance;
- e) Removal of hazard trees;
- f) Normal maintenance of public utilities and facilities; and
- h) Restoration or enhancement of floodplains, riparian areas and streams that meets Federal and State standards (BO for the NFIP for Puget Sound, Appendix 4 – page 223, NMFS 2008).

In addition, the Model Ordinance (Sections 7.1 and 7.2) identifies two types of activities that can proceed without the habitat assessment. The reader must check the community's flood management ordinance because it may have a slightly different list. Section 7.1 of the Model Ordinance clarifies that some activities are not considered "development" and, therefore, do not need a floodplain development permit, provided all other state and local requirements are met. An example would be normal maintenance of structures, such as re-roofing and replacing siding (provided they are not part of a larger project that would need a permit). The Model Ordinance's list is not included here, because the community's list may be different.

Section 7.2 of the Model Ordinance lists other activities which are allowed in the Regulatory Floodplain without the floodway analysis or the habitat impact assessment required under Sections 7.5 and 7.7, providing they meet all the community's other requirements and a floodplain development permit is issued. Again, the Model Ordinance's list is not included here, because the community's list may be different and takes precedence.



Habitat Assessment Flow Chart

Conducting the Assessment

The following steps should be taken to adequately identify and address the impacts a proposed project may have on habitat within the Regulatory Floodplain. In circumstances where an approved habitat assessment (Steps 1 through 4) determines that no impacts to habitat functions associated with ESA-listed species will occur, development of a mitigation plan is not necessary. However, for any activity requiring a habitat assessment within the Regulatory Floodplain, it is highly likely that impacts to habitats associated with ESA-listed species will occur. When habitat impacts are identified, a mitigation plan must be prepared for the project, in accordance with Steps 5 and 6.

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:

1.1. Project Area Description

If a Washington State Joint Aquatic Resources Permit Application (JARPA) 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. JARPAs are completed when a Hydraulic Project Approval (HPA) permit is required by WDFW, and/or a 401 water type certification is needed from Washington State Department of Ecology, and/or a 404 permit is needed from the USACE for excavation or filling of water bodies. The JARPA may not, however, adequately describe all the natural functions and processes that support habitat, species distribution, hydrologic variables, and/or water quality that need to be addressed in a habitat assessment. At a minimum, a Washington State JARPA 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
 - Water resource inventory area (WRIA). Information on Puget Sound basin WRIAs can be found at the Washington State Department of Ecology's watershed planning

webpage: <http://www.ecy.wa.gov/watershed/index.html> and the mapping webpage at: <http://www.ecy.wa.gov/services/gis/maps/wria/wria.htm>

- Water bodies in which work will occur, including water typing. For more information on water typing and a map that designates the types for major water bodies, see the Washington State Department of Natural Resources water typing webpage at: www.dnr.wa.gov/BusinessPermits/Topics/ForestPracticesApplications/Pages/fp_watertyping.aspx
 - Water bodies bordering or adjacent to the project location, including water typing.
 - Shoreline Management Areas associated with shorelines of the state, as managed by the State Shoreline Management Act and local Shoreline Master Programs. Shoreline Management Area information should include the Shoreline Environment designation and a description of the approximate extent of jurisdiction. To identify associated Shoreline Management Areas and Shoreline Environment designations review the jurisdiction's Shoreline Master Program and contact the local permitting official.
 - Critical Areas associated with streams, designated pursuant to the Growth Management Act and the local critical area ordinance. Critical areas management information should include the critical areas designation and a description of the extent of jurisdiction.
- Fish and Wildlife Habitat Conservation Areas (FWHCAs) in the project action area (cited by name with a short description). FWHCAs are designated by local governments pursuant to the Growth Management Act. They should include: waters of the state (i.e., Type S streams and shorelines); habitats for species that are endangered or threatened (including designated critical habitats and areas where the presence of listed species is documented); habitats for species of local importance, and natural area preserves. The community should have a list of designated FWHCAs and/or criteria for designating them.

1.2. Project Area Map

The second item needed for Step 1 is a map, drawn to scale that delineates 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
- Existing native vegetation by vegetation community zones. For example, a map could distinguish areas with existing coniferous forest cover versus areas with existing shrub cover vs. areas with existing meadow cover.

- Boundaries of the following regulatory areas (see Section 3 of the Model Ordinance)
 - Special Flood Hazard Area
 - Floodway
 - Riparian habitat zone
 - Channel Migration Zone (CMZ)
- 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 or the community.

Step 2. Describe the Project Area's Habitat

During Step 2 of the habitat assessment, the applicant describes the existing habitat conditions of the project area. Tasks 2.1 and 2.2 of Step 2 are largely based on existing scientific information on species use and current habitat functions in the project action areas.

2.1. Background Research

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

- The community's planning or environmental protection department for critical areas inventory maps; best available science consistency studies; designated Fish and Wildlife Habitat Conservation Areas; Shoreline Master Program; flood control and floodplain management plans; watershed analyses; and habitat studies
- The community's parks and/or natural resources departments natural area studies
- National Marine Fisheries Service distribution of Threatened and Endangered Species (www.nwr.noaa.gov)
- National Marine Fisheries Service critical habitat maps (www.nmfs.noaa.gov/pr/species/criticalhabitat.htm)
- US Fish and Wildlife Service distribution of Threatened and Endangered Species (www.fws.gov/westwafwo/speciesmap.html)
- US Fish and Wildlife Service critical habitat maps (<http://criticalhabitat.fws.gov/> and www.fws.gov/pacific/bulltrout/)
- USFWS National Wetland Inventory maps (www.fws.gov/wetlands/)
- 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/>)
- Washington Department of Fish and Wildlife Priority Habitats and Species Database (<http://wdfw.wa.gov/hab/phslist.htm>)
- Washington State Department of Ecology Water Quality Assessment (www.ecy.wa.gov/programs/wq/303d/2008/index.html)

- Inter-agency basin fisheries recovery plans. These are usually written for a Washington State Water Resource Inventory Area (WRIA), and lead by a county or tribe. They often contain much of the most detailed and most current information available regarding populations and habitat conditions (request the county or tribe for citation and access if such a local recovery plan exists).

- 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 snorkeling or electroshocking surveys. Recent other projects near the action area may also have collected stream survey data.

2.2. Protected Species Identification

The review of the existing research should identify all federally-listed species and 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 that occur in or near the project action area. Species or habitats that have a viable potential to be directly, indirectly, or cumulatively negatively impacted 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 effect analysis, will occur later in this document.

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 Present
Puget Sound Evolutionarily Significant Unit (ESU) Chinook Salmon	<i>Oncorhynchus tshawytscha</i>	Threatened	NMFS	Yes
Puget Sound Distinct Population Segment (DPS) Steelhead	<i>O. mykiss</i>	Threatened	NMFS	None currently designated, but possibly will be soon
Coastal-Puget Sound DPS Bull Trout	<i>Salvelinus confluentus</i>	Threatened	USFWS	Yes

To obtain general maps of the distribution of ESA-listed or proposed species, listed critical habitats, and any areas designated Essential Fish Habitat check with the NMFS and USFWS data sources described in Section 2.1 of this document.. Please note that the maps of potential fish distribution at these websites are not necessarily the most detailed or accurate which exist. The regional or local offices of NMFS, USFWS, WDFW, 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 may also need to be considered that are listed under EFH.

This task should summarize the biological and ecological information that will be needed for the habitat assessment. Appropriate information on the specie(s) life histories, their habitat and distributions, and other data on habitat life cycle variables necessary for their survival or possible

recovery in the future must be included in order to provide sufficient background for the analyses in later sections. It is important to note that even though the 2008 BO for Puget Sound 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, methods, and assessments beyond those described in this guidance.

Several sources of existing information are listed above in Section 2.1. When some of these documents contain relevant information, that information can simply be cited by page-specific reference. Other sources are the locally developed Best Available Science (BAS) documentation reports, which are required to be prepared by each community for their critical areas standards under the state's Growth Management Act. Other documents that are available for review to examine the general format and guidance on how some agencies conduct biological assessments include:

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]

Washington Department of Transportation *Biological Assessment Preparation Manual* (WSDOT 2012) [<http://www.wsdot.wa.gov/Environment/Biology/BA/BAguidance.htm#manual>]

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

The Pacific Northwest Region of NMFS currently 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), but rather allows the potential use of a variety of formats.

Habitat assessments must describe existing conditions of ESA-listed populations, and those 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 the populations of those species and their habitats. The detail and extent of the assessments 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

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.

Following the description of the protected species, there should be a summary of the habitat needs for each species. This section of the narrative needs to identify and describe the key factors that are important for the protected species. These Primary Constituent Elements (PCEs) are the key habitat components required for an ESA listed species, as identified in the final critical habitat rules and published in the Federal Register for listed species (see example in the box). The PCEs must be described when critical habitat may potentially be affected. In those cases where listed Critical Habitat is not present near the project action area, describing available habitat in terms of the PCE variables is still recommended in order to concisely depict key habitat features.

2.3. Site Investigation

Tasks 2.1 and 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 needed to determine if there are habitat areas that identified species have a “primary association”. “Habitats of primary association” include critical components of the habitats which, if altered, may reduce the likelihood that the listed species will maintain and reproduce over the long term. A site visit and determination of site-specific conditions is necessary to determine what actual impacts to ESA-listed species, EFH, and associated habitats may occur.

This process must identify, but is not limited to, those areas discussed in Step 2.2 as being primary constituent elements for each ESA-listed species within the project area. For example, identification of Chinook salmon habitat areas of primary association should look for those constituent elements listed in the box above. A description of the riparian and instream habitat conditions that exist in both upstream and downstream of the project action area is also needed. This description of existing baseline habitat functions must, at a minimum, include those habitat functions that are listed in the BO for the NFIP in Puget Sound. 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 Regulatory Floodplain, including existing structures, roads, impervious areas and graded or filled areas. Any existing modification that is impairing habitats of primary association and habitat functions identified should be described (discussed in

the next section). Including activities to restore habitat in these modified areas could help the assessment conclude that there will be no adverse effects to habitat due to the project (see also Task 3.3 of Step 3).

The Washington Department of Fish and Wildlife's *Management Recommendations for Washington's Priority Habitats: Riparian* (see References and Resources section of this guidance) describes common land uses and modifications that impair riparian habitats; the site investigation should look for these possible modifications. In general, actions that have the potential to result in adverse effects to ESA-listed fish or their critical habitats involve either:

- bank armoring; or
- channel straightening or other adverse impacts to channel form; or
- habitat isolation; reduced flood storage capacity; or
- degraded water quality; increases in delivery of sediments to channels via surface erosion, avulsions, or mass failures; or
- increases in the peak, magnitude, or duration of flood flows; or
- reductions in the discharge of low summer baseflows or increases in the duration or recurrence of very low baseflows; or
- the removal of riparian vegetation (except for the removal of noxious plants).

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 quality of the natural features that relate to the primary constituent elements for all the species and habitat areas that were identified in Tasks 2.2 and 2.3. As described in the final paragraph of Task 2.2, primary constituent elements 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 species are listed. The narrative must identify what functions are relatively intact and which are impaired by previous site and/or area (e.g. sub-watershed, watershed, or basin scale) modifications.

The BO for the NFIP in Puget Sound states that within the Protected Area adverse effects must not occur to: 1) water quality; 2) water quantity; 3) flood volumes; 4) flood velocities; 5) spawning substrate; or 6) floodplain refugia for ESA-listed fish. The site investigation and resulting habitat narrative must, therefore, include a description of the existing conditions for those variables when any action is proposed within the Protected Area. The BO further states that outside of the Protected Area that any negative effects to: 7) stormwater discharge; 8) riparian vegetation; 9) channel migration; 10) large woody input; 11) gravel recruitment; 12) the hyporheic zone; 13) wetlands; or 14) bank stability must be fully mitigated. The site investigation and resulting habitat narrative must, therefore, also include a description of the existing conditions for those latter variables when any action is proposed outside of the Protected Area.

It is possible that there may be limited information available from the sources identified in Tasks 2.1 and 2.2. The habitat narrative must note where this occurs and clarify where statements are

based on scientific reports and data, and where they are based on the professional opinion of the author. This is one of the most vital aspects of the assessment and is required in order for readers to assess the basis and relative confidence of statements related to current conditions and estimated environmental effects.

The narrative also needs to include a discussion of what the relative potential for channel migration is within the area being analyzed (either the project-, sub-watershed-, or watershed-scale), and what the basis is for the assessment. Migrating channels have the potential to affect several of the habitat functions described below. In addition, some land development actions may impact key habitat functions if the channel migrates into the project area, and project features restrict where the channel can move, which may result in degradation of some riparian or instream habitat functions.

The variables listed below should be considered for each spatial area of analysis in order to ensure that the assessment will cover all the factors required by the Biological Opinion (Appendix A, part 3), and Section 7.7.B of the Model Ordinance. In many cases the analysis scale will be a small action area, while some may include sites in multiple watersheds. In each case 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 make it clear why the project does not have any significant potential to degrade some or all of these variables. The list below is intended to assist jurisdictions in considering all possible impacts to aquatic habitat and ESA-listed fish species due to major land management actions.

- The Primary Constituent Elements (PCEs).
These are identified in the final rules that designated 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 13) 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 in order to concisely depict key habitat features. The distance and locations of the nearest critical habitat relative to the project area need to be listed in order that the potential of project impact to impact these areas be known (e.g. via sediment transport).
- Water Quality
 - Does the proposed action assessed by the jurisdiction include any actions (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 variables may be affected? Water quality variables that should be considered include turbidity, pH, total dissolved gas (percent of saturation), bacteria, toxics, and pollutants.

In Washington State 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). Washington has also adopted narrative criteria to supplement its numeric criteria for some variables. The narrative criteria are statements that describe the desired water quality goal, such as waters being "free from" pollutants such as oil and scum, color and odor, and other substances that can harm people and fish. Information on the designated uses and the numeric and narrative criteria for water quality in Washington can be found at: <http://apps.leg.wa.gov/WAC/default.aspx?cite=173-201A>

- Is there any potential for the project to result in not meeting state water quality standards 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). The absence of a river reach being included on one of these lists does not necessarily ensure that it meets all water quality standards for all variables, possibly only that no sampling (if any has occurred) has demonstrated that it does not meet standards. Data on some water quality variables is extremely limited or non-existent for in many some stream and river reaches. Water body segments only become listed via documented repeated violations that are estimated to likely be man-caused.

Jurisdictions in Washington should advise Ecology regarding any water quality data that they are aware of that is additional to what is cited in the current 303(d) for a specific river reach. Ecology will access such data to see if it meets their minimum QA/QC standards, and if so, if that data may result in a change in the 303(d) list the next time they update it. Information on the 303(d) is found at: www.ecy.wa.gov/Programs/wq/303d/index.html.

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 current status of water quality in the project action area, and evaluate if 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 to ESA-listed fish species and/or their 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 to ESA-listed fish species and/or their critical habitats might occur?

- Water Temperature and Dissolved Oxygen
 - Does the proposed action assessed by the jurisdiction include any actions or regulations that may cause measurable increases in water temperature or decreases in 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]
 - If there is any potential for measurable impacts, what is the estimated effect (at all temporal scales) to ESA-listed fish species and how was this assessed?
 - If so, what is the maximum estimated spatial scale and locations (including any downstream effects), and maximum time period when impacts to ESA-listed fish species may occur?

- Low Flow Hydrologic Regimes (including hyporheic flows)
 - Does the proposed action assessed by the jurisdiction include any actions that could potentially cause changes to the magnitude, duration, or recurrence intervals of low summer baseflows in any locations over any temporal scale, and how was this assessed?
 - If there is any potential for changes, what impact would those changes have upon ESA-listed fish species or their critical habitats in the project action area, and what is the maximum estimated spatial and temporal scale of effects?

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

Site flood dynamics and hydrology must be assessed to varying degrees to ensure that 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 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 to ESA-listed fish populations and their critical habitats. Projects with more potential for measurable or observable negative impacts will sometimes require more rigorous examinations of hydrologic or sediment regimes based on best available data, and often on correlations to existing gage stations. They may also require more intensive field surveys and possibly 1- or 2-dimensional flow modeling to describe likely extents of inundation, water velocities, and possible changes to instream and riparian habitat due to future flood events.

- Flood Velocities
 - Does the proposed action assessed by the jurisdiction 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 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 (i.e. the ‘nose’ velocities that fish encounter) 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 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 assessed by the jurisdiction include any actions that could potentially cause increased rates of surface erosion, delivery of sediments to water bodies, or total loadings (volumes) of sediment transported in rivers that provide potential habitat to ESA-listed species? How was this assessed?
 - If there is any potential for increases, what impact would those changes have upon ESA-listed fish species and/or their critical habitats in the project action area, and what is the maximum estimated spatial and temporal scale of effects?
- Stream Substrate

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

If the proposed actions have the potential to deliver significant quantities of fine-sediments to stream reaches in listed critical habitat, or in those areas that may otherwise provide potential habitat to ESA-listed species, the percent fines (e.g. per Washington Administrative Code regarding water quality, the fraction of all particles in a given

stream reach with sediment less than 0.85 mm in diameter) needs to be estimated, and the analysis methods need to be described. This information is required in order to describe the current condition of one of the key habitat characteristics for fish, and estimate how (if) any additional inputs of fine-sediments may degrade the current quality of stream substrate habitat.

In those limited cases where impacts of sediment 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, this description needs to include the general range of the 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 assessed by the jurisdiction include any actions that could potentially cause increased rates of aggradation of fine-sediments (those less than approximately 0.85 mm diameter, i.e. sand, silt and clay particles) or coarse-sediments on potential substrates for spawning, feeding, rearing, or migration? How was this assessed?
- If there is any potential for increases, what impact would those changes have upon ESA-listed fish species and/or their critical habitats in the project action area, and what is the maximum estimated spatial and temporal scale of effects?
- **Floodplain Connectivity**
Disconnecting a river from its floodplain impacts several other functions that directly impact the quality and quantity of habitat that supports ESA-listed species. Connectivity affects the potential for natural lateral migrations and hydrologic connectivity between the stream and its floodplain, including the groundwater systems, and the production and utilization of organic matter by riparian and aquatic communities.

The hydrologic connections provide the means of temporary storage of flood waters, 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. Biological diversity can't be maintained in stream ecosystems, nor do they have the potential to recover from major episodic disturbances, if the stream is largely disconnected from its floodplain. 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 examining aerial photography. Some of the conditions that need to be noted include, but are not necessarily limited to: the extent of the channel migration zone; general channel geometry in the potentially affected stream reaches, including the distribution and size of riffles and pools; review of FIRM maps (if they exist); and identification of any side-channels and tributaries. Specific questions that need to be addressed include:

- Does the proposed action assessed by the jurisdiction 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 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 assessed by the jurisdiction include any actions that could potentially affect the location, extent, or quality of habitat available for ESA-listed fish species from high velocity flows 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 critical habitats in the project action area, and what is the maximum estimated spatial and temporal scale of effects?
- Riparian Vegetative Community (providing bank stability, food input to streams, nutrient cycling, potential for recruitment of large woody debris to streams, shade, buffering of sediment and pollutants, etc.). This assessment should include, but not necessarily be limited to, a discussion of conditions throughout any mapped channel migration area. Freshwater riparian conditions should be characterized by describing conditions as they relate to the riparian habitat functions. In Washington State those functions are discussed in the Washington State Department of Fish and Wildlife's (WDFW) guidance for *Management Recommendations for Washington's Priority Habitats: Riparian* (see Appendices B and C at <http://wdfw.wa.gov/hab/ripsum.htm>).

The functions that riparian communities affect 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 WDFW's and Ecology's (*Land Use Planning for Salmon, Steelhead and Trout*), and with other Puget Sound nearshore guidance materials listed in the References and Resources section of this guidance. Questions that should be addressed include:

- Does the proposed action assessed by the jurisdiction 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 covers of current baseline levels of riparian vegetation.
- If the project has any potential to affect riparian vegetation, describe the general species, sizes, areas, and percent covers that would result 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 be impacted?
- If there is any potential for degradation for some of the functions that riparian community provides, what impact would those changes have upon ESA-listed fish species and/or their critical habitats in the project action area, and what is the maximum estimated spatial and temporal scale of effects?

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 to the same scale as the project area map (Task 1.2) to facilitate comparison of the habitat to be protected with the extent of the Regulatory Floodplain, the Protected Area, the riparian habitat zone, and other relevant features such as watercourses and wetlands.

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 (i.e. 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 actually occur, so their potential positive impacts can't be part of the assured result.

As is the case for Task 1.1, if a Washington State Joint Aquatic Resources Permit Application (JARPA) form has been prepared for the project, it will include the general project description information required for the habitat assessment, but usually not all the information needed for the habitat assessment. Applying for a JARPA falls under the Washington State Governor's Office of Regulatory Assistance. More information regarding the application process and the JARPA form template can be found at: www.ora.wa.gov/resources/permitting.asp.

If the information that is already being provided in a Washington State JARPA includes the level of detail described in this guidance, the community may accept the application form as sufficient for the project description. If a Washington State JARPA has not been prepared for the project, the project area description should, at a minimum, include the information included in Tasks 3.1 and 3.2 of this section.

3.1. Final Project

All features of a 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, and 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, 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, outfall structures, etc...
- 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 projects, and their locations 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, stream courses, and any key floodplain features need to be mapped, including showing those features on the project area map(s) (Task 1.2) and being able to see how they relate to stream conditions appearing on the habitat area map(s) (Task 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, as an increase in traffic, an increase in stormwater runoff from the site, increased noise, and changes air quality, etc...

3.2. Construction Process

At a minimum, this section 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 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.
- Construction phasing and anticipated construction timing.
- Mobilization and staging plans.
- Temporary construction access and staging areas.

Maps and a timeline are needed to show where and when each activity will occur.

3.3. Protection Measures

There are several federal, state, and local regulatory requirements for developments to include measures that avoid, minimize, replace, or compensate for negative effects on populations or habitat functions due to project impacts. The applicant may initiate additional measures. The habitat assessment must list those measures, 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 to ESA-listed species or their habitats.
- Drainage/erosion control plan 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 to 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 storage¹ that are able to demonstrate that they will not potentially strand fish.
- Any other forms of on-site or off-site compensation for degradation to habitat functions that support ESA-listed species.
- A description of any adaptive management program that will be utilized. This should include, but not necessarily be limited to, a description of what the monitoring that will 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:

- Monitoring and resultant possible changes in project management (e.g. variations to mitigation measures) are based on spatial and temporal scales of analysis that are appropriate for the project in question, and the basis for those scales is explained. This includes the location(s), duration, and frequency of monitoring.
- The variables selected for monitoring are appropriate and practical to track project impacts, and the effectiveness of best management practices and mitigation measures.
- 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 (dfc) is obvious and can easily be stated. In some more complex projects the minimum parameters needed to adequately define the dfc will need to be determined.
- Adaptive changes to the project are based on existing best management practices and best available science to the greatest extent possible

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.

Step 4. Assess the Environmental Effects

The habitat assessment must analyze the direct and indirect effects of the 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 proximity of the action to the species present, management units, or designated critical habitat units. This includes assessing the likelihood of measurable or observable impacts to fish or their critical habitats based on the relative location(s) of the action and nearby populations and habitats. As an example, habitats located well downstream of an action that is expected to deliver significant volumes of sediment to upstream reaches 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 distribution of an action over one or more action areas and sub-watersheds, This will give a spatial perspective for any accumulated impacts due to impacts in multiple locations due to the project proposal, and/or cumulative effects due to the combined impact of lingering effects of the project proposal added to the effects of other nearby, reasonably foreseeable future, non-federal actions.
- The timing of the proposed action, and any resulting negative impacts relative to sensitive periods of the lifecycles of any potentially impacted ESA-listed species.
- The nature, scale, scope, and duration of the effects of the proposed action on: the sub-population size; growth and survival; life cycle, diversity, and isolation; and genetic integrity of ESA-listed species that could potentially be impacted. Assessments should include as much information as is needed to adequately estimate potential effects to these population variables. In some cases there may be little or no potential for adverse effects 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 primary constituent elements (PCEs) of any listed critical habitat, including any direct, indirect, interdependent, interrelated, or cumulative effects. In freshwater systems these PCEs essentially require: adequate water quality, water quantity, and substrate (free of fine sediments) for spawning, incubation, and larval development; adequate water quality and floodplain connectivity for rearing; and stream channels free of man-made obstructions (due to physical, water temperature, or chemical barriers). Again, the assessments should include as much information as is needed to adequately estimate potential effects to these habitat variables. In some cases there may be little or no potential for adverse effects to these variables, so relatively little discussion will be needed.
- There are three potential categories of effect on 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. ‘Short-term’ effects will never persist more than one year (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 one event of a much longer duration, but the opposite may also be true depending on the nature of the perturbation.
- The severity of any negative effects to ESA-listed fish or their 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. A severe disturbance infers that affected fish would take a longer time to recover, due to the both the intensity of effects, as well as the effects of the other variables described above.

4.1. Types of Environmental Effects

The References section at the end of this document lists resources that have additional guidance for the assessment of environmental effects.

Direct effects: According to the 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 they have 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. Cumulative effects under the ESA differ, however, from this definition. Under the ESA 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. The distinction is that under the ESA 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 can't be segmented under either NEPA or EIS. 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 can't 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.

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 be able to fully describe the impacts of the proposed action on ESA-listed species and their habitats. Similarly, in Washington State neither the NMFS nor USFWS (jointly often 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). http://www.nmfs.noaa.gov/pr/pdfs/laws/esa_section7_handbook.pdf

It’s 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. There are, however, also a number of examples of formats that are sometimes employed by various agencies that may be helpful for jurisdictions to refer to that can supplement the recommendations in this guidance. One useful reference that describes suggested contents and format for a biological assessment is titled “Recommendations for the Contents of Biological Assessments and Biological Evaluations” (National Marine Fisheries Service) is available at: http://sero.nmfs.noaa.gov/pr/pdf/BA_guide_comboeh081105.pdf

Another format that is 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 NMFSS version can be found at:

http://www.nwr.noaa.gov/publications/reference_documents/esa_refs/matrix_1996.pdf.

The only significant difference between the NMFS and USFWS versions is that the suggested thresholds that constitute what defines when the current conditions of an indicator is ‘properly functioning’, ‘at risk’, or ‘not properly functioning’ varies between NMFS and USFWS. The narrative for the matrices emphasize 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>

The components of this USACE outline must be covered in some manner, but the format may vary.

A. Direct effects

1. First primary constituent element (e.g., freshwater spawning sites²).
2. Second primary constituent element (e.g., freshwater rearing sites).
3. Third primary constituent element (e.g., freshwater migration corridors).
4. Essential Fish Habitat designated by the National Marine Fisheries Service.
5. Fish and Wildlife Habitat Conservation Areas.
6. Vegetation communities and habitat structures.
7. Water quality.
8. Water quantity, including flood and low flow depths, volumes and velocities.
9. The channel's planform pattern and migration processes.
10. Spawning substrate, if applicable.
11. Floodplain refugia, if applicable.

B. Indirect effects - see the list on the previous pages of this document and include consideration of indirect effects to items A.1 through A.11, 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

4.3. Effects Determination

An effects determination needs to be made for each project action analysis area. In most cases there will only be one analysis area. The spatial scale of the analysis area will be dependent on the nature, scope, and extent of the proposed actions that are being assessed. The analysis area for an individual project site may be as small as a stream reach, while a project with multiple related sites may be assessed at a sub-watershed (e.g. 6th-field Hydrologic Unit Code (HUC)) or watershed (5th-field HUC) scale. In every case the rationale for the spatial scale of analysis must be explained. The current (baseline) habitat conditions and the effects of the proposed action on ESA-listed species and their designated critical habitats must be described for the entire analysis area.

Determinations for individual analysis areas could be utilized to make an overall project effect determination if there are more than one analysis areas for multiple interrelated or interdependent project actions. For example, if the effects determination for all areas is No Effect (NE), then the

² Primary constituent elements are key habitat components for ESA listed species as specified in the Federal Register at the time of critical habitat designation for listed species. See the discussion earlier in this guidance for further information.

overall determination for the project proposal would be No Effect. If, however, actions at some locations would result in a determination of No Effect, while related project actions in other areas would result in a determination of May Affect, Not Likely to Adversely Affect (NLAA), the overall call for the project would be NLAA since it represents the determination with the most potential for negative impact to species or habitat.

In the prior example the overall determination would be NLAA. In the same manner, if the determination for one or more analysis areas is May Affect, Likely to Adversely Affect (LAA) some ESA-listed species or their designated critical habitat, then the overall call is LAA, even if the determination for other interconnected or interrelated projects is NLAA or NE. It is critical to document how the effects determinations were reached.

If the assessment concludes that the determination for the overall project is LAA due to project actions occurring within the Protected Area, the project will not be covered under the existing NMFS BO for the NFIP in Puget Sound. In these cases the project must either be redesigned to avoid those adverse effects or the project must be dropped, or the proponent may seek ESA coverage via separate consultation under Section 4(d), 7, or 10 of the ESA.

NMFS, USFWS, and the USACE use the following effects determination criteria. This language which should be used for habitat assessments:

- No Effect (NE): the project has no effect, whatsoever, to the listed species or designated critical habitat.
- May Affect, Not Likely to Adversely Affect (NLAA): any negative effects to the listed species or designated critical habitat are insignificant and/or discountable. A determination of NLAA would also be made for those activities that have only a beneficial effect with no short- or long-term adverse effects.
- Likely to Adversely Affect (LAA): the effects of the project will result in short -or long-term adverse effects on the identified species or designated habitat area.

There are two key words within the definition of a NLAA determination – ‘insignificant’ and ‘discountable’. “Insignificant effects relate to the size of the impacts and should never reach the scale where take occurs. Discountable effects are those extremely likely to occur. Based on best judgment, a person would not: 1) be able to meaningfully measure, detect, or evaluate insignificant effects, or 2) expect discountable effects to occur” (NMFS 1998). Any projects that may result in adverse impacts that are more than insignificant and/or discountable would result in overall effects determination of LAA.

If the effects determination is NLAA, the report should indicate what steps were taken to avoid and minimize any negative project impacts. For example, the permit applicant could time certain construction work to occur when the species are not present in the project area.

4.4. If avoidance and minimization measures do not eliminate the potential for long-term adverse effects due to actions outside of the Protected Area and riparian buffer zone, the project cannot proceed as designed. In those cases additional replacement and/or compensatory measures need to be included in the mitigation plan (see steps 5 – 6) in order

to result in a net, long-term neutral or beneficial impact to ESA-listed species and their critical habitats. Assessment Report

If the assessment concludes No Effect (NE) or May Affect, Not Likely to Adversely Affect (NLAA) the report should be prepared and submitted to the community's permit office. For NLAA determinations that include avoidance and minimization measures, the assessment must include enough detail to show how the measures are related to potential project impacts.

The assessment report must include all the information needed to support the effects determination and the rationale for reaching the conclusion(s). It could be organized to follow Steps 1 – 4 as outlined in this document. The level of detail should be commensurate with the level of anticipated impacts. Projects with significant impacts or potential for significant impacts (due to project type and/or project location) require more detailed review and analysis.

If the assessment makes a determination of Likely to Adversely Affect (LAA) or NLAA the assessment will need to proceed to Step 5.

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 to quality or quantity of natural habitat functions and processes within the Protected Area (with the limited exemptions for each area listed earlier in this guidance). Step 6, Task 6.1 of this guidance provides additional recommendations on mitigation objectives, including specific requirements for mitigation within riparian buffer zones the Protected Areas, as well as beyond those areas throughout the remainder of FEMA's Regulatory Floodplain (i.e. the 100-year floodplain).

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

Step 5. Review Mitigation Alternatives (Mitigation Sequencing)

There are four major types of alternative mitigation approaches to rectify an adverse effect. In descending order of preference and effectiveness they are: avoidance, minimization, rectification (replacement), and compensation. This mitigation sequence hierarchy directs that those impacts that can't be avoided must be minimized, and impacts that remain after taking steps to minimize

shall be restored and/or compensated for to the fullest extent practicable. 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, and 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.

Applicants in the Puget Sound Basin need to be aware that, with the limited exceptions described earlier in this guidance, that no short- or long-term adverse effects to ESA-listed species or their designated critical habitats are allowed to occur within the Protected Area. This means that for any project type that is not listed as an exemption, that the only viable mitigation option within the Protected Area is avoidance of adverse effects. Projects that would result in an adverse effect over any temporal scale must either be redesigned to avoid those effects or the project is not compliant with the NFIP BO. Proponents could also seek separate ESA consultation under section 4(d), 7, or 10 of the ESA. Beyond (outside) of the Protected Area any adverse effect must be fully mitigated to the extent practicable. Beyond the Protected Area all of the measures within the mitigation sequence are available, and the proponent must demonstrate how each one was used.

5.1. Avoidance

Avoidance is the preferred approach. FEMA recommends that new land development actions remain outside of the Regulatory Floodplain. Avoidance prevents additional adverse effects on aquatic and riparian habitats, while also precluding any risks to public safety and property from possible increased frequencies, durations, or magnitudes of flooding that would result from further development in the Regulatory Floodplain. Avoidance also largely eliminates the need and expense of mitigating any adverse effects on aquatic and riparian habitat. The permit applicant should strongly consider relocating or redesigning the proposed project to avoid impacts on floodplain habitat functions, and the need for a mitigation plan.

Communities should consider incentives to encourage permit applicants to avoid the Regulatory Floodplain. Many communities currently use many strategies to encourage conservation of key areas by allowing for development at a more intense level in other areas. These are usually provisions of a zoning ordinance or separate development regulations. Here are three approaches that some jurisdictions use to encourage conservation:

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 a 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 Regulatory Floodplain, the community might consider allowing the ten “dry” acres to be developed with half acre lots, allowing the development 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 clustering development methods, such as is often used in planned unit developments. Under both

approaches, the overall project does not exceed the development density allowed by the zoning district.

2. **Transferable development rights:** Transferable development rights (TDR) systems have been in limited use by certain jurisdictions within the Puget Sound region in recent years. TDR systems 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 in negotiating 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 that has proven to discourage development of sensitive lands. As an example, King County, Washington has an established system of providing property tax relief for lands that are established as conservation areas. All projects must meet certain criteria and approval is not automatic. Such a system could provide an additional venue to encourage conservation of floodplain lands.

5.2. Minimization

If the entire project cannot avoid some development within the Regulatory Floodplain, it may be possible that it can be designed to minimize the physical area and magnitude of impacts on aquatic and riparian functions by preventing development in identified high value habitat areas, and/or by changing the construction design of the projects. For example, while water access may be necessary for some projects (namely those that are inherently water dependent), the design might place most buildings and pavements out of the riparian habitat zone. Here are some ideas for this approach:

- Site the project footprint away from the higher value habitat areas.
- Designate buffer areas that are not disturbed during or after construction. Note that Section 7.4 of the Model Ordinance option in Puget Sound prohibits removing vegetation (other than noxious weeds) in the riparian habitat zone without mitigation.
- Include vegetation measures around the site's active use areas.

Many adverse effects are due to 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 habitat 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.

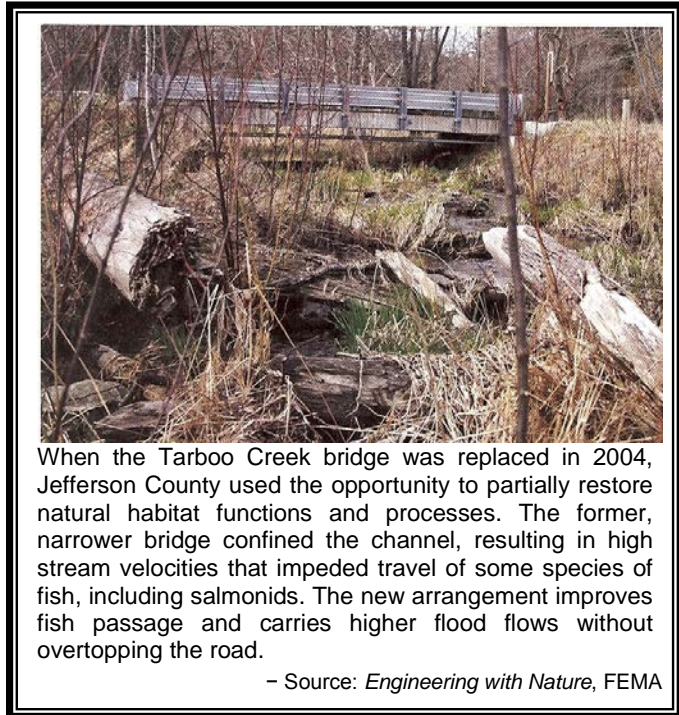
5.3. Replacement of Degraded Habitats

A project’s plans must, to the extent practicable, include provisions to replace (rectify) those habitat functions that were degraded by project actions. The baseline is the condition of the site immediately prior to the proposed action, not historic conditions at the site. As an example, wetlands, channels, and riparian areas can potentially be repaired or rebuilt after the land clearance, grading and filling is concluded. All areas temporarily cleared should be re-vegetated with native plants.

In some cases, incorporation of avoidance, minimization, and replacement actions may have a net result of maintaining or even improving natural habitat functions and processes relative to pre-project conditions. The box to the right provides an example, where conditions in a stream in Jefferson County, Washington were improved by replacing a culvert with a bridge of adequate span.

5.4. Compensation

When conducted in concert with avoidance and minimization measures, replacement actions may mitigate for some habitat degradation at the site of the proposed actions. In those cases where complete (or nearly complete) replacement of habitat is not practicable, compensation is the next action in the mitigation sequence that should be considered.

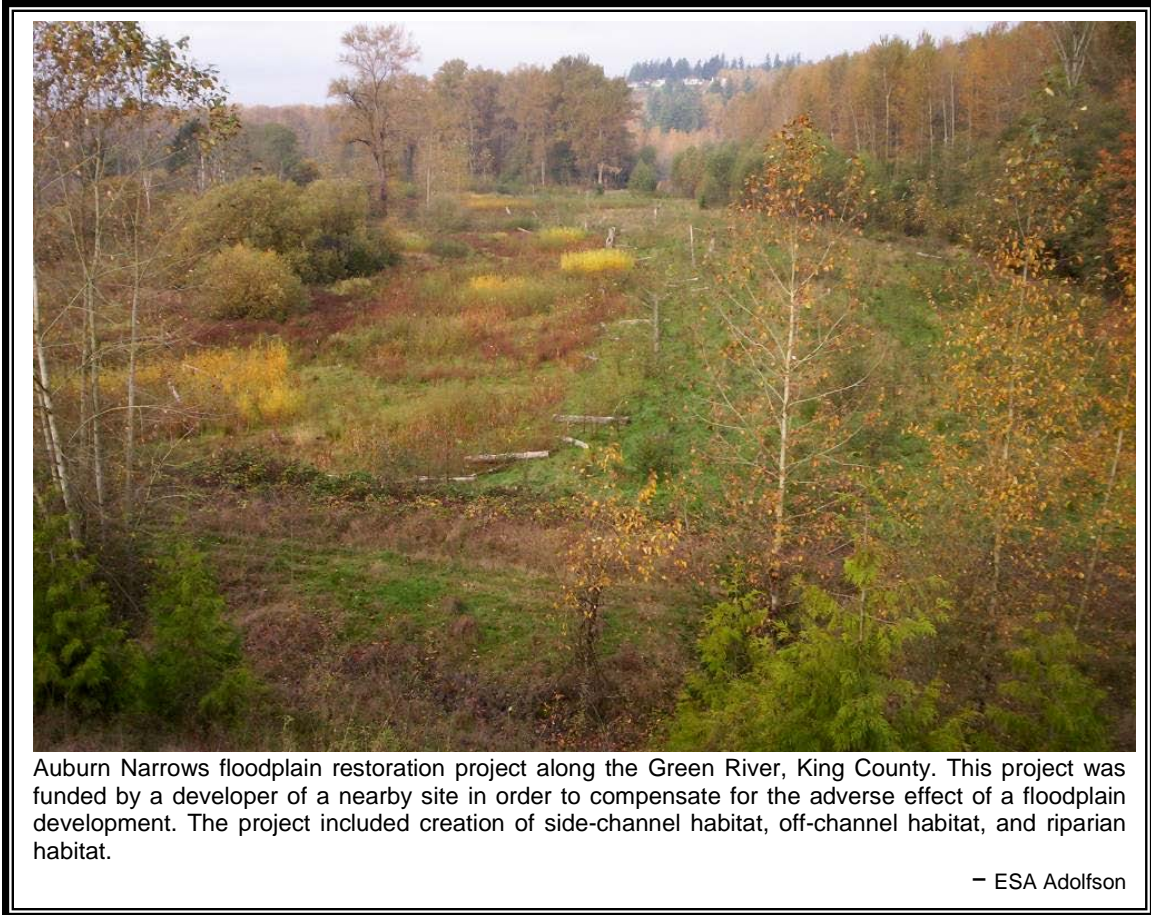


Compensation varies from in-kind, on-site compensatory actions, to off-site, out-of-kind actions. If the action literally restores the specific functions that were degraded at the same location that they were impacted, that form of compensation is synonymous with replacement. This type of compensation is preferred. When it is not possible, off-site and/or out-of-kind compensation should be conducted when practicable. Compensation measures should account for the habitat functions and elements identified in Step 2. Some functions, such as a freshwater migration corridor, are not possible to adequately compensate via actions at other locations. Off-site, out-of-kind measures are least preferred; when they are used applicants need to explain why they are the only viable form of compensation for the project proposal, and how they would provide adequate mitigation.

The applicant should also keep in mind that the area required for constructed compensatory habitat is generally greater than the area of impact because of the length of time it takes to successfully create a properly functioning stream side channel, wetland, or upland floodplain habitat area that provides similar quality and quantity of the affected habitat functions (see the Auburn Narrows compensation example, next page).

5.5. Select the Best Approach(s)

Selecting the best mitigation approaches for the proposed project is an iterative process. It should consider avoidance as the preferred choice. If work must be done in a sensitive area, it should consider the costs of restoration and compensation. If those costs are too high, 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 the appropriate sequence of mitigation of actions. Early and periodic meetings with appropriate regulatory agencies will increase the likelihood that the mitigation plan will meet all regulatory requirements, and can reduce total project costs and the probability of possible schedule delays during the approval process.

Step 6. Prepare the Mitigation Plan

6.1. Objective

As noted in Step 5, the objective of the plan is to assure that actions are taken to sufficiently and appropriately mitigate for negative impacts to ESA-listed populations and the natural functions and processes that support their habitats. The mitigation plan document needs to be of sufficient

detail to demonstrate how this is done, using avoidance, minimization, replacement (rectify), and/or compensatory measures.

Options for mitigation under the BO for the NFIP in Puget Sound differ for those impacts occurring within the Protected Area versus those impacts occurring outside of the Protected Area, but still within the remainder of the Regulatory Floodplain. Within the Protected Area no short- or long-term adverse effects are allowed, hence avoidance is the only viable mitigation measure. If adverse effects would occur, the project must either be redesigned to avoid those adverse effects or the project must be dropped, or the proponent may seek ESA coverage via separate consultation under Section 4(d), 7, or 10 of the ESA.

Outside of the Protected Area, but still within the remainder of the Regulatory Floodplain, minimization, replacement, and compensation measures are also available as methods to mitigate for any adverse effects. The long-term net result must be neutral or beneficial for ESA-listed species and their critical habitats. Examples of some options available include, but are not limited to:

- Doubling, tripling, or further increasing the area of compensatory mitigation to offset the difference in quality and function of the lost habitat versus the constructed habitat (thereby increasing the mitigation ratio of area of habitat impacts to area of compensatory mitigation provided).
- Identifying additional areas of previously degraded habitat within the project area and developing and implementing a plan to restore them.
- Implementing restoration actions which are targeted as a high priority by an adopted and approved species recovery plan, when such actions are identified within the same 5th-field Hydrologic Unit Code (HUC) or Watershed Resource Inventory Area (WRIA) watershed as the proposed action, and approved by local, state, and federal permitting agencies.
- Adopting a plan that would adaptively manage, if necessary, to adjust the mitigation plan based on the results of monitoring both the implementation and effectiveness of the planned mitigation measures. This plan would establish metrics for the mitigation plan (e.g. replanting success rates after a set period of time) to assure that any adverse effects from actions outside of the Protected Area are minimized to the fullest extent practicable.

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 objective. 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.

6.2. Format

Many communities have established formats that they have long used to document mitigation plans within environmental or biological assessments. These formats are likely adequate for purposes of the NFIP. One option is to refer to Chapter 2 of *Wetland Mitigation in Washington State Part 2: Developing Mitigation Plans* [www.ecy.wa.gov/biblio/0606011b.html], which has detailed guidelines regarding what to include in a mitigation plan. There is a recommended

outline in Appendix C of that publication which is geared to larger projects involving complex habitat impacts and mitigation. Smaller, less complex projects involving very limited impacts may not require all the information in the outline because it may not be relevant or applicable.

Here is an example mitigation plan outline:

1. Introduction, background, etc...
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

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 Seattle District of the Corps of Engineers and *Wetland Mitigation in Washington State Part 2: Developing Mitigation Plans* (see Reference section). They must also be consistent with the community's critical areas regulations. 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.

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 Consultants: The community could provide a list of qualified consultants to developers and land owners who have experience in the area. Another strategy for ensuring that qualified consultants are used could include developing qualification criteria for authors of habitat assessments and mitigation plans; see the box to the right for an example of one community's 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 in the Puget Sound region 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 ordinance.

Establishing a system of third party review could augment internal review within the local jurisdiction. Another option for certain jurisdictions could be formalizing a system of internal review where qualified staff would determine the adequacy of submittal 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.

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.

References and Resources

Federal and State Regulations and Guidance

Checklist for the 2008 NMFS Biological Opinion for the NFIP in Puget Sound - National Flood Insurance Program and the Endangered Species Act, FEMA Region 10.

<http://www.fema.gov/nfip-and-endangered-species-act>

Compliance Options for the 2008 NMFS Biological Opinion for the NFIP in Puget Sound - National Flood Insurance Program and the Endangered Species Act, FEMA Region 10.

<http://www.fema.gov/nfip-and-endangered-species-act>

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

Endangered Species Consultation Handbook, National Marine Fisheries Service, 1998.

http://www.fws.gov/endangered/esa-library/pdf/esa_section7_handbook.pdf

Endangered Species Act Section 7 Consultation, Final Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation – Implementation of the National Flood Insurance Program in the State of Washington Phase One Document, Puget Sound Region, National Marine Fisheries Service, September 22, 2008.

Frequently Asked Questions Regarding Implementation of the 2008 NMFS Biological Opinion for the NFIP in Puget Sound.- National Flood Insurance Program and the Endangered Species Act, FEMA Region 10. <http://www.fema.gov/nfip-and-endangered-species-act>

Mitigation guidance and JARPA permit information, Army Corps of Engineers, Seattle District.

<http://www.nws.usace.army.mil/PublicMenu/Menu.cfm?sitename=REG&pagename=Forms>

Model Ordinance for the 2008 NMFS Biological Opinion for the NFIP in Puget Sound. - National Flood Insurance Program and the Endangered Species Act, FEMA Region 10.

<http://www.fema.gov/nfip-and-endangered-species-act>

National Flood Insurance Program Floodplain Management Requirements A Study Guide & Desk Reference for Local Officials, FEMA 480, 2005.

www.fema.gov/library/viewRecord.do?id=1443

Recommendations for the Contents of Biological Assessments and Biological Evaluations, National Marine Fisheries Service.

http://sero.nmfs.noaa.gov/pr/pdf/BA_guide_comboeh081105.pdf

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, Washington Department of Natural Resources.
www.dnr.wa.gov/BusinessPermits/Topics/ForestPracticesApplications/Pages/fp_watertyping.aspx

A Framework for Delineating Channel Migration Zones. Washington State Department of Ecology and Washington State Department of Transportation, Ecology Publication # 03-06-027, 2003. <http://www.ecy.wa.gov/biblio/0306027.html>

National Wetland Inventory maps for the Puget Sound Region, U.S. Fish and Wildlife Service.
<http://www.fws.gov/wetlands/>

Priority Habitats and Species (PHS) Database, Washington Department of Fish and Wildlife.
<http://wdfw.wa.gov/hab/phslist.htm>

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