Draft Environmental Impact Statement

Draft Oregon Implementation Plan for NFIP-ESA Integration

Appendix A. 2024 Revised Draft Implementation Plan

August 2025

FEMA

Federal Emergency Management Agency
Region 10
Department of Homeland Security
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Table of Contents

Appendices

Figures

Tables

Acronyms

BFE	base flood elevation
BiOp	Biological Opinion
CFR	Code of Federal Regulations
CRS	Community Rating System
CWA	Clean Water Act
dbh	diameter at breast heigh
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
HUC	hydrologic unit code
LID	Low Impact Development
MSA	Magnuson-Stevens Fishery Conservation and Management Act
n.d.	no date
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
ODF	Oregon Department of Forestry
RBZ	riparian buffer zone
SFHA	special flood hazard area

USACE	U.S. Army Corps of Engineers
USC	United States Code

Executive Summary

The Federal Emergency Management Agency (FEMA) implements the National Flood Insurance Program (NFIP). The NFIP was designed so that floodplain management would be regulated and carried out at the state and local levels, where land use authority resides. Communities choosing to participate in the NFIP are required to adopt and enforce floodplain management regulations (e.g., ordinances) that meet the NFIP minimum floodplain management standards (44 Code of Federal Regulations 59.2[b], 59.22, 60.1[d], 60.3[a]-[f], 60.6).

As a federal agency, FEMA is required to ensure their activities are not likely to jeopardize the continued existence of species listed under the Endangered Species Act (ESA). Because FEMA administers the NFIP, the implementation of the NFIP must be in compliance with the ESA. Working with the Oregon Department of Land Conservation and Development, and interested stakeholders, and considering input from the National Marine Fisheries Service (NMFS), FEMA developed this 2024 Implementation Plan for NFIP-ESA integration. This 2024 Draft Implementation Plan outlines no net loss standards supportive of the survival of ESA-listed species under the jurisdiction of NMFS that are required for participation in the NFIP by Oregon communities within the plan area (**Figure ES-1**).

"*Jeopardize the continued existence of*" *means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR 402.02).*

The no net loss standards would apply to development actions that 1) occur in an Oregon NFIP participating community within the plan area; 2) are located in the special flood hazard area (SFHA); and 3) meet the definition of development. These standards apply to all new development as well as redevelopment, renovations, repairs, modifications, or improvements of infrastructure that expand the existing footprint of the development. The NFIP substantial improvement threshold does not apply to these standards. That is, the cost of redevelopment, renovations, repairs, or other improvements do not need to equal 50 percent of the market value of the structure for the no net loss standards to apply. These standards apply to all land within an NFIP participating community for which the community has land use authority, including land of all zoning designations (e.g., residential, commercial, resource zones).

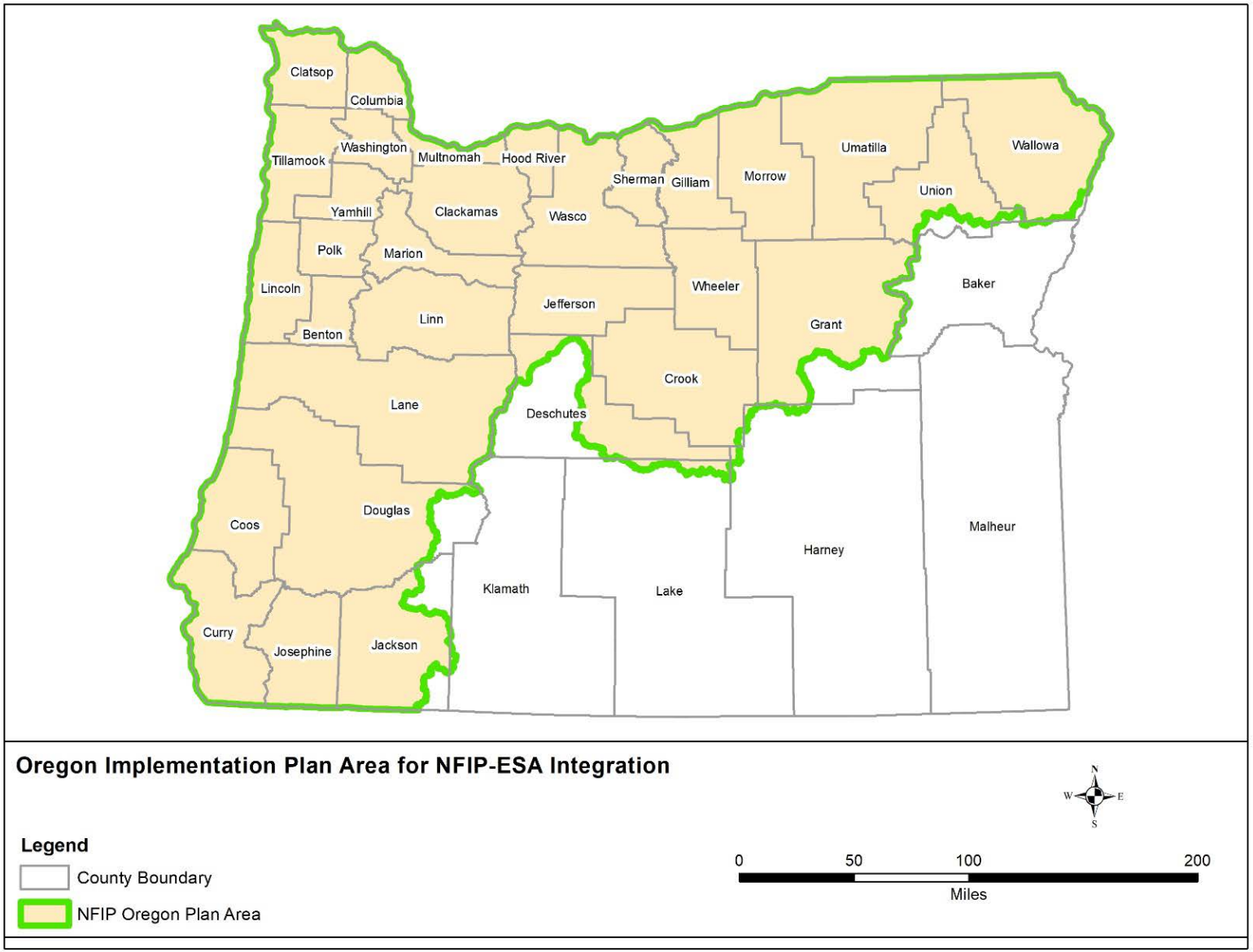


Figure ES-1. Oregon National Flood Insurance Program Plan Area for Endangered Species Act Integration

FEMA identified three floodplain functions for which the no net loss standards would apply. The floodplain functions FEMA identified are flood storage, water quality, and vegetation. FEMA identified the following proxies to measure impacts on the three floodplain functions from SFHA development:

1) Flood Storage Proxy: The flood storage capacity, which is the three-dimensional space (i.e., volume) between the existing ground and the base flood elevation with impacts measured as the volume occupied by a development.[1]

2) Water Quality Proxy: The extent of pervious surface in the SFHA measured as an area that is impacted by the creation of new impervious surface.

3) Vegetation Proxy: Trees 6 inches in diameter at breast height (dbh) or larger in the SFHA with impacts measured as the number of such trees removed by a development.

Achieving no net loss would occur through first avoiding impacts, then by minimizing the degree or magnitude of impacts, and finally offsetting any remaining impacts through mitigation.

Four paths have been identified for communities to choose from to implement the no net loss standards. The four paths are a result of recognition by FEMA and its partner agencies of the diverse needs, capacities, policy contexts, and geographic constraints faced by NFIP participating communities in the Oregon plan area. Each community would select the path(s) that works best for them. The four paths are:

- Path A – A community would adopt a model ordinance developed by FEMA.

- Path B – A community would complete an ordinance checklist to demonstrate that all the required elements in the model ordinance are found in existing or newly adopted local, regional, or statewide enforceable requirements.

- Path C – A community would develop a customized community plan identifying their proposed approach to implementing the no net loss standards, which can include altered floodplain functions or proxies.

- Path D – A community would pursue ESA compliance at the community level by working directly with NMFS through the development of a Habitat Conservation Plan under ESA Section 10(a)(1)(B) or an ESA Section 4(d) Limit authorization, as appropriate. This path allows for alternatives to no net loss.

[1] The base flood elevation identifies the height that water will rise above the surface of the ground during the 1-percent annual chance flood (i.e., 100-year flood, SFHA).

Chapter 1. Introduction and Background

In 2011, the Federal Emergency Management Agency (FEMA) consulted with the National Marine Fisheries Service (NMFS) under the Endangered Species Act (ESA) on the implementation of the National Flood Insurance Program (NFIP) in the Oregon plan area. On April 4, 2016, NMFS completed their analysis of the effects of the NFIP on species listed as threatened or endangered under the ESA, designated and proposed critical habitat, and essential fish habitat (EFH) under the Magnuson-Stevens Fishery Conservation and Management Act (MSA) in the Oregon plan area and issued a Biological Opinion (BiOp) (NMFS 2016a). The BiOp concluded that the current implementation of the NFIP in the Oregon plan area is likely to jeopardize the continued existence of 16 ESA-listed fish species and the Southern Resident killer whale, and it will result in the destruction or adverse modification of designated or proposed critical habitat, and adversely affect EFH protected under the MSA.

"Jeopardize the continued existence of" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR 402.02).

Working with the Oregon Department of Land Conservation and Development (DLCD), interested stakeholders, and considering input from NMFS, FEMA developed the 2021 Draft Oregon Implementation Plan for NFIP-ESA Integration (2021 Draft Implementation Plan) to address the integration of ESA considerations into the NFIP in the Oregon plan area (FEMA 2021).

FEMA continued to work with partner agencies and Oregon stakeholders to refine the 2021 Draft Implementation Plan through outreach and engagement efforts. FEMA received input through these continued engagement efforts identifying the need for clarification of NFIP-ESA integration and adequate flexibility for NFIP participating community implementation. These efforts culminated in this 2024 Draft Implementation Plan. This iterative process in developing the implementation plan reflects the efforts of FEMA to establish no net loss standards that avoid jeopardy to listed species and EFH and address the needs and concerns of Oregon communities within the plan area.

This 2024 Draft Implementation Plan outlines the no net loss standards, which is an umbrella term that includes mitigation ratios to offset impacts on the three floodplain functions, riparian buffer zone (RBZ) requirements, and reporting requirements for participation in the NFIP by Oregon communities. The no net loss standards specify:

- Mitigation ratios for three floodplain functions supportive of the survival of the ESA-listed species under the jurisdiction of NMFS within the plan area. The floodplain functions are flood storage, water quality, and vegetation (see Section 2.3).

- RBZ requirements, including establishing a buffer and a planting requirement for certain types of development in the RBZ (i.e., beneficial gain). Specifically, a planting requirement for development that is not functionally dependent on being located in the RBZ.

- The RBZ is defined as 170-feet measured from the ordinary high water mark of a fresh waterbody (lake; pond; ephemeral, intermittent, or perennial stream) or from the mean higher-high water line of a marine shoreline or tidally influenced river reach.[2]

- Beneficial gain in the RBZ is defined as: an area within the RBZ, within the same reach of the project, and equivalent to 5 percent of the area impacted within the RBZ that is not a functionally dependent use shall be planted with a native riparian herbaceous, shrub, and tree vegetation (see Section 2.4).

- Reporting requirements as detailed in Chapter 5.

These no net loss standards would apply to development actions that 1) occur in an Oregon NFIP participating community within the plan area (Section 1.1); 2) are located in the special flood hazard area (SFHA); and 3) meet the definition of development. All three criteria must apply before the no net loss standards would be required for a development action. These standards apply to all new development, redevelopment, and renovations outside of the existing footprint of a development. FEMA's NFIP substantial improvement threshold does not apply to these requirements. That is, the cost of redevelopment, renovations, repairs, or other improvements do not need to equal 50 percent of the market value of the structure for the no net loss standards to apply. These standards apply to all land within an NFIP participating community for which the community has land use authority, including land of all zoning designations (e.g., residential, commercial, resource zones).

The purpose of this guidance is to assist NFIP participating communities in the Oregon plan area to implement the no net loss standards. This guide has been developed to be used by local governments, floodplain administrators, developers and property owners, and elected officials.

NFIP-ESA INTEGRATION AND NATIONAL ENVIRONMENTAL POLICY ACT COMPLIANCE

The National Environmental Policy Act (NEPA) was enacted in 1970 and requires federal agencies to evaluate the environmental, social, and economic effects of their proposed actions and alternatives prior to making a decision. NEPA also requires that any agency proposing a major federal action (as defined at 40 Code of Federal Regulations [CFR] 1508.18) must consider a range of reasonable alternatives. Proposed changes to the implementation of the NFIP in the Oregon plan area constitutes a proposed action and thus requires analysis under NEPA and consideration of a range of alternatives.

FEMA is preparing a Draft Environmental Impact Statement (EIS), in accordance with NEPA, which details the proposed alternatives being analyzed for NFIP-ESA integration. The NEPA alternatives are as follows:

[2] The U.S. Geological Survey defines freshwater as water containing less than 1,000 milligrams per liter of dissolved solids, most often salt. However, for the purposes of no net loss, fresh waterbodies are any waterbodies with a mapped SFHA that are not marine waters or tidally influenced waters.

1. No Action Alternative (Alternative 1)
2. No Net Loss With Exception for Project-Specific ESA Compliance Alternative (Alternative 2)
3. No Net Loss Without Exceptions for Project-Specific ESA Compliance (Alternative 3)

This 2024 Draft Implementation Plan provides guidance on the implementation of changes to the NFIP in the Oregon plan area, including variations in implementation associated with Alternative 2 and Alternative 3. The No Action Alternative (Alternative 1) is not included in this guidance.

The Draft EIS will be published and be open for public review and comment. FEMA has not identified a preferred alternative. The preferred alternative will be identified in the Final EIS, once the public review and comment period for the Draft EIS has been completed and all comments have been considered. This guidance document will be updated when the preferred alternative has been identified.

1.1. The Oregon Plan Area

The Oregon plan area is shown in **Figure 1-1**. The Oregon plan area boundary is generally defined by the boundaries of six NMFS Salmon and Steelhead Recovery Domains within the State of Oregon: Oregon Coast, Southern Oregon/Northern California Coast, Willamette River, Lower Columbia River, Middle Columbia River, and Snake River. NMFS has mapped these Recovery Domains at https://www.webapps.nwfsc.noaa.gov/portal/home/webmap/viewer.html.

The Oregon plan area boundary generally follows hydrologic unit code (HUC) 10 watershed boundaries, which are defined by hydrologic and topographic features, and generally encompasses those watersheds that drain to the Columbia River or the Pacific coast of Oregon. The Oregon plan area consists of most areas where ESA-listed species covered by the NMFS BiOp may be affected by FEMA's implementation of the NFIP in the State of Oregon. It includes flood-prone areas adjacent to rivers and streams, as well as adjacent estuarine and marine areas.

For a proposed development activity to be subject to this 2024 Draft Implementation Plan, it must be proposed in a location subject to the minimum standards of the NFIP, which means that, at the time the activity is proposed, it is 1) within the geographic jurisdiction of a community that participates in the NFIP, and 2) it is within the mapped SFHA. All Oregon counties are fully or partially within the boundaries of the plan area, with the exception of Baker, Harney, Klamath, Lake, and Malheur Counties. Although the Oregon plan area boundary includes portions of Baker, Harney, Klamath, Lake, and Malheur Counties, these counties do not have SFHA within the plan area boundary, the SFHA is on federal land and therefore not under the jurisdiction of a NFIP participating community, or both. For additional detail on the Oregon plan area, including why areas were included or excluded, see Appendix A.

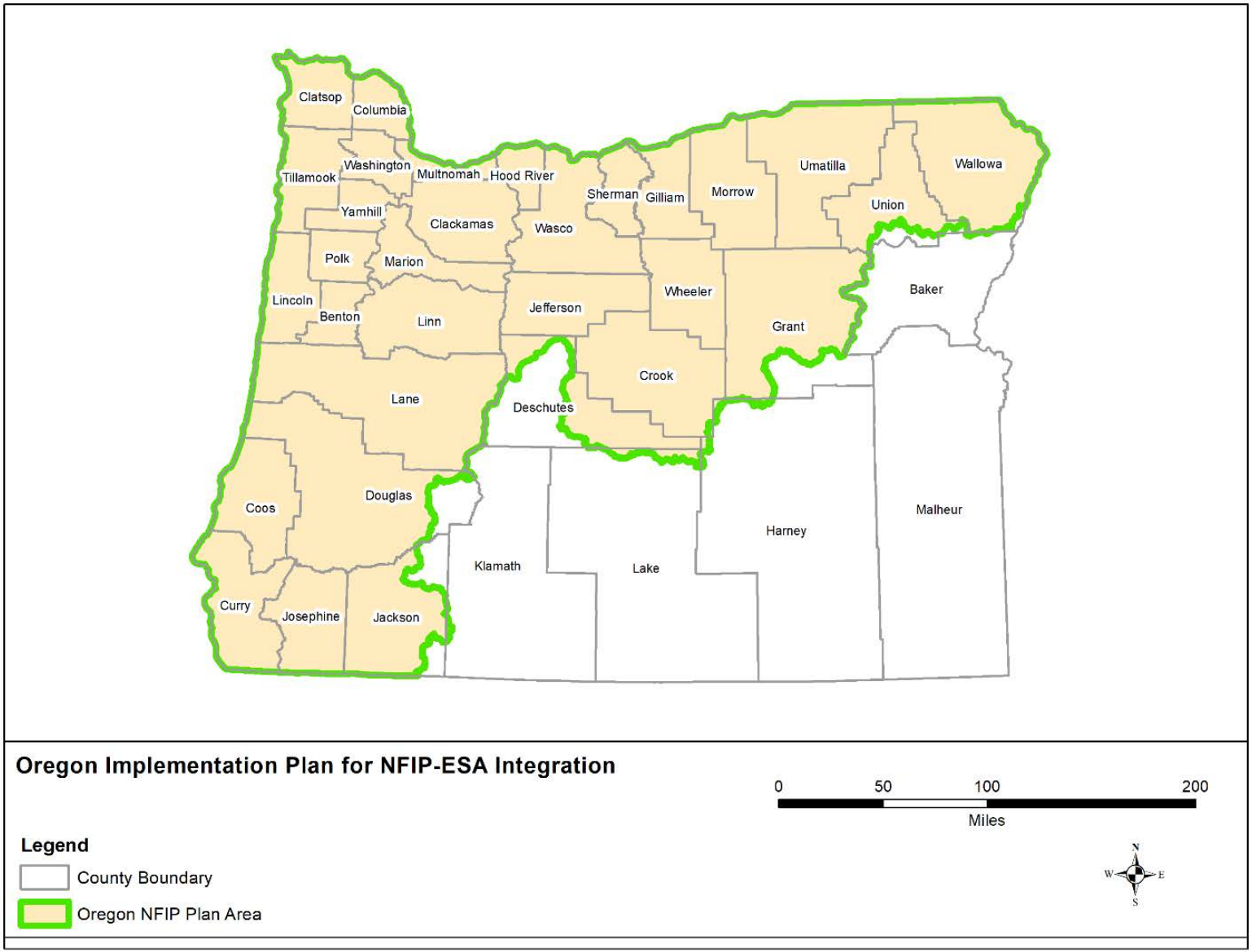


Figure 1-1. Oregon National Flood Insurance Program Plan Area for Endangered Species Act Integration

1.2. Intended Audiences

1.2.1. ELECTED OFFICIALS

This guide is intended to assist elected officials in understanding the drivers behind the changes in the NFIP implementation in the Oregon plan area, which communities are affected, and to communicate the issues to their constituents. Communities within the Oregon plan area will each decide which compliance path(s) to pursue. In most cases, continued participation in the NFIP and compliance with the no net loss standards will require the adoption of new codes or ordinances and the allocation of community resources. Ultimately, these decisions will rest with the community's elected officials and an understanding of the options will assist in that decision-making process.

1.2.2. TRIBAL, STATE, AND LOCAL GOVERNMENT OFFICIALS AND STAFF

This document describes the no net loss standards that must be implemented for Oregon communities located in the plan area to remain in the NFIP. The options for compliance are described and tools and resources are included to assist staff with implementation. This document identifies that the no net loss standards may also contribute to a community's Community Rating System (CRS) status and as such, can earn credit toward reduced flood insurance premiums. This document explains measures that can be taken to avoid, minimize, and mitigate impacts on the three floodplain functions (i.e., flood storage, water quality, and vegetation) and identifies the four paths that communities can take to ensure no net loss.

1.2.3. DEVELOPERS AND PROPERTY OWNERS

This document describes the no net loss standards and how they are related to development. It includes examples of how development can avoid and minimize impacts on the three floodplain functions and specifies the mitigation that will be required for unavoidable impacts. Further, this document provides information that can be used to help understand if an action is considered development and if such development would have impacts on the three floodplain functions based on the proxies of flood storage capacity, pervious surface, and trees 6-inches dbh.

1.3. Overview of the National Flood Insurance Program

This section provides an overview of the NFIP as implemented by NFIP participating communities.

The NFIP was established through the National Flood Insurance Act. The primary purpose and objective of the NFIP is to provide access to federally underwritten flood insurance. The National Flood Insurance Act was amended in 1973 to require the purchase of flood insurance as a condition of receiving federally underwritten loans and federal assistance in the SFHA. Congress also provided for the development of a floodplain management program that would encourage NFIP participating communities to reduce future flood losses nationwide through sound land use practices including community-enforced floodplain management regulations (42 USC 4001(c) and (e)). The NFIP was

designed so that floodplain management would be regulated and carried out at the Tribal, state, and local levels, where land use authority resides.

Communities are not required to participate in the program; they participate to obtain access to NFIP flood insurance and federal assistance. FEMA has set forth in federal regulations the minimum standards required for participation in the NFIP, which are not changing as part of the NFIP-ESA integration. Communities choosing to participate in the NFIP are required to adopt and enforce floodplain management regulations (e.g., codes and ordinances) that meet the NFIP minimum floodplain management standards (44 Code of Federal Regulations [CFR] 59.2[b], 59.22[a][3], 60.1[d], 60.3[a]-[f], 60.6). Legal enforcement of floodplain management standards is the responsibility of participating NFIP communities, which also can elect to adopt higher standards to mitigate flood risk.

Communities generally incorporate the floodplain management standards into their zoning codes, subdivision ordinances, and building codes, or they adopt special purpose floodplain management ordinances. The floodplain management standards apply to areas mapped as the SFHA. NFIP participating communities must have regulations that meet or exceed the minimum floodplain management standards and apply the regulations to all new development in the SFHA, as well as to existing buildings and infrastructure in the SFHA that have been substantially damaged or improved.

Relevant Definitions in the Code of Federal Regulations

FEMA adheres to the definitions of development and substantial improvement as codified in 44 CFR 59.

Development: Any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations, or storage of equipment or materials (44 CFR 59.1).

Substantial Improvement: any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the "start of construction" of the improvement (44 CFR 59.1).

Special Flood Hazard Area (SFHA): The land in the floodplain within a community subject to a 1 percent or greater chance of flooding in any given year. It is shown on the Flood Insurance Rate Map (FIRM) as Zone A, AO, AH, A1-30, AE, A99, AR, V, V1-30, VO, or VE (44 CFR 59.1).

At the local level, floodplain development is regulated through the community's floodplain management regulations and floodplain development permitting process. Before an applicant (including a state, local government entity, or a private party) can undertake any development in the SFHA, the community may require a floodplain development permit. For example, the following development in the SFHA requires a permit:

- Building a new house, barn, shed, commercial building, or other new structure
- Constructing an addition to an existing structure such as a sunroom or patio that increases the existing footprint of the structure
- Constructing roads and sidewalks
- Dredging
- Marina development
- Improving piers or existing structures at a port
- Bank stabilization or restoration (e.g., installing riprap, bulkheads, or other features)
- Installing drainage infrastructure
- Installing utility infrastructure (e.g., powerlines, water and wastewater pipes)
- Installing a tank at or above grade
- Constructing a boat dock or boat ramp
- Paving a previously unpaved driveway or parking area
- Terracing a yard

Federal agencies need to obtain floodplain permits from the local community for development projects unless the work is being done on land that the federal agency owns. State agencies need to obtain floodplain permits from the local community even if the state agency owns the land or has a legal right of way.

The community's floodplain administrator is responsible for reviewing the proposed development to ensure compliance with their floodplain management regulations and that all necessary permits have been received from federal or state agencies from which approval is required (e.g., Clean Water Act [CWA] permit).

The community's ordinances must also include effective enforcement provisions (44 CFR 59.2[b]). A community that fails to adequately enforce its floodplain management ordinance may be put on probation or suspended from the NFIP (44 CFR 59.24[b]-[c]).

Chapter 2. Oregon NFIP-ESA Integration Overview

2.1. NFIP-ESA Integration Authority

In the 1968 National Flood Insurance Act (42 USC 4001(e)), Congress established the NFIP program to 1) encourage state and local governments to make appropriate land use adjustments to constrict the development of land which is exposed to flood damage and minimize damage caused by flood losses, 2) guide the development of proposed future construction, where practicable, away from locations which are threatened by flood hazards, 3) encourage lending and credit institutions, as a matter of national policy, to assist in furthering the objectives of the flood insurance program, 4) assure that any Federal assistance provided under the program will be related closely to all flood-related programs and activities of the Federal Government, and 5) authorize continuing studies of flood hazards in order to provide for a constant reappraisal of the flood insurance program and its effect on land use requirements.

The statutory authority for requiring community adoption of the minimum floodplain management standards as a condition of participation in the NFIP is found in 42 USC 4022(a)(1), which states:

> After December 31, 1971, no new flood insurance coverage shall be provided under this title in any area (or subdivision thereof) unless an appropriate public body shall have adopted adequate land use and control measures (with effective enforcement provisions) which the Administrator finds are consistent with the comprehensive criteria for land management and use under section 1361.

In addition, 42 USC 4012(c) states that flood insurance shall be made available only on those states or areas which have 1) evidenced a positive interest in securing flood insurance coverage under the flood insurance program, and 2) given satisfactory assurance that by December 31, 1971, adequate land use and control measures will have been adopted for the State or area (or subdivision) which are consistent with the comprehensive criteria for land management and use developed under Section 4102 of this title, and that the application and enforcement of such measures will commence as soon as technical information on floodways and on controlling flood elevations is available.

FEMA's authority under 42 USC is limited to requiring communities that chose to participate in the NFIP to adopt minimum floodplain management regulations. FEMA has been given no authority to issue or deny permits, nor the authority to regulate development.

Federal floodplain management regulations (44 CFR 9.2(b)) establish several FEMA responsibilities, specifically requiring the agency to:

- Avoid long- and short-term adverse impacts associated with the occupancy and modification of floodplains and the destruction and modification of wetlands.

- Avoid direct and indirect support of floodplain development and new construction in wetlands wherever there is a practicable alternative.

- Restore and preserve the natural and beneficial values served by floodplains.

- Improve and coordinate the agency's plans, programs, functions, and resources so that the Nation may attain the widest range of beneficial uses of the environment without degradation or risk to health and safety.

These regulations are foundational in establishing FEMA's responsibility and authority to implement the no net loss standards, in particular the fourth bullet (44 CFR 9.2(b)(11). Further, the NFIP regulations at 44 CFR 60.3(a)(2) require that NFIP participating communities ensure that all permits, as required by federal or state law, are obtained as a condition of issuing a permit for development in the floodplain.

Under ESA Section 7(a)(1), federal agencies are directed to "utilize their authorities to further the purposes of the (Endangered Species) Act by carrying out conservation programs for listed species" (50 CFR 402.01(a)). Section 7(a)(2) of the ESA requires all federal agencies to ensure that any action they authorize, fund, or carry out is unlikely to jeopardize the continued existence of any ESA-listed species or result in the destruction or adverse modification of their habitat. The federal action agency is responsible for determining the effects on species listed as threatened or endangered under the ESA, and consulting with the United States Fish and Wildlife Service (USFWS) or NMFS, as appropriate. FEMA is the federal action agency for the NFIP program.

In 2016, NMFS issued a BiOp that determined that the implementation of the NFIP in the Oregon plan area is likely to jeopardize the continued existence of 16 ESA-listed fish species and will result in destruction or adverse modification of these species' critical habitat. The BiOp found that development in the SFHA in the Oregon plan area is harming listed species and their habitat and identified the need for no further loss of floodplain function as a means to reduce that harm. This 2024 Draft Implementation Plan describes the no net loss standards for NFIP-ESA integration in the Oregon plan area. As described in Section 1.3, the NFIP is implemented locally by NFIP participating communities. As such, communities in the Oregon plan area must adopt the standards identified for ESA compliance.

2.2. The No Net Loss Standards

The no net loss standards ensure that the implementation of the NFIP avoids jeopardy of listed species and adverse modification of habitat, including EFH under the jurisdiction of NMFS within the Oregon plan area. "No net loss standards" is an umbrella term that includes mitigation ratios to offset impacts on the three floodplain functions (Section 2.3), RBZ requirements (buffer zone and planting requirements, Section 2.4) as well as reporting requirements (Chapter 5). The no net loss mitigation ratios apply to three floodplain functions (i.e., flood storage, water quality, and vegetation) supportive of the survival of the 16 ESA-listed fish species and Southern Resident killer whale in the Oregon plan area (Section 2.3).

Definition of No Net Loss

No net loss is a standard wherein adverse impacts are avoided or offset through mitigation so that there is no net change in the function from the authorized existing condition.

The authorized existing condition is the state of the site when a floodplain permit application is submitted and assumes the resolution of all violations (e.g., unpermitted development).

No net loss maintains the quality of the floodplain functions over time as development occurs. Achieving no net loss of flood storage, water quality, and vegetation are minimum requirements for participating in the NFIP in the Oregon plan area. A community may propose additional standards, alternative floodplain functions, or other customized methods of achieving no net loss under Path C (Section 4.4).

2.3. Floodplain Functions and Their Proxies Defined

This section defines the three floodplain functions (i.e., flood storage, water quality, and vegetation) and their habitat value for the ESA-listed species under NMFS jurisdiction in the Oregon plan area. This section discusses the measurable proxies that will be used for quantifying impacts on the floodplain functions from development. The floodplain functions, their proxies, and what is being mitigated is summarized in **Table 2.1**.

Table 2.1. Floodplain Functions, Proxies, and What is Being Mitigated

Floodplain Function	*Proxy*	*Mitigating Against*
Flood Storage	Flood Storage Capacity	Loss of fish accessible and egress-able SFHA
Water Quality	Pervious Surfaces	Impervious Surface
Vegetation	Trees 6 inches dbh	Trees Removed

Understanding the relationship between the floodplain functions, the proxies, and development helps developers and floodplain managers identify when a development activity would have an impact. Mitigation required to offset impacts from development and achieve no net loss is described in Chapter 3.

Appendix E provides further information on determining the impacts of a development on the three floodplain functions through example projects.

2.3.1. FLOOD STORAGE – FLOOD STORAGE CAPACITY

Flood storage is the three-dimensional space (i.e., volume) between the existing ground and the BFE in which floodwaters flow in the special flood hazard area (i.e., 1-percent annual chance flood, 100-

year floodplain). Flood storage in the SFHA serves as important habitat for certain fish species at different life stages (Burgess et al. 2012). During flood events, fish disperse up into the SFHA, following slower moving waters away from high velocity flows in the floodway and the main channel, see **Figure 2-1** (Burgess et al. 2012). While fish are in the flooded SFHA, fish benefit from the vegetation, insects, and other food sources that may be present.

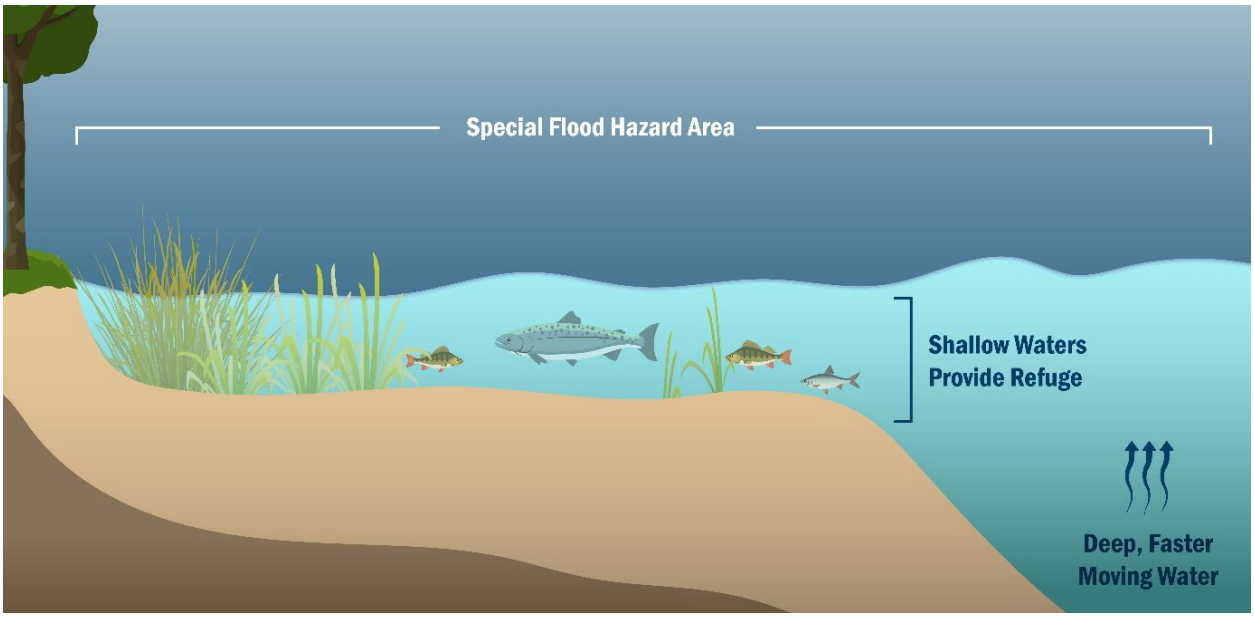


Figure 2-1. Flood Storage

When the SFHA is occupied by buildings, storage tanks, roads, or other development, the volume in which floodwaters can spread may be reduced. This increased depth can result in a higher velocity (i.e., speed) of floodwaters, which reduces the amount of slower moving floodwaters that provide a refuge for fish during flood events. When fish cannot find slower moving water during a flood, they may be swept downstream to areas that are not suitable for their life stage. In addition, when something is placed or constructed in the SFHA (e.g., building a house), the volume occupied by the development becomes inaccessible to fish for use as habitat and no longer serves the function of flood storage. As such, the proxy for flood storage is flood storage capacity, which is the flood storage (i.e., volume) that is unoccupied by any development including, but not limited to, the addition of fill, structures, concrete structures (vaults or tanks), pilings, levees and dikes, or any other development that reduces flood storage.

Path C (Section 4.4) allows communities to take a community-wide perspective to identify areas within the SFHA that are not available for fish access, fish egress, or both under the existing condition and therefore not subject to no net loss of flood storage. Examples may include areas above a waterfall, or areas hydrologically disconnected from waterways with anadromous fish (e.g., lake or pond, behind existing levee).

Certain development may result in a change in flood storage capacity by placing structures or material in the SFHA between the ground surface elevation and the base flood elevation (BFE) that reduces the volume available for

floodwater, fish access and egress at the site, or both. That is, even if floodwaters can flow freely through a development, such as through a screened crawl space, if fish are no longer able to access and egress that space (i.e., volume), it is an impact that must be mitigated.

Definition of Base Flood Elevation

The BFE is the computed elevation to which floodwater is anticipated to rise during the base flood. The base flood means the flood which has a one percent chance of being equaled or exceeded in any given year. That is, the BFE defines the anticipated elevation of floodwaters in the SFHA. BFEs are shown on the Flood Insurance Rate Maps (FIRMs) and on flood profiles in the Flood Insurance Study (FIS), by working with your local floodplain administrator, or both. If the BFE is not provided on FIRMs or FISs, a community would be expected to use the same provisions they use to determine a BFE as in 44 CFR 60.3(b).

Any material (e.g., dirt, concrete, asphalt, wood, equipment, structures) that reduces flood storage capacity in the SFHA is an impact on flood storage. While this material is generally referred to as "fill," it applies to structures that protrude above the ground (e.g., houses, tanks, abutments) as generally measured by the volume of the structure below the BFE. A more detailed definition of flood storage capacity is provided in Chapter 8.

Explanation of Structure and Fill

The definition of structure in 44 CFR 59 is not changing and is: a walled and roofed building, including a gas or liquid storage tank, that is principally above ground, as well as a manufactured home.

Structure, for insurance purposes, means:

(1) A building with two or more outside rigid walls and a fully secured roof, that is affixed to a permanent site;

(2) A manufactured home (also known as a mobile home), built on a permanent chassis, transported to its site in one or more sections, and affixed to a permanent foundation); or

(3) A travel trailer without wheels, built on a chassis and affixed to a permanent foundation, that is regulated under the community's floodplain management and building ordinances or laws.

The construction or installation of structures is considered "development." For explanatory purposes only, a structure is considered something that is constructed or installed and would include things that occupy physical space and therefore can reduce flood storage capacity.

Structures would include bridges, roads, abutments, bulkheads, buildings, manufactured homes, or storage tanks.

Fill: Placement of any materials such as soil, gravel, crushed stone, or other materials that changes the topographic elevation within the floodplain. The placement of fill is considered "development."

Some development activities, such as building a berm, limit floodwaters and access for fish from both the volume of the material placed to construct the berm as well as the volume behind the berm that is no longer accessible to floodwaters or fish. The impact quantified for flood storage capacity in such cases must consider the entire volume lost. That is, the impact includes both the volume of the material placed to construct the berm as well as the volume behind the berm that is no longer available for floodwaters and fish.

Other development activities, such as building an elevated home on posts/piers, would have a smaller adverse impact (i.e., require less mitigation) because only the volume of the post/piers would reduce the volume available for floodwaters and fish habitat. In this example, during a flood, both floodwaters and fish would be able to flow freely under the structure. The impact on flood storage capacity would include the volume of the posts/piers.

On occasion, berms and similar structures may be overtopped or breached. In such circumstances, floodwaters flow behind the berm and may transport fish behind the berm as well. As floodwaters recede, fish can become stranded behind the berm because connectivity to the water source remains restricted. This circumstance depicts the importance of egress as well as access to floodplain areas to serve the function of flood storage for fish.

Key Question to Help Determine Flood Storage Impacts

Will the development place structures or fill in the SFHA, between the existing ground surface elevation and BFE, that reduces the volume of floodwater able to flow freely during a flood event, reduces the area that fish can take refuge in during a flood event, or both?

No = No flood storage impact (water quality and vegetation impacts may apply)

Yes = Impact on flood storage

2.3.2. WATER QUALITY - PERVIOUS SURFACE

Water quality is a measure of the condition of water relative to its suitability for a specific use or purpose. Water quality plays an important role in the health of fish and ecosystems (Demeke and Tassew 2016). Impaired water quality such as elevated water temperature and the presence of pollutants can be harmful to listed fish as well as other aquatic organisms that the listed species forage on such as insects, either through direct mortality or by inducing behavioral changes that

affect survival (U.S. Government Accountability Office 2023, National Oceanic and Atmospheric Administration [NOAA] 2016).

Development impacts water quality by adding surfaces that prevent precipitation and stormwater runoff from infiltrating into the ground (i.e., impervious surfaces) (Chithra et al. 2015). Typical impervious surfaces include concrete, asphalt, wood, or other materials that water passes over instead of passing through. Although impervious surfaces do not directly generate water pollutants, they prevent the natural process of water infiltrating into the ground where soils and plants filter pollutants. Impervious surfaces collect debris and pollutants such as oils, gas, and chemicals (Frazer 2005, NOAA 2016). When water flows over these surfaces, it picks up the debris and pollutants and carries them into surface waters or stormwater collection systems (Chithra et al. 2015, NOAA 2016). Impervious surfaces also typically absorb heat, which can warm water running across the surface and result in increased waterway temperatures, which can negatively impact fish (Frazer 2005, NOAA 2016). In addition, impervious surfaces can increase the volume or velocity of water downstream because the water does not infiltrate into the ground where it may be stored in an aquifer or in groundwater from which it moves slowly toward a surface water. Stormwater runoff from impervious surfaces can result in erosion or increased flood damage and reduces groundwater recharge, thus reducing seasonal stream flows (Frazer 2005, Sleavin and Civco 2000). Therefore, the proxy for no net loss of water quality is pervious surface. Any loss of pervious surface (i.e., increase in impervious surface) would require mitigation to achieve no net loss of water quality.

Key Question to Help Determine Water Quality Impacts

Will the development add materials on-site that do not allow water to infiltrate the ground?

No = No water quality impact (flood storage and vegetation impacts may apply)

Yes = See next question

Is the water from new impervious surface area allowed to infiltrate into the ground on-site (e.g., water from a roof is collected in gutters and transferred to a rain garden, water from a deck flows into permeable ground)?

No (not allowed to infiltrate) = Impact on water quality

Yes (allowed to infiltrate) = No water quality impact (flood storage and vegetation impacts may apply)

2.3.3. VEGETATION – TREES 6-INCHES DIAMETER AT BREAST HEIGHT OR LARGER

Vegetation, as it relates to the SFHA, includes plants growing in the floodplain and on the edge of a waterbody, such as along streams or riverbanks. It includes both native and non-native plants that may have been planted as part of landscaping or that have become established on their own. Many floodplain vegetation areas include grasses, shrubs, trees, and forbs that are often able to tolerate

periodic flooding. Trees are an important subset of vegetation in the SFHA because they provide important habitat values for fish species. Trees in the riparian area provide shade, thereby moderating water temperature. Trees in the SFHA also provide large woody debris, habitat for invertebrates that serve as food for fish, and organic matter and other nutrients to a waterway (Boyer et al. 2003, Florsheim et al. 2008, Segura and Booth 2010). Further, trees reduce the risk of erosion by stabilizing soils with their roots (Boyer et al. 2003, Florsheim et al. 2008, Segura and Booth 2010). Although trees are not the only vegetation that provides habitat benefits, trees 6 inches dbh or larger in the SFHA are particularly important in providing habitat benefits for fish species and as such, are the proxy for no net loss of vegetation.

Development may remove trees to accommodate construction equipment or clear the ground for fill, infrastructure, and structures. Each tree 6 inches dbh or larger removed is considered an impact on vegetation.[3]

Definition of Diameter at Breast Height

Diameter at breast height (dbh) is the standard for measuring trees. It is the measurement of the diameter of the tree's trunk when measured 4.5 feet above the ground.

Key Question to Help Determine Vegetation Impacts

Will any trees 6 inches dbh or larger be removed?

No = No vegetation impact (flood storage and water quality impacts may apply)

Yes = Impact on vegetation

2.4. Riparian Buffer Zone Requirements

The riparian buffer zone (RBZ) is the area that borders rivers, streams, lakes, and other bodies of water. The RBZ, in part based on its adjacency to waterways, provides a number of benefits to fish species both during and between flooding events. Vegetation in the RBZ filters nutrients, pesticides, and agricultural waste and stabilizes eroding banks. Vegetation in the RBZ also filters sediment from runoff and provides shade, shelter, and food for fish and other aquatic organisms. NMFS, in their 2016 BiOp on the implementation of the NFIP in the Oregon plan area, stated that an RBZ width equal to the maximum site-potential tree height of native species is adequate to ensure the majority of the riparian functions are retained.

FEMA has established a standard 170-foot RBZ for use in implementing the no net loss standards, which generally equates to between 75 and 85 percent of the maximum potential tree height of

[3] Removal of hazardous trees is not subject to the no net loss standards, see Section 2.7.

common tree species in the Oregon plan area and would be expected to provide an equivalent or greater percentage of associated riparian functions in most instances. FEMA is not proposing to limit development in the RBZ. Instead, FEMA identified mitigation ratios that reflect the importance of the RBZ in preserving riparian functions and established the beneficial gain standard, which allows for development that is not functionally dependent on being located near a waterway to occur in the RBZ while preserving the riparian functions of the RBZ in the long term.

The boundary of the RBZ is measured 170 feet inland from the ordinary high water mark of a fresh waterbody (lake; pond; ephemeral, intermittent, or perennial stream) or from the mean higher-high water mark of a marine shoreline or tidally influenced river reach (**Figure 2-2**). The RBZ includes the area between these boundaries on each side of the waterway, including the waterway channel. In instances where the 170-foot RBZ extends further than the SFHA, only impacts occurring in both the RBZ and the SFHA must be mitigated. It is not necessary to identify the RBZ on water bodies that are not within an SFHA.

The U.S. Army Corps of Engineers (USACE) and U.S. Environmental Protection Agency (EPA) have released a technical manual on delineating the ordinary high water mark in the field (https://erdc-library.erdc.dren.mil/items/76c61f8f-6d75-4a35-aaf3-39aa64918afb). In addition, the Oregon Department of Fish and Wildlife provides guidance on delineating the ordinary high water mark (https://www.oregon.gov/odot/Engineering/Doc_TechnicalGuidance/GE09-07b.pdf). If delineating the ordinary high water mark is not feasible, the RBZ can be measured from the top of bank.

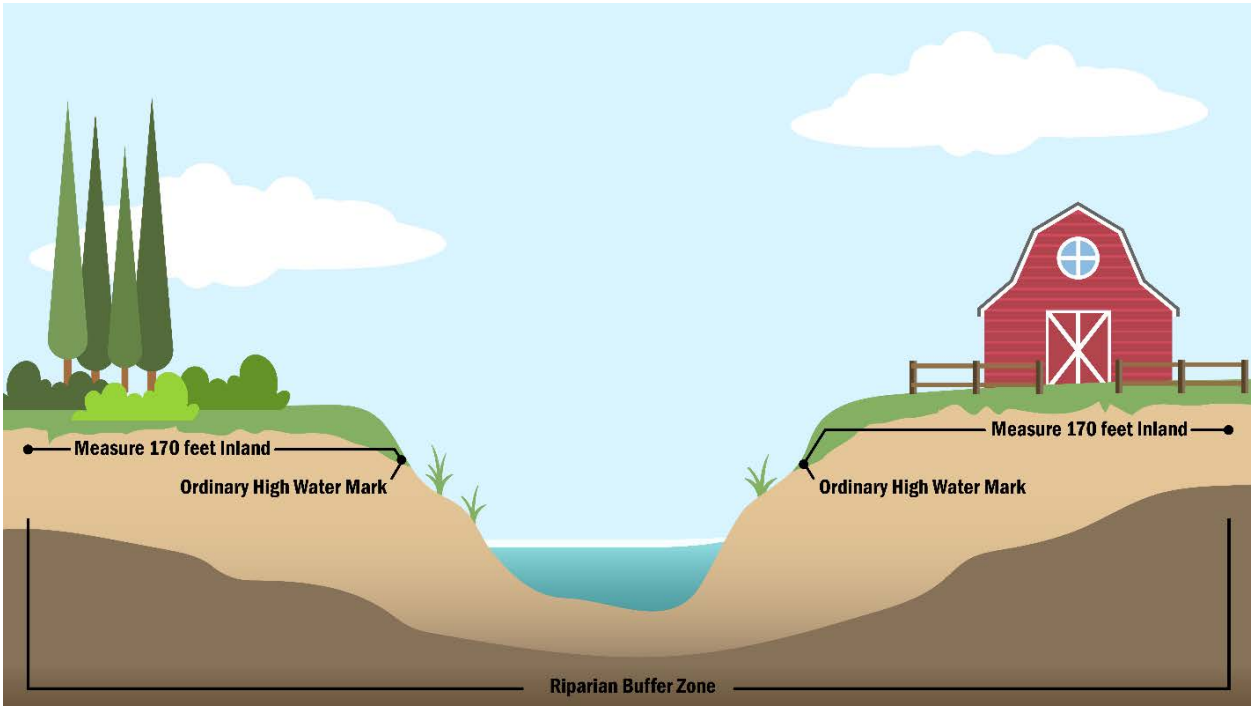


Figure 2-2. Riparian Buffer Zone

Development that is dependent on being located within the RBZ to function (i.e., functionally dependent use) will require no net loss. The mitigation ratios required for no net loss in the RBZ are provided for each floodplain function in Chapter 3. Development that occurs in the RBZ and is not a functionally dependent use will require implementation of both no net loss and beneficial gain.

Definition of Functionally Dependent Use and Beneficial Gain

Functionally dependent use: A use which cannot perform its intended purpose unless it is located or carried out in proximity to water. The term includes bridges, docking facilities, port facilities that are necessary for the loading and unloading of cargo or passengers, and ship building and ship repair facilities, but does not include long-term storage or related manufacturing facilities.

Beneficial Gain: FEMA's beneficial gain standard would apply to development that is not a functionally dependent use that occurs within the RBZ. The standard would require that an area within the RBZ, within the same reach as the project, and equivalent to 5 percent of the area impacted within the RBZ be planted with native riparian herbaceous, shrub, and tree vegetation.

Native vegetation creates a pervious surface to store and filter stormwater to improve water quality. Additionally, it addresses an aspect (native non-tree vegetation) of the vegetation function that was repeatedly mentioned in the BiOp beyond the required replanting to replace the function of trees 6-inches dbh or larger that were removed.

Communities may propose a deviation to the 170-foot RBZ (to no less than 50-feet) based on the local maximum potential tree height or existing riparian functions of the RBZ under Path C (see Section 4.4 and Appendix D).

2.5. Relationship of No Net Loss Standards to the Community Rating System

The NFIP CRS was implemented in 1990 as a voluntary program for recognizing and encouraging community floodplain management activities that exceed the national minimum NFIP standards codified in 44 CFR 59-60. Under the CRS program, a community can undertake activities that earn CRS credit (points) that leads to reduced flood insurance premiums. Such activities can include prohibiting fill or improving stormwater management.

Participation in the CRS requires communities to participate in the NFIP. Implementation of the no net loss standards are required for Oregon communities in the plan area to participate in the NFIP. Thus, communities in the Oregon plan area must implement the no net loss standards to be eligible for CRS credit. However, the no net loss standards could also support certain components of CRS activities and, as such, may contribute to earning credit toward reduced flood insurance premiums. Implementation of the no net loss standards would most likely contribute to the following CRS activities.

2.5.1. ACTIVITY 430 HIGHER REGULATORY STANDARDS

Prohibition of all fill (DL1a): This credit is for prohibiting all fill in the regulatory floodplain. To meet this standard, communities may NOT approve Conditional Letters of Map Revision based on Fill (CLOMR-F) or Letters of Map Revision based on Fill (LOMR-F). If a CLOMR-F or LOMR-F is issued for a property in a community, then DL1 credit will be denied. This applies to CLOMRs and LOMRs that include filling as part of the reason for requesting a map change. Minor filling may be allowed, where needed, to protect or restore natural floodplain functions, such as part of a channel restoration project.

The CRS manual describes a number of regulatory approaches that do not warrant credit under DL1; however, because the no net loss standards exceed the approaches described in the manual, a community meeting the Oregon no net loss standards should qualify for credit under DL1.

Compensatory storage (DL1b): This credit is for regulations that require new development to provide compensatory storage at hydraulically equivalent sites up to a ratio of 1.5:1. Credit is not provided for:

- Compensatory storage requirements in floodways only or in V Zones only, or
- Stormwater management regulations that require a developer to compensate for any increase in runoff created by the development. This is credited under Activity 450.

2.5.2. ACTIVITY 450 STORMWATER MANAGEMENT

Stormwater management regulations (SMR – 452a): This credit is the sum of four sub-elements: Size of development (Section 452.a[1], SZ), design storm used (Section 452.a[2], DS), low impact development (LID) regulations (Section 452.a[3], LID) and public agency authority to inspect and maintain, at the owner's expense, private facilities constructed to comply with the ordinance (Section 452.a.[4], PUB).

LID credits the community's regulatory language that requires the implementation of LID techniques to the maximum extent feasible to control peak runoff when new development occurs. LID techniques can substantially reduce or eliminate the increase in stormwater runoff created by traditional development, encourage aquifer recharge, and promote better water quality.

2.6. Actions Subject to the No Net Loss Standards

The minimum floodplain management standards codified in 44 CFR 59 and 44 CFR 60 and the no net loss standards would apply to any development activity that meets all of the following criteria:

- Occurs within a participating Oregon NFIP community within the plan area (**Figure 1-1**); AND
- The proposed development is located within the mapped SFHA on a community's FEMA-approved FIRM; AND

- Meet FEMA's definition of development: “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, and storage of equipment or materials” (44 CFR 59.1). The term “development” for the NFIP is not restricted to a building with walls and a roof. It is any disturbance (permanent or temporary) of the ground, including, but not limited to, a new or expanded culvert, road, driveway, deck, dock, fence, storage tank, or wall. This includes redevelopment or renovations outside of the existing footprint of a structure. There are no exceptions for the value of the improvement; therefore, FEMA’s NFIP substantial improvement threshold does not apply.

2.7. Actions Not Subject to the No Net Loss Standards

Any man-made change to improved or unimproved real estate in the SFHA will require a permit from the local floodplain administrator. However, some actions that require a permit would not trigger the proposed mitigation to achieve no net loss. These actions are not subject to the no net loss standards because they are not reasonably expected to have an impact on the floodplain functions. The local floodplain administrator retains the authority to require no net loss for any actions, including those listed below, if they are determined or expected to have an impact on the floodplain functions. Actions not subject to no net loss standards include:

- Maintenance, repair, or remodel of existing buildings, facilities, and utilities **within their existing footprints**, such as re-roofing, replacing siding, or replacing downed power lines and utility poles, provided there is no net change in footprint. This includes in-kind repair and replacement that occurs after a disaster (e.g., wildfire) so long as the footprint remains the same as that of the pre-disaster building, facility, or utility.

- Normal street, sidewalk, and road maintenance, including farm and forest roads, and including filling potholes, repaving, and installing signs and traffic signals, that does not alter contours, uses, or culverts. Exempt activities do not include vertical or horizonal expansion of paved areas.

- This includes resurfacing of roads that occurs within the same footprint as the existing roadway. This activity would be subject to the no net loss standards if it includes new shoulders, lane widening, or other actions that expand the road.

- Routine maintenance of landscaping that does not involve grading, excavation, or filling.

- Lawn care, gardening, removal or noxious weeds and hazard trees, and replacement of non-native vegetation with native vegetation.

- Gardening activities that include grading (e.g., altering the topography of the landscape to terrace a yard) or fill (e.g., stabilizing a slope using impervious rocks) would be subject to the no net loss standards.

- Hazardous trees are standing dead, dying, diseased, infested trees, or ones with a structural defect that makes it likely to fail in whole or in part and that present a potential hazard to a structure, or pose a safety threat from the risk of falling on a road, building, or otherwise creates a risk of damage or injury.[4]

- Routine agricultural practices such as tilling, plowing, harvesting, soil amendments, and ditch clearing that do not alter the ditch configuration provided the spoils are removed from the SFHA or tilled into fields as a soil amendment.

- Routine silvicultural practices (i.e., harvesting of trees), including hazardous fuels reduction and hazard tree removal, as long as root balls are left in place.

- Silviculture practices must be carried out in compliance with applicable permits and regulations. Such activities include pruning, thinning, removing underbrush, planting, tending, burning infected trees, tree harvesting so long as root balls are left in place, and canopy alterations.

- Normal maintenance of above ground utilities and facilities, such as replacing downed power lines and utility poles provided there is no net change in footprint.

- Normal maintenance of a levee or other flood control facility prescribed in the operations and maintenance plan for the levee or flood control facility. Normal maintenance does not include repair of flood damage, expansion of the prism, expansion of the face or toe or addition of protection on the face or toe with rock armor.

- Habitat restoration activities.

- Restoration activities must have the sole purpose of restoring habitat for ESA-listed species that have only temporary impacts (e.g., erosion during construction) and long-term benefits to habitat. Such projects cannot include ancillary structures such as a storage shed for maintenance equipment or restrooms, must demonstrate that no rise in the BFE would occur as a result of the project, and have obtained any other required permits (e.g., Section 404 CWA permit).[5]

- Temporary stockpiling or storage of materials and equipment. Temporary is defined as up to 6 months.

- Pre-emptive removal of documented susceptible trees to manage the spread of invasive species.

Floodplain administrators can work with developers to determine if actions similar to, but not explicitly described in the preceding list, are not subject to the no net loss standards. Through a discretionary review, floodplain administrators may determine that a similar action would not impact

[4] An arborist is qualified to determine hazard trees.
[5] Demonstrating no rise in the BFE may require certification by a registered engineer. Other forms of verification may be allowable. FEMA recommends utilizing the same community processes that are used to determine compliance with 60.3 (d)(3) - Floodway Requirement.

the three floodplain functions and that mitigation to achieve the no net loss standards would not be required.

Clarification of Temporary Stockpiling and Storage

FEMA recognizes that land and business owners may store inventory or materials in the SFHA that are continually depleted and replenished or otherwise do not occupy a fixed volume of flood storage capacity. In such cases, a developer shall follow local floodplain regulations and permit processes and implement the no net loss standards accordingly.

2.7.1. EXCEPTIONS FOR PROJECT-SPECIFIC ESA COMPLIANCE

During the NEPA scoping process, FEMA heard numerous requests for an exception to the no net loss standards for projects with other ESA compliance. Many development activities in the SFHA may be subject to Section 7 consultation under ESA via an alternative federal nexus, such as federal funding (e.g., FEMA mitigation grants), federal permits (e.g., activities requiring a CWA Section 404 permit), or federal licensing, that is not associated with the NFIP. Additionally, some activities (e.g., forestry and related activities) may achieve ESA compliance through an existing Habitat Conservation Plan (under Section 10 of the ESA). A project may also secure an ESA Limit 4(d) approval for threatened ESA-species only (e.g., hatchery expansion or Oregon Department of Transportation road maintenance projects). SFHA development activities achieving ESA compliance via these traditional approaches may result in consequences to ESA-listed species, but those consequences would be evaluated in the appropriate ESA context for those actions (e.g., Section 7 consultation for CWA Section 404 permit). The consultation process may result in different or additional offsetting measures for consequences to ESA-listed species.

If federal construction, funding, or permitting is involved in a project for which a floodplain development permit has been requested, then the applicant may use that agency's Section 7 consultation to document to the floodplain administrator that ESA compliance has been achieved and the project would not be subject to the no net loss standards. For example, port and marina construction and maintenance activities that require approvals under Section 404 of the CWA, Section 10 of the Rivers and Harbors Act, or both, through the U.S. Army Corps of Engineers (USACE) that have ESA-coverage through USACE would not need to also apply the no net loss standards to offset the impacts.

If a proposed project in the SFHA is a covered activity under an approved Section 10 Habitat Conservation Plan and associated Incidental Take Statement, that project would not be required to adhere to the no net loss standards (see Section 4.5 for additional detail on Habitat Conservation Plans). For example, road system maintenance and recreation infrastructure construction and maintenance under the Western Oregon State Forests Habitat Conservation Plan (once approved) would not be subject to the no net loss standards.

If a project in the SFHA is a covered activity under a Limit 4(d) approval (e.g., Oregon Department of Transportation roadway maintenance projects implementing BMPs identified in the Routine Road Maintenance Water Quality and Habitat Guide) and only threatened species covered by the 4(d) limit are present in the project area, the project would not be subject to the no net loss standards (Oregon Department of Transportation 2020) (see Section 4.5 for additional detail on Section 4(d) limits).

Developers that receive federal funding, require a federal permit, or have otherwise consulted with NFMS (i.e., developed a Habitat Conservation Plan or coordinated on approval of a Section 4[d] limit) would not be subject to the no net loss standards.

DIFFERENCE IN APPLICABILITY AMONG NEPA ALTERNATIVES

No Net Loss with Exception for Project-Specific ESA Compliance Alternative (Alternative 2)

Under this alternative, a development proposal that has project-specific ESA compliance documentation obtained through other means would not be subject to the no net loss standards. For example, a project that receives a USACE permit or a FEMA-funded hazard mitigation project that has secured ESA compliance would not also be subject to the no net loss standards. Development without project-specific ESA compliance through other means would be required to meet the no net loss standards for the three floodplain functions through the avoidance, minimization, and mitigation measures described in Chapter 3.

No Net Loss Without Exceptions for Project-Specific ESA Compliance (Alternative 3)

Under this alternative, development would be subject to the no net loss standards regardless of whether it has project-specific ESA compliance through other means. Development would be required to meet the no net loss standards for the three floodplain functions through the avoidance, minimization, and mitigation measures described in Chapter 3 in addition to any mitigation measures identified in project-specific ESA compliance documentation.

The local floodplain administrator retains the authority to require no net loss for any actions including those with project-specific ESA compliance, that are determined or expected to have an impact on the three floodplain functions.

Chapter 3. Achieving the No Net Loss Standards

Developers can achieve no net loss by avoiding impacts, minimizing the degree or magnitude of impacts, and offsetting any remaining impacts through mitigation. Avoidance, minimization, and mitigation is a logical succession in that mitigation is not required for impacts that are completely avoided or for the part of the impacts that are reduced through minimization. Mitigation is only required to offset any remaining impacts after measures to avoid and minimize are employed in order to achieve no net loss. FEMA cannot dictate that avoidance and minimization must occur prior to using mitigation, so long as all impacts are offset and no net loss is achieved.

Avoidance means that impacts do not occur in the first place. It may consist of not taking an action (e.g., not cutting down trees 6 inches dbh or larger), selecting the least-damaging project type (e.g., building a second story instead of a horizontal expansion to avoid reducing flood storage capacity and pervious surfaces), or building outside of the SFHA when possible, to avoid impacts on all three floodplain functions. Avoidance is achieved by considering project alternatives and their potential impacts.

Minimization includes actions to reduce the degree or magnitude of impacts on the three floodplain functions and require less mitigation. Minimization is achieved through careful project design.

Mitigation is required for any reduction of flood storage capacity (i.e., fill or structures), reduction of pervious surface, and removal of trees 6 inches dbh or larger. Mitigation may include both natural methods (e.g., replanting of trees) or engineered methods (e.g., green infrastructure) depending on the impact and site-specific constraints.

Mitigation is recommended to occur on the same site where the impact occurs and must occur in the SFHA. Mitigation for impacts within the RBZ must also occur in the RBZ. Off-site mitigation is allowed; however, it must occur within the same reach of the waterbody where the impact occurs, or within the 10-digit Hydrologic Unit Code (HUC) watershed.[6]

Definition of Reach

A section of a stream or river along which similar hydrologic conditions exist, such as discharge, depth, area, and slope. It can also be the length of a stream or river (with varying hydrologic conditions) between major tributaries or two stream gages, or a length of river for which the characteristics are well described by readings at a single stream gage.

[6] The 10-digit HUC watershed is also called the 5th Level or Watershed 5th Level (2016 BiOp, Appendix 2.8-C (f))

Mitigation to achieve no net loss is categorized by three areas within the SFHA:

- Impacts occurring in the mapped floodway of the SFHA
- Impacts occurring in the RBZ of the SFHA
- Impacts occurring outside of the floodway and RBZ, in the remainder of the SFHA

In some instances, the boundaries of the mapped floodway and RBZ may overlap. The mitigation ratios for the floodway and RBZ are the same (see Sections 3.1.3, 3.2.3, and 3.3.3). However, development in the RBZ that is a non-functionally dependent use must also adhere to the beneficial gain standard described in Section 2.4. The beneficial gain standard must be met for non-functionally dependent uses that occur in the RBZ, regardless of floodway designation. Impacts that occur in the floodway but not in the RBZ do not need to meet the beneficial gain standard. When the floodway is not mapped, the mitigation ratios identified for the RBZ and remainder of the SFHA will be used.

NFIP participating communities will decide who is responsible (e.g., land use permit reviewers, floodplain administrator, building official, public works staff) for quantifying the impacts of a development and approving proposed mitigation to achieve no net loss. The developer (i.e., the individual, company, department, or agency applying for a floodplain permit) will be responsible for the implementation and maintenance of the mitigation. Floodplain administrators will be responsible for ensuring that all mitigation requirements are satisfied prior to closing out the floodplain permit. Alternatives to developer-led mitigation are allowable under Path C, see Section 4.4 and Appendix C.

The developer might have mitigation requirements associated with other federal permits (e.g., activities requiring a CWA Section 404 permit), or federal licensing, that are not associated with the NFIP no net loss standards. In such cases, the developer should work with the federal, state, and local regulatory agencies and the floodplain administrator to identify opportunities to provide for multiple mitigation requirements within the same site, if feasible, to reduce duplication and costs. All oversight agencies must agree that such mitigation can serve as compliance with federal regulations as well as for no net loss. For example, removal of fill and the creation of a wetland mitigation site for compliance with the CWA may also serve to offset impacts on flood storage capacity, so long as no net loss is achieved. The developer can work with USACE to determine the size of the wetland mitigation site required to comply with both the CWA and to meet FEMA's no net loss standard for flood storage. Similarly, the creation of a forested wetland for compliance with the CWA may also serve to offset impacts on vegetation. The developer can work with USACE to determine the number of trees necessary to plant for compliance with both the CWA and FEMA's no net loss standard for vegetation (i.e., trees 6 inches dbh or larger).

The potential for community-led mitigation is discussed under Path C, as described in Section 4.4 and Appendix C. A community may use Path C to provide higher-value mitigation for future anticipated impacts. Mitigation that provides a broader range of habitat benefits in addition to no net loss of floodplain functions might provide more mitigation value per unit and thus be able to offset impacts at more than a 1:1 ratio. For example, a wetland mitigation site that is expanded to address flood storage capacity requirements may be approved to provide mitigation at a more favorable ratio than otherwise would be required (e.g., 0.5 cubic foot of mitigation area might offset 1 cubic foot of impacted area).

3.1. Flood Storage – Flood Storage Capacity

3.1.1. AVOIDANCE

Avoiding impacts on flood storage would be achieved by not reducing the amount of flood storage capacity between the ground surface elevation and the BFE in the SFHA. An example measure to avoid impacts on flood storage capacity would be to expand structures vertically (i.e., increase in height) instead of horizontally so that no new fill or structures are placed in the SFHA below the BFE.

3.1.2. MINIMIZATION

Minimizing impacts on flood storage would be achieved by reducing the amount of new fill or structures at or below the BFE in the SFHA to the extent possible. As discussed in Section 2.3.1, fill includes any material that impedes the flow of flood waters (e.g., dirt, gravel, concrete, or other materials and structures that protrude above the ground such as buildings, tanks, and abutments).

An example measure to minimize reductions of flood storage would be to elevate new structures in the SFHA on posts or piers rather than on an enclosed crawl space to reduce the amount of fill and structures placed below the BFE. In this example, only the volume of the posts or piers elevating the structure would reduce flood storage capacity compared to the volume of the structure footprint and enclosed crawl space at or below the BFE.

3.1.3. MITIGATION

Any decrease in flood storage capacity (e.g., increase in fill or structures) at or below the BFE will require mitigation to achieve no net loss of flood storage. Mitigation includes creating new flood storage capacity (i.e., removing fill and structures that occupy space, compensatory volume) to offset the loss resulting from development.

As discussed in Section 2.3.1, flood storage capacity impacts are calculated as a volume and consider both the volume of floodwater displaced as well as the volume displaced for fish access and egress of the site. Similarly, mitigation must address both floodwater volume as well as fish access and egress of the site. That is, mitigation (i.e., the removal of fill and structures) cannot result in the potential for fish blockage or stranding.

Flood Storage Capacity Mitigation - Fish Access and Egress

For flood storage mitigation, fish access and egress are determined for the site on which mitigation is occurring.

Under Path C (Section 4.4), communities can take a community-wide perspective to identify areas within the SFHA that are not available for fish access, fish egress, or both under the existing condition and therefore not subject to no net loss of flood storage. Examples may include areas above a waterfall, or areas hydrologically disconnected from waterways with anadromous fish (e.g., lake or pond, behind existing levee).

Impacts on flood storage capacity must be mitigated at the ratios in **Table 3.1**. Mitigation must:

- Occur at the same elevation relative to the BFE at which the development causes an impact (i.e., hydraulically equivalent elevation, defined in Chapter 8) or within 1 foot (vertically) of the hydraulically equivalent elevation. Hydraulically equivalent elevations can be determined by elevation data, observed ordinary-high water mark, determined ordinary-high water marks by a state or federal agency, or best available water surface profiles.

- Be hydrologically connected to the waterbody that is the flooding source, ensure there is no increase of flood velocity, be vegetated[7], and be designed to fill and drain in a manner that does not block or trap fish.

[7] Vegetation can include crops for farming and agricultural production.

Table 3.1. Mitigation Required for Lost Flood Storage Capacity

Location of Impact	Flood Storage Capacity Proportion of Mitigation to Impact (Mitigation: Impact)
Impact Occurring in the Mapped Floodway[1]	2:1
Impact Occurring in the RBZ[2]	2:1
Impact Occurring Outside the Floodway and RBZ, in remainder of SFHA	1.5:1
Mitigation Location Multipliers[3]	
Mitigation occurring on-site or off-site in the same reach[4]	100%
Mitigation occurring off-site, in a different reach, but within the same watershed (i.e., 10-digit Hydrologic Unit Code [HUC])[5]	200%

Conditions:

1 When the floodway is not mapped, the mitigation ratios for the RBZ and remainder of the SFHA would be used.

2 Impacts that occur in the RBZ must be mitigated in the RBZ.

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

a For example, if a development would fill 1,000 cubic feet of flood storage capacity in the RBZ, then 2,000 cubic feet of new flood storage capacity would be required to be created (mitigation ratio of 2:1). However, if only 500 cubic feet can be created on-site and in the same reach, the remaining 1,500 cubic feet created off-site along a different reach would need to be created at double the required amount (200% multiplier). That is, another 3,000 cubic feet would need to be created at the off-site location in addition to the 500 cubic feet created on-site.

4 Reach is defined as a section of a stream or river along which similar hydrologic conditions exist, such as discharge, depth, area, and slope. It can also be the length of a stream or river (with varying hydrologic conditions) between major tributaries or two stream gages, or a length of river for which the characteristics are well described by readings at a single stream gage.

5 Watersheds are determined by the U.S. Geological Survey using the 10-digit HUC area.

If there are no suitable mitigation opportunities at an appropriate elevation relative to the BFE, a developer or qualified professional must conduct a study demonstrating that the proposed alternate mitigation elevation would not result in impacts on the value of habitat to ESA-listed species or floodplain elevations up or downstream within the project reach and submit the study as part of the floodplain development permit application. The analysis should also identify the necessary volume of flood storage capacity in the proposed location to achieve the required compensatory volume based on the appropriate ratio and multiplier. In this case, mitigation must:

- Not result in adverse impacts to fish access, egress, and use of the site.

A qualified professional is a subject matter expert as defined by a community based on available expertise. Qualified professionals may include surveyors, biologists, hydrologists, engineers, arborists, or other specialties depending on the expertise needed.

- Not negatively affect other aquatic features such as wetlands, rivers, or streams.
- Not adversely affect the RBZ vegetated with trees or shrubs.
- Be hydrologically connected to the source floodplain waterbody.

For example, if mitigation were to reduce flood elevations in a nearby wetland, then there would be an adverse impact on the habitat value of the wetland during a flood even though the wetland may not be directly affected by the proposed development or mitigation.

All mitigation would need to be accomplished within the period of construction for the project and would need to be completed before the floodplain development permit could be closed or a certificate of occupancy issued.

3.2. Water Quality – Pervious Surface

3.2.1. AVOIDANCE

Avoidance of impacts on water quality would be achieved by not reducing the amount of pervious surface in the SFHA. An example measure to avoid reducing pervious surface would be to use pervious material instead of an impervious material for surfaces such as a patio or parking area. Another example avoidance measure would be to expand structures vertically (i.e., increase in height) instead of horizontally and not increase the surface area of the roof thereby avoiding an increase in the surface area that is impervious. As noted above, this example is also an avoidance measure for impacts on flood storage capacity.

3.2.2. MINIMIZATION

Minimizing impacts on water quality would be achieved by reducing the amount of new impervious surface. An example minimization measure would be to include planted areas that allow for stormwater infiltration within parking lots to reduce the amount of impervious surface area. Another example minimization measure would be to use pervious surfaces where possible even if not all surfaces can be pervious **Figure 3-1** and **Figure 3-2**.

Source: U.S. Geological Survey 2019

Figure 3-1. Permeable Pavers, Concrete, and Asphalt

Source: City of Portland

Figure 3-2. Pervious Turf Block

3.2.3. MITIGATION

Any reduction in pervious surface will require mitigation to achieve no net loss of water quality. Impacts on pervious surface are calculated by area of new impervious surface (i.e., square feet) and must be mitigated at the ratios in Table 3.2.

Table 3.2. Mitigation Required for Lost Pervious Surface

Location of Impact	Pervious Surface Proportion of Mitigation to Impact (Mitigation: Impact)
Impact Occurring in the Mapped Floodway[1]	1:1
Impact Occurring in the RBZ[2]	1:1
Impact Occurring Outside the Floodway and RBZ, in remainder of SFHA	1:1
Mitigation Location Multipliers[3]	
Mitigation occurring on-site or off-site within the same reach[4]	100%
Mitigation occurring off-site, within a different reach, but within the same watershed (i.e., 10-digit HUC)[5]	200%

Conditions:

1 When the floodway is not mapped, the mitigation ratios for the RBZ and remainder of the SFHA would be used.

2 Impacts that occur in the RBZ must be mitigated in the RBZ.

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

a For example, if a development would create 1,000 square feet of new impervious surface, then 1,000 square feet of new pervious surface would need to be created (mitigation ratio of 1:1). However, if only 500 square feet can be created on-site and in the same reach, the remaining 500 square feet created off-site along a different reach would need to be created at double the required amount as a result of the 200 percent multiplier. That is, another 1,000 square feet of pervious surface would need to be created at the off-site location, in addition to the 500 square feet created on-site.

4 Reach is defined as a section of a stream or river along which similar hydrologic conditions exist, such as discharge, depth, area, and slope. It can also be the length of a stream or river (with varying hydrologic conditions) between major tributaries or two stream gages, or a length of river for which the characteristics are well described by readings at a single stream gage.

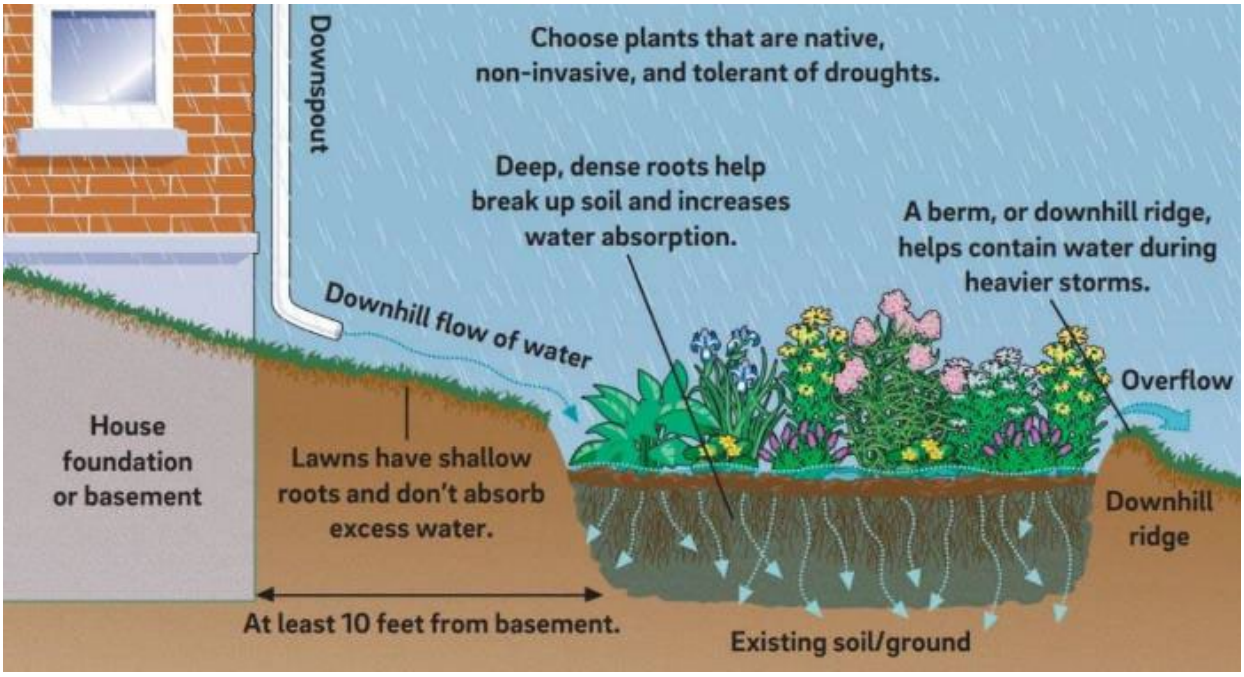
5 Watersheds are determined by the U.S. Geological Survey using the 10-digit HUC area.

Mitigation will occur by:

- Removing an area of existing impervious surface, or
- Infiltrating generated stormwater using low impact development (LID) or green infrastructure practices, or,
- Where the above methods are not possible, providing stormwater retention or detention and treatment sufficient to ensure the peak volume or flow does not increase, and pollutant loading is minimized.

LID or green infrastructure practices (e.g., rain garden, bioswale, green roof) infiltrate stormwater runoff from new impervious surface into the ground where it is treated by the soil and replenishes natural systems (**Figure 3-3**). The design of LID or green infrastructure features must accommodate the stormwater runoff associated with the square footage of new impervious surface as determined by a qualified professional or be consistent with LID guidance. For example, the EPA's Green Streets

Handbook provides information on the appropriate application of various LID and green infrastructure methods (EPA 2021).



Source: Philadelphia Water Department nd

Figure 3-3. Rain Garden

LID and green infrastructure practices should avoid impacts on flood storage capacity (i.e., avoid a net increase in material placed in the SFHA at or below the BFE and be accessible to fish without resulting in fish stranding). If LID and green infrastructure does not avoid impacts on flood storage, the volume of flood storage capacity lost will also require mitigation.

When stormwater infiltration through LID or green infrastructure is not possible because of poor soil composition (e.g., poorly draining or contaminated soils) or a high groundwater table, then stormwater retention or detention will be required. Stormwater retention and detention facilities must:

- Limit the discharge of water to match the existing peak discharge rate (i.e., the discharge rate of the site based on its groundcover and grade before any development occurs) for the 10-year peak flow using a continuous simulation for flows between 50 percent of the 2-year event and the 10-year flow event (annual series).

- Treat stormwater to remove sediment and pollutants from impervious surfaces such that at least 80 percent of the suspended solids are removed from the stormwater prior to discharging to the receiving water body.

Stormwater retention or detention and treatment would require modeling of the expected stormwater runoff from the proposed new impervious surface so that they can be sized

appropriately, and designs should be confirmed by a hydraulic engineer. Treatment methods proposed should be appropriate to the type of pollution potentially generated from the new impervious surface. The Oregon Department of Environmental Quality's Guide 3: Stormwater Management Standards provides standards for stormwater retention and detention (Oregon Department of Environmental Quality n.d.).

All mitigation would need to be accomplished within the period of construction for the project and would need to be completed before the floodplain development permit could be closed or a certificate of occupancy issued.

Compliance would be determined by the community following a site inspection (if applicable) and confirmation that all documentation that is required under current floodplain management processes is submitted to the floodplain administrator. This would include verification that the required area of impervious surface has been removed, the LID or green infrastructure has been constructed as designed, or the stormwater detention and treatment has been constructed as designed. Mitigation using LID, green infrastructure, or stormwater detention and treatment must all include measures to provide for proper operation and maintenance of the measures.

Allowing LID, green infrastructure, and stormwater retention and detention provides flexibility in achieving no net loss as technology improves. Communities can propose using existing stormwater requirements (e.g., Municipal Separate Storm Sewer System, National Pollutant Discharge Elimination System) to implement no net loss standards under Path C (Section 4.4).

3.3. Vegetation – Trees 6 Inches DBH or Larger

3.3.1. AVOIDANCE

Avoidance of vegetation impacts would be achieved by not removing trees 6 inches dbh or larger. Development activities could be designed and constructed in a manner where trees are not removed. An example avoidance measure is to site the proposed development on the lot so that trees 6 inches dbh or larger do not need to be removed.

3.3.2. MINIMIZATION

Minimizing impacts on vegetation would be achieved by reducing the number of trees 6 inches dbh or larger that are removed. An example minimization measure would be to site a house on the lot to remove the fewest trees 6 inches dbh or larger as possible. Another example would be to design a structure to be built into a slope instead of regrading the site to minimize the number of trees 6 inches dbh or larger that would need to be removed.

3.3.3. MITIGATION

Any trees 6 inches dbh or larger that are removed will need to be replaced at the ratios shown in **Table 3.3**.

Table 3.3. Mitigation Required for Trees 6-inches Diameter at Breast Height or Larger Removed

Location of Impact	Trees[3] Proportion of Mitigation to Impact (Mitigation: Impact)		
	(6-inches dbh to 20-inches dbh)	(Greater than 20-inches dbh to 39-inches dbh)	(Greater than 39-inches dbh)
Impact Occurring in the Mapped Floodway[1]	3:1	5:1	6:1
Impact Occurring in the RBZ[2]	3:1	5:1	6:1
Impact Occurring Outside the Floodway and RBZ, in remainder of SFHA	2:1	4:1	5:1
Mitigation Location Multipliers[4]			
Mitigation occurring on-site or off-site within the same reach[5]	100%	100%	100%
Mitigation occurring off-site, within a different reach, but within the same watershed (i.e., 10-digit HUC)[6]	200%	200%	200%

Notes:

1 When the floodway is not mapped, the mitigation ratios for the RBZ and remainder of the SFHA will be used.

2 Impacts that occur in the RBZ must be mitigated in the RBZ.

3 Trees planted for mitigation do not have a specified dbh; however, they must be native species.

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

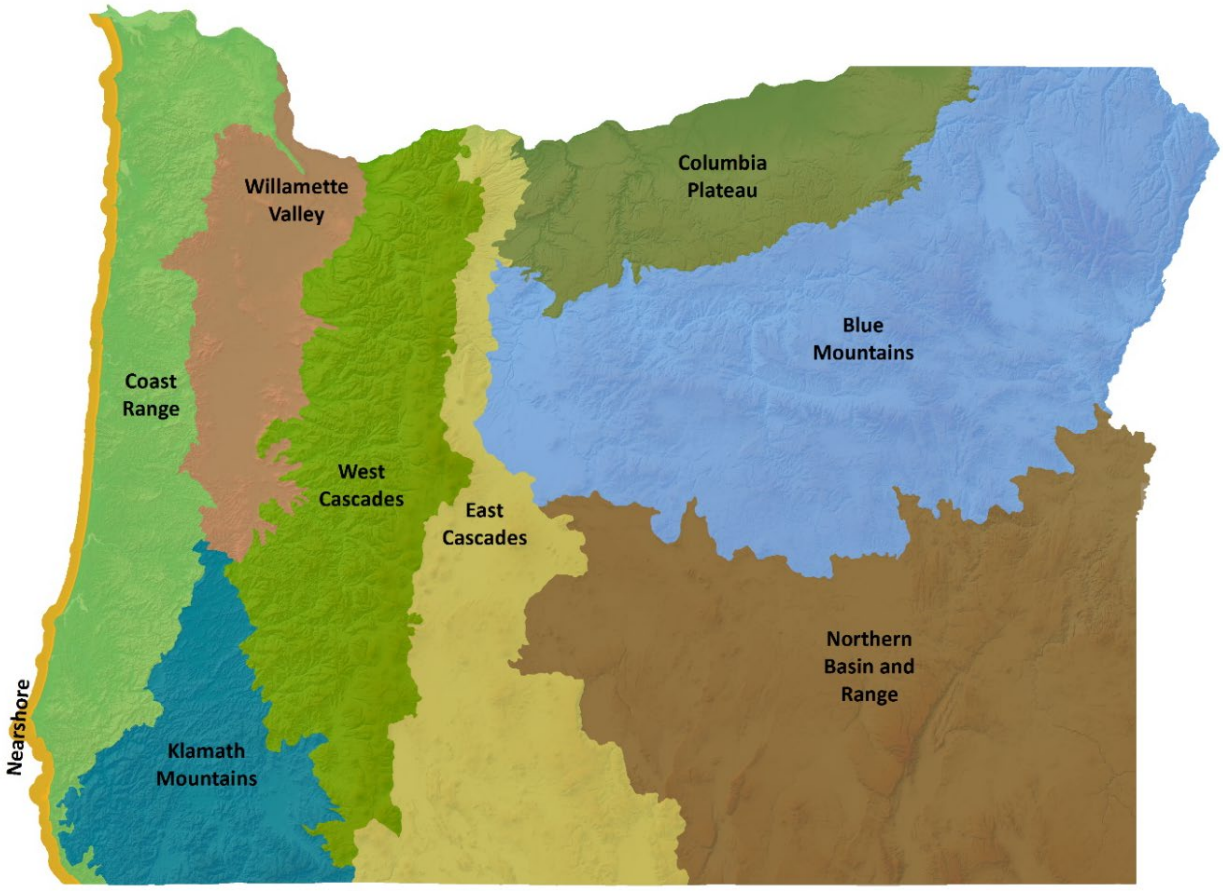
a For example, if a development would remove 12 trees greater than 6-inches dbh in the RBZ (assuming all are also less than 20-inches dbh), then 36 new trees would need to be planted (mitigation ratio of 3:1). However, if only 20 new trees can be planted within the same reach, the remaining 16 that would need to be planted along a different reach would need to be planted at double the required number as a result of the 200 percent multiplier. That is, another 32 trees would need to be planted at the off-site location, in addition to the 20 planted on-site.

5 Reach is defined as a section of a stream or river along which similar hydrologic conditions exist, such as discharge, depth, area, and slope. It can also be the length of a stream or river (with varying hydrologic conditions) between major tributaries or two stream gages, or a length of river for which the characteristics are well described by readings at a single stream gage.

6 Watersheds are determined by the U.S. Geological Survey using the 10-digit HUC area.

A greater than 1:1 mitigation ratio is necessary to account for underestimating impacts and poor performance in executing mitigation. This reasoning was the main argument for the ratios recommended in the NMFS BiOp and is further backed by a study conducted by the National Research Council, which found of nine wetland mitigation efforts, the average percentage of compliance was 69 percent (NRC 2001).

Replacement trees must be native species that would occur naturally in the Level III ecoregion of the impact area. There are eight Level III ecoregions within the Oregon plan area (**Figure 3-4**) (Thorson et al. 2003). EPA maps of Level III ecoregions are available at https://gaftp.epa.gov/EPADataCommons/ORD/Ecoregions/or/or_eco_lg.pdf. The potential natural vegetation present in each ecoregion is described on the back of the EPA ecoregion poster at https://gaftp.epa.gov/EPADataCommons/ORD/Ecoregions/or/or_back.pdf. In addition, the Oregon Department of Fish and Wildlife provides information on the Level III Ecoregions at https://www.oregonconservationstrategy.org/ecoregions/.



Source: Oregon Department of Fish and Wildlife n.d.

Figure 3-4. Oregon Level III Ecoregions

Where possible, mitigation trees should be replanted beginning close to the ordinary high-water mark or mean higher-high water line and should be planted in higher densities closer to the stream channel or shore.

The mitigation would need to be accomplished within the period of construction of the project and would need to be completed before the floodplain development permit could be closed or a certificate of occupancy issued.

3.4. Mitigation Banks

Mitigation banks are commonly used for wetland and stream mitigation and are formally developed through consultation with applicable resource agencies, such as USACE, EPA, and the Oregon Department of State Lands. Mitigation banks are typically developed by a third party before impacts occur. They are designed, approved for construction, built, and inspected and approved for the sale of credits. The type and number of credits available for sale is determined by the regulating agencies and is based on the actual wetland or stream types and functions that are established following construction of the bank. Mitigation banks have a "service area" or an area within which credits may be applied against future impacts. Mitigation banks must be permanently protected through conservation easements, restrictive covenants, or ownership by conservation entities or agencies.

When establishing and using banking systems for mitigation, the mitigation must have occurred prior to the impact. That is, the creation of the functions must occur first. Only after the bank has been constructed and has grown sufficiently to be providing wetland or stream functions can the bank be used to mitigate impacts by a developer. This ensures there is no temporal lag between an impact and associated mitigation.

Wetland mitigation banks are not currently approved to sell credits as mitigation for the loss of the three floodplain functions. However, there may be unidentified floodplain function values within a wetland mitigation bank that are not integral to the wetland functions provided that could be utilized as mitigation to achieve no net loss of the three floodplain functions. FEMA has not yet consulted with regulatory agencies to define the criteria necessary to determine whether floodplain credits might be available. Therefore, wetland mitigation banks are not currently able to sell credit as mitigation for floodplain functions but may be an option in the future should FEMA and the wetland mitigation bank authorizing agencies identify usable floodplain function credits.

Floodplain specific mitigation banks do not currently exist; however, they could be developed by a community or cluster of communities in coordination with the State of Oregon (through any of its agencies) and FEMA. To establish floodplain mitigation banks, the communities and State of Oregon would need to identify the party responsible for design, construction, and maintenance of the bank, and an appropriate oversight agency. A floodplain mitigation bank must make measurable improvements to floodplain functions that can be documented before a bank could be approved for the sale of credits. A verifiable method of determining the number and type of credits available and a pricing structure would need to be established prior to any sales. The service area of a floodplain mitigation bank must be within the same 10-digit HUC

Local floodplain impact offset actions may encompass a wide variety of activities, of which mitigation banks may be one. However, not all local offset actions would require consultation with resource agencies to implement. A formal mitigation bank may be managed by a third party with appropriate approvals and financial assurances. If a formal mitigation bank were established, available credit for the floodplain functions of flood storage, water quality, and vegetation could be used under Path A, Path B, or Path C to achieve no net loss. However, local offset actions are only able to be used under Path C.

watershed in which impacts occur and benefit the same species identified in the NMFS BiOp as the project wishing to purchase credits.

The process to establish a formal floodplain mitigation bank would take a number of years to develop because of the coordination required to establish the responsible parties and oversight agency and criteria and pricing structure for creation of floodplain credits. Once a process is established, it will take time before credits could be available from a bank because of the time needed to design, construct, inspect, and quantify the number and type of credits available from a specific bank. Some types of credits may also take time to develop within a bank; for example, credits for tree removal might not be available for sale until trees planted in the bank have achieved a certain size.

Although the formal floodplain mitigation bank concept may not result in available credits for a number of years, communities are able to implement local floodplain impact offset actions under Path C. Local offset actions would not require a community to establish a formal floodplain mitigation bank. Rather, they are actions implemented by a community that mitigate for the impacts of future development in the community. This could include accounting for habitat restoration projects or acquisition and demolition projects implemented by a community, or planting trees as part of a green streets program. Section 4.4 provides example actions a community can take to offset development impacts under Path C. Appendix D provides additional information on local offset actions, including stipulations that must be met in order to utilize them to implement no net loss.

Chapter 4. Implementing the No Net Loss Standards in Your Community

4.1. Introduction

FEMA, DLCD and other stakeholders have identified four paths for communities to choose from to implement the no net loss standards. The four paths recognize the diverse needs, capacities, policy contexts, and geographic constraints faced by NFIP participating communities within the Oregon plan area and provide flexibility toward implementation. Each community would select one or more path that works best for them.

Paths for Oregon NFIP Communities to Implement the No Net Loss Standards

Path A. Adopt a **model ordinance** that contains the required elements.

Path B. Complete and submit to FEMA an **ordinance checklist** to demonstrate that new regulations, existing local regulations, or both address the required elements.

Path C. Complete and implement an approved **customized community plan**, developed by the local community and approved by FEMA prior to implementation as meeting the no net loss standards at the community level.

Path D. Complete and implement a **community-level Habitat Conservation Plan** that is approved by NMFS as being in compliance with Section 10 of the ESA.

An NFIP community can implement one or more path at multiple scales so long as the entire SFHA in the community is covered at all points in time. While many communities would likely initially choose to implement a single path over the entirety of their jurisdiction, it is possible, and in some cases may be preferable, for communities to implement different approaches within different parts of a jurisdiction or to implement different paths at different times. For example:

- The model ordinance (Path A) could be used for properties adjacent to waterways, while alternative compliance methods (Path C) could be used for the remainder of a community.
- The model ordinance (Path A) could be used for certain land uses (e.g., private development), while a customized community plan (Path C) could be used for civic land uses (e.g., government buildings, roadways, schools).
- Customized community plan (Path C) could be used in the RBZ while model ordinance (Path A) could be used outside of the RBZ.

- Portions of a community could be managed under an ESA Section 10 Habitat Conservation Plan (Path D), such as state forests, as long as the proposed development activity is covered by the plan, while the remainder of the community could be subject to existing ordinances that ensure compliance (Path B).

If a community chooses multiple paths, documentation of each path and the portion of the community each path covers shall be provided to FEMA. In addition, a community can change paths over time—for example, using the ordinance checklist (Path B) to demonstrate compliance with the minimum standards in the near term while developing a customized community plan (Path C) to provide more flexibility for the long term. To change paths, a community shall provide the needed documentation to FEMA (i.e., adopted model ordinance, ordinance checklist, customized community plan, HCP).

Communities are also encouraged to consider an interjurisdictional approach to balancing development impacts and restoration priorities at the watershed scale if multiple communities are within or partially within the same watershed. Watersheds are determined by the U.S. Geological Survey using the 10-digit HUC area. HUC provides a standardized way to delineate water resources.

The sections that follow offer additional information on each path. The draft Model Ordinance (Path A), Ordinance Checklist (Path B), and Customized Community Plan guidance (Path C) are provided in the Appendices.

4.2. Path A – Model Ordinance

Under Path A, a community would adopt FEMA's model ordinance without material changes. Because the model ordinance is based on the existing Oregon Flood Hazard Model Ordinance, a community may only need to update their existing floodplain ordinance with the language related to the no net loss standards. The community would provide a copy of the signed and effective ordinance to FEMA after adoption.

4.3. Path B – Model Ordinance Checklist

Under Path B, a community would use FEMA's model ordinance checklist to provide documentation that all the required elements in the model ordinance are found in existing or newly adopted local ordinances or in other local, regional, or statewide enforceable requirements. The model ordinance checklist must be submitted to FEMA for review and approval before a community is cleared to use Path B.

4.4. Path C – Customized Community Plan

Under Path C, communities would have flexibility to determine their own approach to achieving no net loss. Communities choosing this path would prepare a plan identifying and substantiating the reasoning for the proposed approach; methods for achieving no net loss, including any additional voluntary requirements or deviations from the mitigation ratios or RBZ; and strategies for implementation (e.g., permit review processes, data collection and reporting procedures, and

compliance enforcement). A customized community plan may use a number of different techniques depending on the volume of floodplain development permits, location in the community, existing conditions, species, or types of development anticipated.

Communities are encouraged to seek input and technical assistance from FEMA before and during development of the plan. Once complete, the plan must be submitted to FEMA for formal review and approval before the community begins enforcement.

Regardless of the specifics or the complexity of the community's approach identified in Path C, the community will be responsible for the enforcement and compliance in meeting the goal of achieving no net loss.

Examples of Path C

FEMA does not have a definitive menu of options that communities can select for their plans because this path offers unrestricted flexibility. Appendix D provides guidance on developing a customized community plan. The following bullets provide several examples of options that may be most commonly applied.

- Basic Approach: A community may submit a simple plan in which it adopts the default mitigation ratios and standard RBZ, explains how the community will require each floodplain development permit application to comply with the no net loss standards, and describes methods of enforcement and reporting. This basic approach is different from Path A because it does not include adoption of the model ordinance, and different from Path B because it does not involve submission of a checklist demonstrating how the no net loss standards are already in local codes and regulations.

- Physical Conditions: A community may submit a plan identifying existing physical conditions that currently severely restrict one or more of the three floodplain functions. For example:

    - A community may have some land above a natural waterfall that serves as a permanent fish barrier and there would be no need to implement no net loss of flood storage. Therefore, only water quality and vegetation (pervious surface and trees) would require no net loss to address indirect impacts on water quality and temperature below the natural waterfall.

    - A community may have isolated SFHA pockets that have no hydrological connectivity to waterbodies; therefore, impacts on the three floodplain functions from development in those isolated pockets would not have any potential impacts on ESA-listed species. In these cases, a community could use Path C to demonstrate and document the existing physical conditions and explain why development in these places would have no effect on the three floodplain functions' relationship to ESA-listed species habitat, and would thus not require no net loss.

- Revised Riparian Buffer Zone: A community may submit a plan to revise FEMA's standard 170-foot RBZ to no less than 50 feet or to more than 170 feet based on existing conditions.

  - A community in an ecoregion where the native tree heights are different from 170 feet may propose an RBZ width based on the actual tree species that naturally occur in the region.

  - A community may perform an assessment of the existing conditions and functions of the riparian zone. Using this approach, RBZs can be adjusted to reflect the area that provides riparian functions within a community.

- Revised Mitigation Ratios and Multipliers: A community may submit a plan that analyzes the quality of existing habitat in the SFHA, the presence of specific ESA-listed species within the community, and propose:

  - Scientifically backed mitigation ratios or multipliers that achieve or exceed no net loss.

  - Variable mitigation ratios across the community based on the quality of habitat, existing performance of floodplain functions or benefits of carbon sequestration, proximity to waterways, land use, or other factors.

  - Alternative measurable standards that address no net loss for the three floodplain functions.

  - Alternative but equivalent, or additional, floodplain functions with measurable standards to propose for no net loss.

- Local Floodplain Impact Offset Actions: A community may submit a plan committing to mitigate all future SFHA development impacts on the floodplain functions through investment in open space, restoration, or programs that increase flood storage capacity, remove impervious surfaces or manage and treat stormwater, and plant native vegetation. Such investments could serve as advance mitigation for future floodplain development impacts within the community. If a community is proposing local floodplain impact offset actions, the mitigation must occur prior to or concurrent with the impacts from development.

  - A community may initiate habitat restoration projects that could mitigate future development impacts. When habitat restoration projects, or projects with a primary purpose other than floodplain protection, but which may also provide habitat functions, receive state or federal funding or permits, the community must coordinate with the funding agency and confirm that the project is able to be used to offset development impacts. Such projects must be secured in perpetuity with a conservation easement, deed restriction that runs with the land, or both. A community would need to have a tracking system to show that the advance mitigation values offset development impacts and achieve no net loss.

    – Restoration projects completed prior to FEMA's implementation of the no net loss standards cannot be used as offset actions for future development impacts. The intent of the requirements is forward-looking to ensure no net loss from development that occurs in the future. Past restoration projects contribute to offsetting past adverse effects on aquatic habitat.

- A community may choose to acquire and demolish structures or remove development from property adjacent to waterways and designate it as open space. A community could then track the flood storage capacity and pervious surface mitigation associated with those acquisitions and associated demolition and use it as a basis to offset impacts of future permitted development elsewhere in the community at the appropriate mitigation ratios.

- A community may implement a green streets or Tree City USA program in the SFHA that includes planting trees and installing streetside stormwater retention facilities to address impacts on water quality and vegetation, see **Figure 4-1.** Such facilities must not result in fish stranding or there would be an impact on food storage.

Source: EPA 2023

Figure 4-1. Streetside Stormwater Retention Facilities

- Incorporate Existing Regulations: Existing federal, state, and local regulations applied to development applications can be used under Path C to achieve no net loss (e.g., Municipal Separate Storm Sewer System, National Pollutant Discharge Elimination System). Depending on the type of development, the location of the proposed development within the Oregon plan area, or existing conditions on-site, existing regulations may apply and require mitigation actions that could support no net loss. Existing regulations that are more stringent than the no net loss standards can also be used under Path C.

Path C Stipulations More Stringent Than No Net Loss

Communities may propose more stringent requirements than no net loss under Path C. Similarly, communities can incorporate existing federal, state, and local regulations that may be more stringent than no net loss. More stringent requirements under Path C may be revised at any time, so long as the revisions meet the minimum standards of no net loss, and the Path C plan is revised and resubmitted to FEMA for approval. If regulatory changes occur and no longer achieve no net loss, the community's Path C plan must be revised and propose alternative methods to achieve no net loss.

- Regional Approach: A Path C plan could be developed jointly by multiple local jurisdictions, or even a state-wide effort. This could allow for a more watershed-scale or integrated regional approach to guiding development, restoration, and mitigation actions in the SFHA. Similarly, a state-level effort could result in a combination of regulations implemented by state agencies that achieve no net loss.

4.5. Path D – Habitat Conservation Plan or Section 4(d) Limits

4.5.1. HABITAT CONSERVATION PLAN OVERVIEW

A Habitat Conservation Plan (HCP) is a long-term planning document developed in coordination with federal agencies under ESA. An HCP identifies a set of development activities in a specified geography as well as best management practices (BMPs) or other conservation measures that would be implemented to protect and enhance habitat for ESA-listed species.

Approving an HCP is a federal action by NMFS, USFWS, or both and thus the HCP requires evaluation under NEPA. It is expected that the agency, community, or developer submitting a draft HCP would be required to support the NEPA analysis either by performing the analysis, paying for the analysis, or both. The HCP approach is resource intensive and lengthy. During the time in which an HCP is being developed and approved, communities would need to implement another path ensure no net loss.

An approved HCP is accompanied by an Incidental Take Permit, which allows for the occasional take of ESA-listed species that may occur during implementation of the development activities specified in the plan. The associated incidental take permit may require additional conservation measures or mitigation beyond those outlined in the plan. Once an HCP is approved and an Incidental Take Permit is issued, the activities specified in the HCP are in compliance with ESA, so long as the specified BMPs are applied, the mitigation measures are implemented, and the limits of the Incidental Take Permit are not exceeded.

One example of an HCP in Oregon is the Western Oregon State Forests HCP developed by the Oregon Department of Forestry (ODF) (ODF 2022). The plan identifies a conservation strategy to avoid take of ESA-listed species associated with ODF activities (e.g., timber harvest, stand management, habitat restoration, and construction and maintenance of roads and recreation facilities). The associated

conservation strategy includes measures such as prohibiting forest management in riparian conservation areas and identifying operational and design standards for roads, equipment use, and the timing of activities to minimize effects on species and streams.

Clackamas County developed an HCP for the John Franklin Eddy Forestlands (Clackamas County 2023). Covered activities in the HCP include timber harvest, silviculture, and road management. Conservation measures include placing large woody debris into small and medium fish-bearing streams to enhance aquatic habitat, using riparian buffers that are greater than state requirements, and locating roads away from streams.

In California, the City of Santa Cruz developed an Anadromous Salmonid HCP that identifies a conservation strategy to avoid take of ESA-listed species associated with activities such as rehabilitation of diversion structures and pipeline reaches, stormwater maintenance, and general vegetation management within riparian corridors (City of Santa Cruz 2023). The conservation strategy includes measures such as providing minimum bypass flows for spawning, conducting maintenance during the low flow season, and refueling vehicles a minimum of 50 feet outside of a waterway (City of Santa Cruz 2023).

Other examples of HCPs include the Western Placer County Habitat Conservation Plan and Natural Community Conservation Plan and the Benton County Prairie Species HCP (Placer County 2020, Benton County 2010). NMFS and U.S. Fish and Wildlife Service developed the Habitat Conservation Planning and Incidental Take Permit Processing Handbook[8] to provide guidance in developing a plan and obtaining the associated Incidental Take Permit (2016).

4.5.2. SECTION 4(d) LIMITS OVERVIEW

Section 4(d) limits are authorized by NMFS or USFWS under the ESA. Section 4(d) limits are applied to specific threatened species and do not cover endangered species. Agencies, communities, and developers can seek coverage under Section 4(d) limits by obtaining a Section 4(d) limit authorization. A Section 4(d) limit authorization identifies specific activities and associated BMPs that can be implemented without violating Section 9 of ESA for the threatened species included in the authorization. Because Section 4(d) limits apply only to specific threatened species and not endangered species, Section 9 violations may still occur for endangered species if they are present or for other threatened species not covered in the authorization. Therefore, a development activity would be only partially covered by a Section 4(d) limit authorization if both threatened and endangered species are present or if threatened species not covered by the 4(d) limit are present. If there are non-covered threatened species or endangered species that may be affected by the development, then additional consultation and coverage would need to be obtained for the development or no net loss of the three floodplain functions would be necessary. For example, the Oregon Department of Transportation (ODOT) has worked with NMFS to authorize a Section 4(d) limit for activities associated with ODOT's Routine Road Maintenance Program. The *Routine Road Maintenance Water Quality and Habitat Guide* established BMPs to ensure that activities under the

[8] https://www.fws.gov/media/habitat-conservation-planning-and-incidental-take-permit-processing-handbook

Routine Road Maintenance Program are within the NMFS Section 4(d) limit, in compliance with ESA, and thus exempt from Section 9 violations for threatened salmon and steelhead specifically. As such, activities covered under ODOT's Section 4(d) limit that occur in locations where only the species covered by the Section 4(d) limit are present would not be subject to the no net loss standards. ODOT's Section 4(d) limit authorization does not apply to development activities utilizing federal funding or requiring federal permits (floodplain permits are local permits), or activities not otherwise specified under the Routine Road Maintenance Program.

ODOT's Section 4(d) limit authorization can be adopted by local jurisdictions and used as coverage for the species specified in the *Routine Road Maintenance Water Quality and Habitat Guide,* so long as all conditions in the guide are met or exceeded. NMFS has agreed that if the conditions of the guide are met or exceeded, the Section 4(d) limit authorization for routine road maintenance could be applied to other jurisdictions such as ports, other state transportation agencies, and cities and counties. The final rule by NMFS from July 10, 2000,[9] describes the procedure for determination of inclusion within the limitation on the take prohibition.

4.5.3. PATH D USE OF HABITAT CONSERVATION PLANS AND SECTION 4(D) LIMITS

Path D allows communities to pursue compliance with ESA requirements at the community level by working directly with NMFS to develop an approved HCP or obtain a Section 4(d) limit authorization. Existing approved HCPs and Section 4(d) limit authorizations can also be used under Path D. Under this path, a community would not need to require no net loss for the development activities covered by the HCP using the HCP requirements applicable at the time.[10] Because Section 4(d) limit authorizations only cover specific threatened species, no net loss would still be required for development activities occurring in areas where endangered species are present, threatened species not covered by the authorization are present, or both. However, no net loss would not be required for activities covered under a Section 4(d) limit authorization that occur in areas where only the threatened species covered by the authorization are present.

Approved HCPs and Section 4(d) limit authorizations would be submitted to FEMA to document compliance with ESA for the activities specified in the HCP or Section 4(d) limit authorization. Activities not covered by the HCP or Section 4(d) limit authorization must be covered by another path (Path A, Path B, or Path C).

During NEPA scoping, FEMA received comments expressing concern about the feasibility of including HCPs and Section 4(d) limit authorizations as a path for NFIP-ESA integration. HCPs can require extensive work to develop. Additionally, Section 4(d) limit authorizations do not cover all ESA-listed species. FEMA also received comments during NEPA scoping expressing concerns about overlapping ESA requirements by requiring implementation of no net loss for activities previously approved through direct coordination with NMFS, such as HCPs or Section 4(d) limit authorizations. Developing

[9] https://www.federalregister.gov/d/00-16933/p-506
[10] The current requirements are identified in the Habitat Conservation Planning and Incidental Take Permit Processing Handbook (2016) available at https://www.fws.gov/library/collections/habitat-conservation-planning-handbook.

an HCP or obtaining a Section 4(d) limit authorization for all development activities or for all communities in the Oregon plan area may not be reasonable. However, Path D would allow the use of existing HCPs and Section 4(d) limit authorizations as a viable path to compliance with ESA requirements for covered developments, as well as the use of future approved HCPs. This allows for activities identified in HCPs and Section 4(d) limit authorizations that have been approved by NMFS to occur without adhering to the no net loss standards and to avoid duplication of ESA requirements.

DIFFERENCES IN COMMUNITY IMPLEMENTATION PATHS AMONG NEPA ALTERNATIVES

No Net Loss with Exception for Project-Specific ESA Compliance Alternative (Alternative 2)
Under this alternative, communities would ensure compliance with the no net loss standards through the use of the four paths described above. Projects that obtain ESA compliance through some other federal nexus (e.g., a Section 404 permit through USACE), would not be required to also apply no net loss standards through the floodplain management permit.

No Net Loss Without Exceptions for Project-Specific ESA Compliance (Alternative 3)
Under this alternative, communities would ensure compliance with the no net loss standards through the use of the four paths described above. Even projects that have ESA coverage through another federal nexus would also need to implement the no net loss standards.

Chapter 5. Reporting

Communities will be required to submit an annual report to FEMA that describes all floodplain development permits issued during the reporting period that involved work outside of a pre-existing footprint, and thus required no net loss. FEMA is developing further guidance on the methods for reporting and the data that will need to be reported. FEMA anticipates requesting the following information for each permit issued:

- Location of the development, including whether it occurred in the floodway, RBZ, or the remainder of the SFHA.
- Quantified impacts of the development (i.e., volume of flood storage capacity lost, area of pervious surface lost, number of trees 6-inches dbh or larger removed).
- Location of the development impact (i.e., in the floodway, RBZ, or in the remainder of the SFHA).
- Timing, method, quantity, and location of mitigation for impacts:
- Did mitigation occur prior to, concurrent with, or after development impacts? If occurring after development, when was mitigation completed? If mitigation for each floodplain function occurred at separate times, provide the timing of mitigation for each function.
- Methods of mitigation for each floodplain function.
- Methods should be explicit, such as mitigation through community-led impact offset actions (Section 4.4), developer-led removal of fill and structures at a hydraulically equivalent elevation, replanting of trees within the RBZ.
- Quantity of mitigation that occurred for each floodplain function (i.e., volume of fill and structures removed to create compensatory flood storage, area of impervious surface removed, number of trees planted).
- Did mitigation occur within the floodway, RBZ, or remainder of the SFHA? Did mitigation occur on-site or off-site. If off-site, did the mitigation occur along the same reach or in a different reach?

Chapter 6. Implementation Schedule

The requirement to implement the no net loss standards will be initiated by FEMA providing communities with a formal letter, expressly stating that implementation and annual reporting requirements are going into effect.

After the formal letter is provided, FEMA and DLCD will provide technical assistance to communities for a 7-to-8-month period. During this period, FEMA will review each communities' documentation provided that describes their chosen path for implementation (i.e., Path A, Path B, Path C, Path D, or a combination). Technical assistance will be prioritized in communities with a greater percentage of their land located in the SFHA, larger numbers of development permits, or other factors.

Within 8 months of receiving FEMA's initial letter, communities must have submitted documentation of their chosen path for implementation for FEMA review and approval. FEMA will strive to:

- Review Path A and Path B submissions within 30 days of receipt.
- Review Path C submissions within 30 days of receipt, but may require up to 6 months for approval depending on the complexity of the plan.

Following FEMA approval of a community's documented path(s), the community would then initiate local processes to adopt and implement the path, such as adoption of the model ordinance or adopting a Path C customized community plan. Communities choosing Path D must implement another path while waiting for approval from NMFS.

Within 18 months after FEMA's initial letter, all NFIP participating communities must have their entire SFHA covered by at least one path and developments must start implementing no net loss. Communities may change paths for all or a portion of the community at any point in time, as long as the entire SFHA is covered by at least one path.

6.1. Communities Joining the National Flood Insurance Program

Communities must apply to participate in the NFIP. The application package must include the application, a resolution of intent to participate and cooperate with FEMA, and evidence of the adoption of floodplain management regulations that meet the minimum standards of the NFIP, including implementation of the no net loss standards. When communities apply to participate in the NFIP, they must provide documentation of the path that will be used to implement the no net loss standards.

6.2. Updates to Flood Insurance Rate Maps

FEMA maintains and updates flood hazard data through Flood Insurance Studies (FIS) and resultant FIRMs and FIS reports. The regulations establishing FEMA's process for identification and mapping of flood hazards are provided in 44 CFR Parts 64, 65, 67, 70, and 72. To assess flood hazards in a

community, FEMA conducts FISs and publishes FIS reports that describe the flood hazards for the community. Changes to flood hazard areas and flood elevations are subject to due process requirements as set forth in 42 USC 4104 and 44 CFR Part 67. FEMA uses the information developed in the FIS to prepare the FIRM. FEMA also prepares a FIRM database, which is a geographic information systems (GIS) version of the FIRM and most of the quantitative data from the FIS.

FEMA publishes FISs and FIRMs for distribution to a wide range of users: private citizens, community officials, insurance agents and brokers, lending institutions, and other federal agencies. The flood hazard data presented on FIRMs is digitally displayed through the National Flood Hazard Layer. FISs and FIRMs can be accessed through FEMA's Flood Map Service Center.

Each time FEMA provides a community with a new, updated, or revised FIRM, that community must ensure their floodplain management regulations, including the no net loss standards, are compliant with the level of study provided on the maps and adopt the updated FIRMs. This may mean a community must amend their regulations to incorporate the new data and adopt the new FIRMs. The community has six months to incorporate the new data or the community will be suspended from the NFIP (44 CFR 59.24(a) and 60.13). Incorporating new data may include adjusting the area in a community subject to Path A, Path B, Path C, or Path D to ensure all areas of the SFHA are covered by at least one path. No net loss standards must be applied throughout the entire SFHA as shown on the new, updated, or revised FIRM.

Chapter 7. FEMA Technical Assistance and Funding

FEMA is committed to working with communities to determine the appropriate path for implementation and providing technical assistance. Technical assistance may include:

- Coordination with communities to state that the no net loss standards and reporting requirements are going into effect.
- Providing training on the no net loss standards.
- Providing technical guidance documents, including this 2024 Draft Implementation Plan and associated appendices.
- Working with communities to determine the most appropriate path(s) for implementation.
- Providing technical assistance on the development of Path C (customized community plan) proposals.
- When expressly invited by a community, providing training to property owners and developers on the no net loss standards.

Chapter 8. Definitions

Base Flood: The base flood means the flood that has a one percent chance of being equaled or exceeded in any given year.

Base flood elevation (BFE): The BFE is the computed elevation to which floodwater is anticipated to rise during the base flood. The base flood means the flood which has a 1 percent chance of being equaled or exceeded in any given year. That is, the BFE defines the anticipated elevation of floodwaters in the special flood hazard area. BFEs are shown on the Flood Insurance Rate Maps and on flood profiles in the Flood Insurance Study, by working with your local floodplain administrator, or both. If the BFE is not provided on FIRMs or FISs, a community would be expected to use the same provisions they use to determine a BFE as in 44 CFR 60.3(b).

Beneficial Gain: An area within the riparian buffer zone, within the same reach as the project, and that is equivalent to 5 percent of the area impacted within the riparian buffer zone that is not a functionally dependent use, would be planted with native riparian herbaceous, shrub, and tree vegetation.

Development: Any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations, or storage of equipment or materials.

Fill: Placement of any materials such as soil, gravel, crushed stone, or other materials that change the topographic elevation within the floodplain. The placement of fill is considered “development”.

Fish: A diverse group of animals with gills and fins that live in water, including all life stages.

Fish Access: The ability for fish to enter a location.

Fish Egress: The ability for fish to exist or leave a location

Flood Storage: The three-dimensional space (i.e., volume) between the existing ground and the base flood elevation in which floodwaters flow during the 1-percent annual chance flood (i.e., 100-year floodplain, SFHA). See definition of base flood elevation and SFHA.

Flood Storage Capacity: The flood storage volume that is unoccupied by any development including, but not limited to fill, structures, concrete structures (vaults or tanks), pilings, levees and dikes, or any other development that reduces flood storage and fish refugia.

Floodway: The portion of the floodplain that is effective in carrying flow, within which this carrying capacity must be preserved and where the flood hazard is generally highest, (i.e., where water depths and velocities are the greatest). It is the area which provides for the discharge of the base flood so the cumulative increase in water surface elevation is no more than one foot (44 CFR 9.4). In other words, the floodway is the channel of a river or other watercourse and the adjacent land areas

that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height. Also referred to as "Regulatory Floodway."

Functionally Dependent Use: A use which cannot perform its intended purpose unless it is located or carried out in proximity to water. The term includes bridges, docking facilities, port facilities that are necessary for the loading and unloading of cargo or passengers, and ship building and ship repair facilities, but does not include long-term storage or related manufacturing facilities.

Green Infrastructure: Use of natural or human-made hydrologic features to manage water, water quality, and provide environmental and community benefits. Green infrastructure uses approaches and technologies that use, enhance, or mimic the natural hydrologic cycle processes of infiltration, evapotranspiration, and reuse. At a large scale, it is an interconnected network of green space that conserves natural systems and provides assorted benefits to human populations. At a local scale, green infrastructure manages stormwater by infiltrating it into the ground where it is generated using vegetation or porous surfaces, or by capturing it for later reuse. Green infrastructure practices can be used to achieve no net loss of pervious surface by creating infiltration of stormwater in an amount equal to or greater than the infiltration lost by the placement of new impervious surface.

Hazard Trees: Standing dead, dying, diseased, or infested trees, or ones with a structural defect that makes them likely to fail in whole or in part and that present a potential hazard to a structure, pose a safety threat from the risk of falling on a road or building, or otherwise creates a risk of damage or injury.

Hydraulically Equivalent Elevation: A location (e.g., a site where no net loss standards are implemented) in which the difference between the ground surface elevation and the 100-year water surface elevation or base flood elevation is equivalent to another location (e.g., the impacted site). Hydraulically equivalent elevations can be determined by elevation data, observed ordinary-high water mark, ordinary-high water marks determined by a state or federal agency, or best available water surface profiles.

Hydrologically Connected: Connected in such a manner that precipitation will run off directly into a watercourse.

Impervious Surface: A surface that cannot be penetrated by water and thereby prevents infiltration.

Low Impact Development: An approach to land development (or redevelopment) that works with nature to manage stormwater at or near its source. It employs principles such as preserving and recreating natural landscape features and minimizing imperviousness to create functional site drainage. Low Impact Development refers to designing and implementing practices that can be employed at the site level to control stormwater and help replicate the predevelopment hydrology of the site. Low Impact Development helps achieve no net loss of pervious surface by infiltrating stormwater in an amount equal to or greater than the infiltration lost by the placement of new impervious surface. Low Impact Development is a subset of green infrastructure.

Wetland Mitigation Bank: A wetland, stream, or other aquatic resource area that has been restored, established, enhanced, or (in certain circumstances) preserved for the purpose of providing compensation for unavoidable impacts to aquatic resources permitted under Section 404 or a similar state or local wetland regulation. A wetland mitigation bank may be created when a government agency, corporation, nonprofit organization, or other entity undertakes these activities under a formal agreement with a regulatory agency.

Mean Higher-High Water: The 19-year average of the higher high-tide water height of each tidal day observed over the National Tidal Datum Epoch.

No Net Loss: A standard wherein adverse impacts must be avoided or offset through mitigation so that there is no net change in the function from the authorized existing condition. The authorized existing condition is the state of a site when a floodplain permit application is submitted and would assume the resolution of all violations (e.g., unpermitted development).

No Net Loss Standards: For the purposes of NFIP-ESA integration, no net loss standards is an umbrella term that includes mitigation ratios to offset impacts on the three floodplain functions of flood storage, water quality, and vegetation; riparian buffer zone requirements (buffer zone and planting requirements, see also Beneficial Gain definition), as well as reporting requirements.

Ordinary High Water Mark: The line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank; shelving; changes in the character of soil; destruction of terrestrial vegetation; the presence of litter and debris; or other appropriate means that consider the characteristics of the surrounding areas.

Reach: A section of a stream or river along which similar hydrologic conditions exist, such as discharge, depth, area, and slope. It can also be the length of a stream or river (with varying hydrologic conditions) between major tributaries or two stream gages, or a length of river for which the characteristics are well described by readings at a single stream gage.

Riparian Buffer Zone (RBZ): An area measured from the ordinary high water mark of a fresh waterbody (lake; pond; ephemeral, intermittent, or perennial stream) or mean higher-high water line of a marine shoreline or tidally influenced river reach to 170 feet horizontally on each side of the stream. The RBZ includes the area between these boundaries on each side of the stream, including the stream channel.

Silviculture: The art and science of controlling the establishment, growth, composition, health, and quality of forests and woodlands.

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

Structure: For floodplain management purposes, walled and roofed building, including a gas or liquid storage tank, that is principally above ground, as well as a manufactured home. See Section 2.3.1 for clarification of structure as it relates to NFIP-ESA integration.

Chapter 9. References

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Appendices

A. Oregon Plan Area Definition: Instructions for determining if your community is located in the plan area and if your property of interest is located in the SFHA

B. Model Ordinance: Annotated model ordinance draft (Path A)

C. Ordinance Checklist: Draft Community Compliance Checklist (ordinance checklist) for Path B

D. Customized Community Plan Procedures: Procedures for a Customized Community Plan (for Path C), including:

   i. Standard outline for Path C plan

   ii. Methods for proposing an alternative RBZ

   iii. Guidance on how to assess habitat conditions

E. Example Projects: Model Project scenarios to illustrate how implementation of no net loss standards might be applied to different types of development projects

2024 Revised Draft Implementation Plan

Appendix A Oregon Plan Area Definition

[Also available at: https://www.fema.gov/sites/default/files/documents/fema_r10-nfip-esa-oregon-plan-area-directions.pdf]

NFIP-ESA Integration in Oregon
Determining if a Location is Within the Plan Area
July 2024

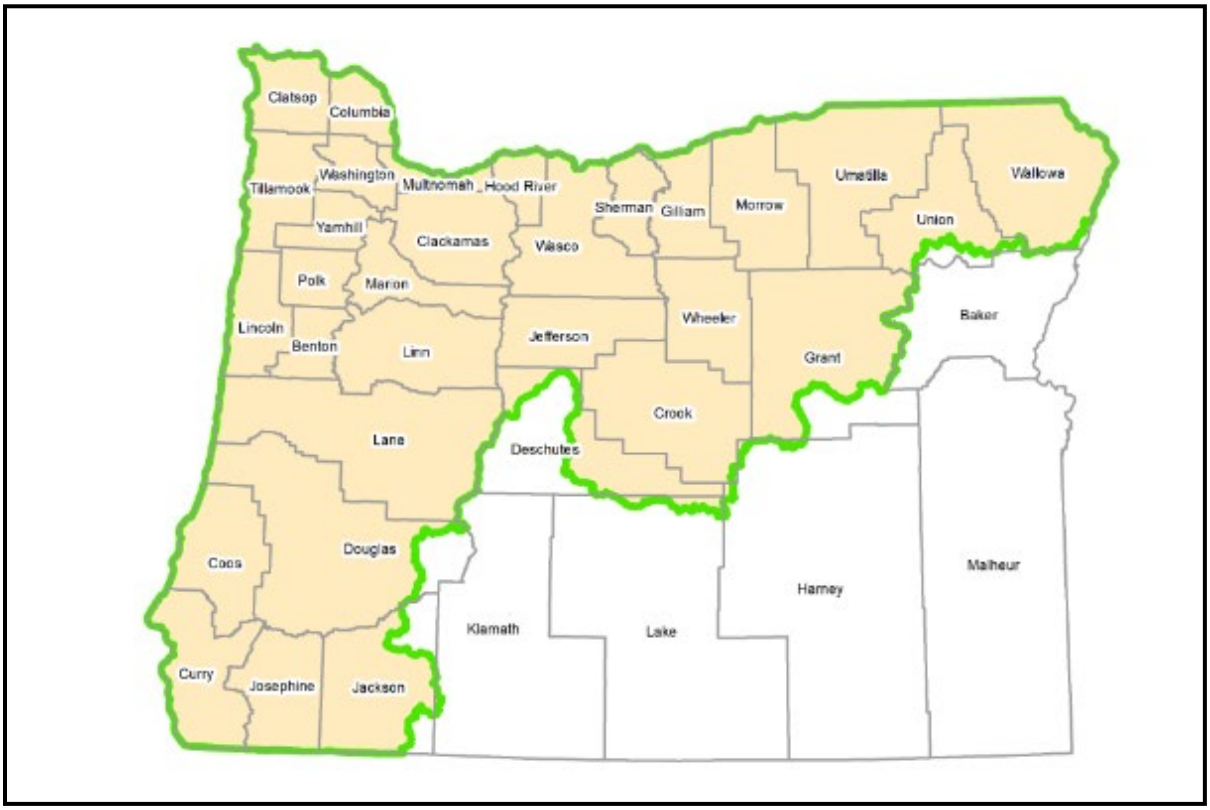
Introduction

The Oregon National Flood Insurance Program (NFIP) Endangered Species Act (ESA) integration performance standards apply to communities that are 1) located in the Oregon plan area, 2) located within the mapped special flood hazard area (SFHA), and 3) within a community participating in the NFIP. This document provides instructions for determining if your location of interest is subject to the Oregon NFIP-ESA integration performance standards based on these three considerations. Applicability is not fixed in time. Updates to SFHA delineations or communities joining or withdrawing from the NFIP could result in changes in applicability for a specific location.

Directions to Determine if a Location is in the Plan Area

The plan area for NFIP-ESA integration in Oregon includes the area encompassed by the green line on Figure 1. The plan area boundary is generally defined by the boundaries of six NMFS Salmon and Steelhead Recovery Domains within the State of Oregon: Oregon Coast, Southern Oregon/Northern California Coast, Willamette River, Lower Columbia River, Middle Columbia River, and Snake River.

Figure 1. Plan Area Boundary for NFIP-ESA Integration



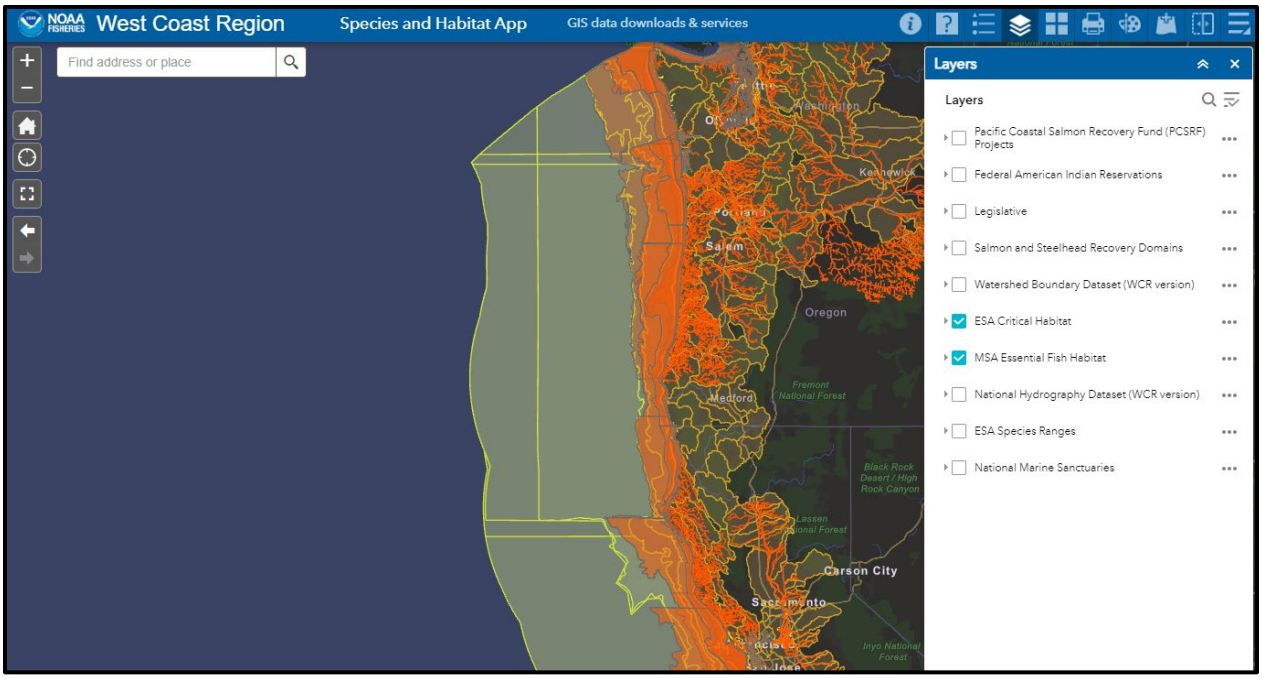
If the location you are interested in is close to the green line, you can use the directions below to determine if the specific location of interest is inside or outside of the plan area.

Step 1

Open NOAA's Species and Habitat App, or you may need to copy and paste the following into your internet address bar: https://maps.fisheries.noaa.gov/portal/apps/webappviewer/index.html?id=e8311ceaa4354de290fb1c456cd86a7f

Figure 2 shows a typical view of the site.

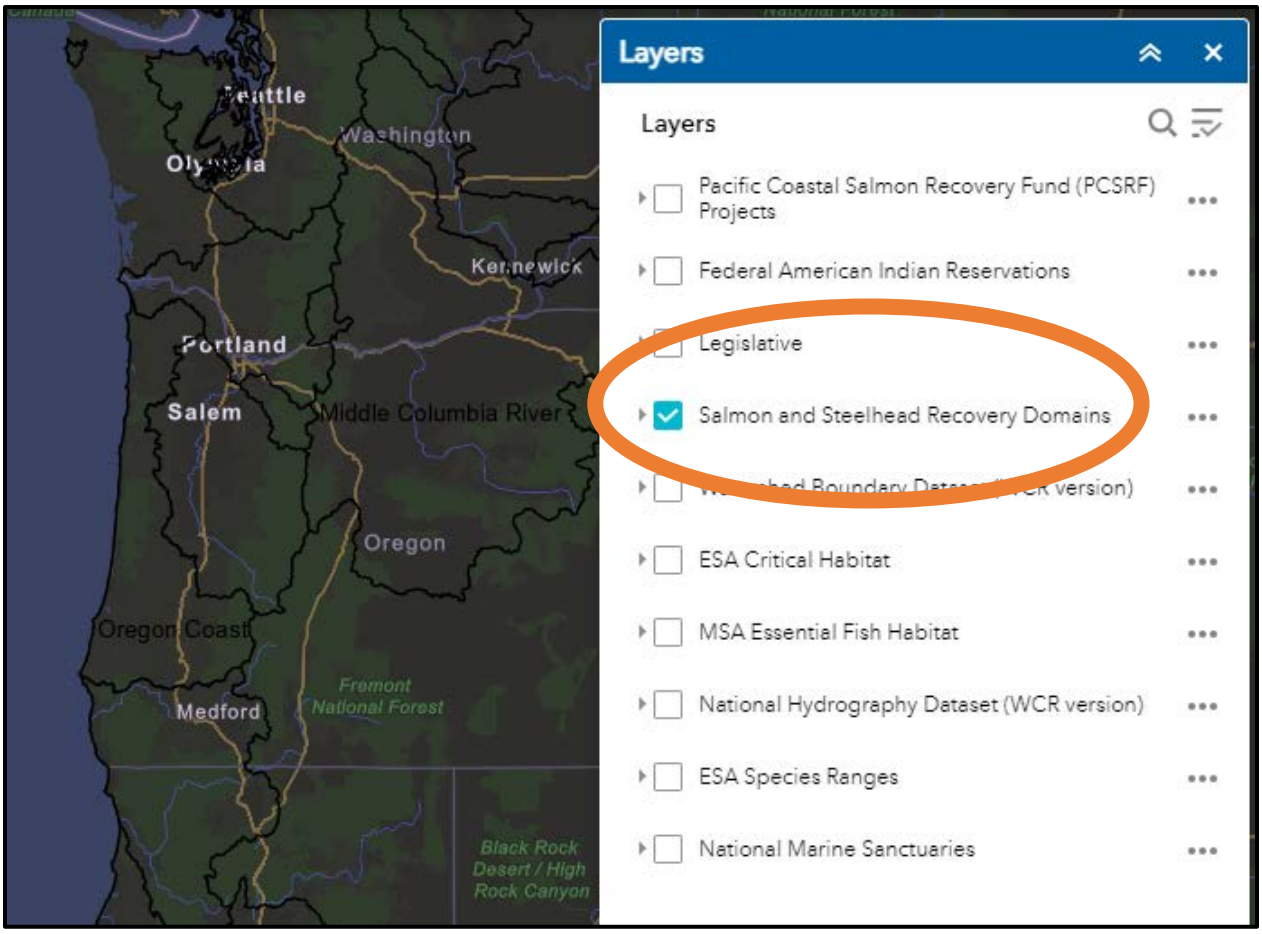
Figure 2. NOAA's Species and Habitat App Map



Step 2

On the layers window on the right side of the scree, check Salmon and Steelhead Recovery Domains, and uncheck any other layers that might be checked. This is indicated by the orange oval in Figure 3.

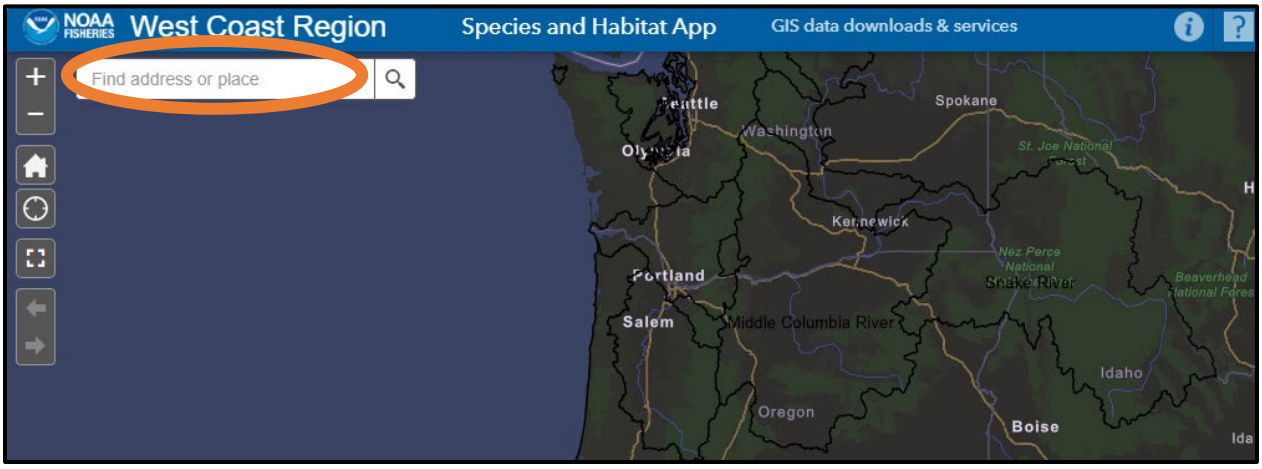
Figure 3. Layers Window



Step 3

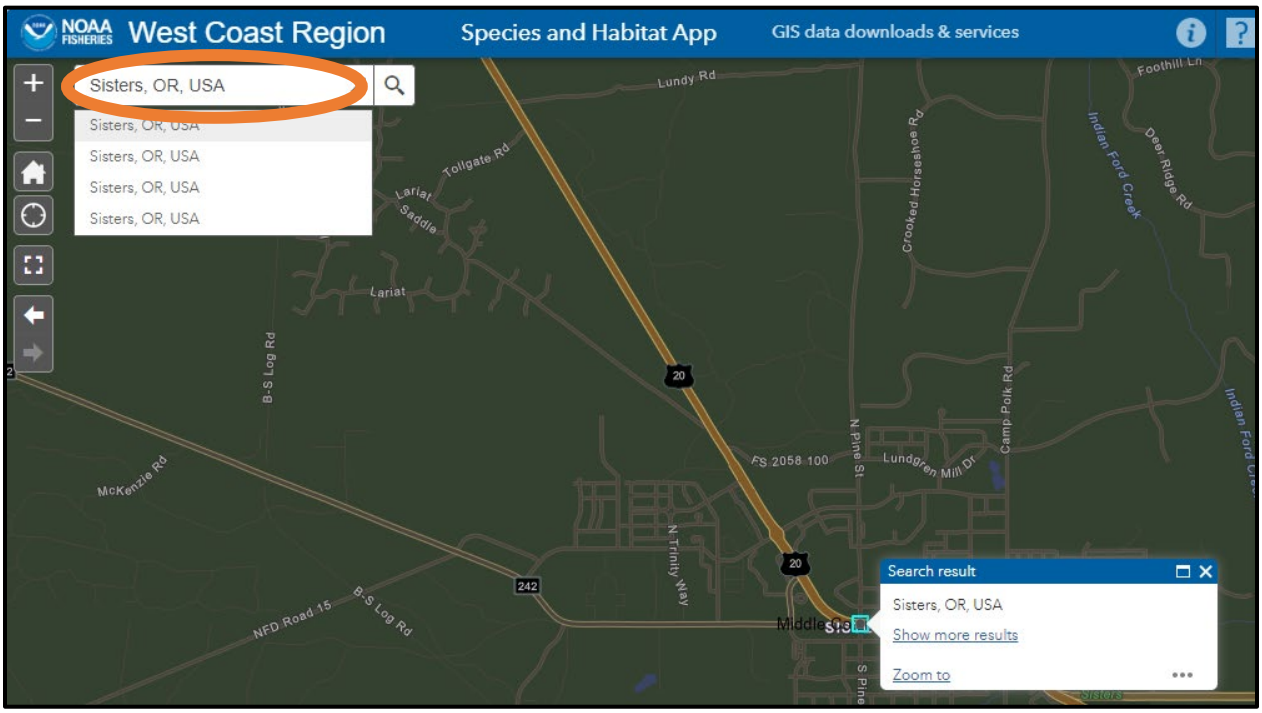
Enter the location of interest in the "Find address or place" search bar, indicated by the orange oval in Figure 4.

Figure 4. Blank Search Bar



Sisters, OR is shown as an example in Figure 5.

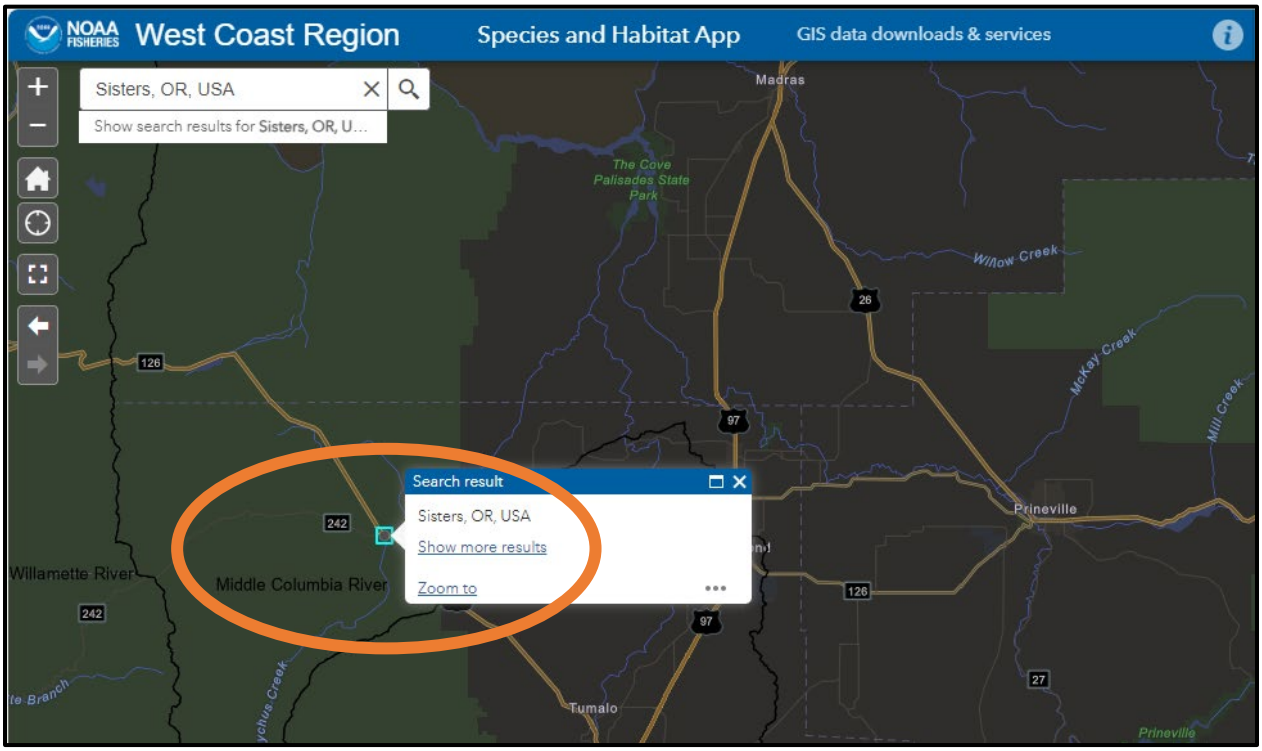
Figure 5. Sisters, OR in Search Bar



Step 4

Using the minus button or the scroll bar, zoom out to see if the location of interest is within the boundary of a Salmon and Steelhead Recovery Domain. The minus button is located in the upper left corner of the screen. Figure 6 shows that Sisters, OR is within the Middle Columbia River Recovery Domain, as indicated by the orange oval.

Figure 6. Sisters, OR, Middle Columbia River Recovery Domain



Step 5

If it is still difficult to tell if your location of interest is located within a Salmon and Steelhead Recovery Domain, you can confirm by clicking on the screen at your location of interest. When you click the screen, an information box will pop up. The information box will either identify the recovery domain or it will say "no information" which indicates the location is outside of the recovery domains.

Figure 7 shows that the location south of Sisters and west of Tumalo is not located within a recovery domain.

Figure 7. Location with No Information Available

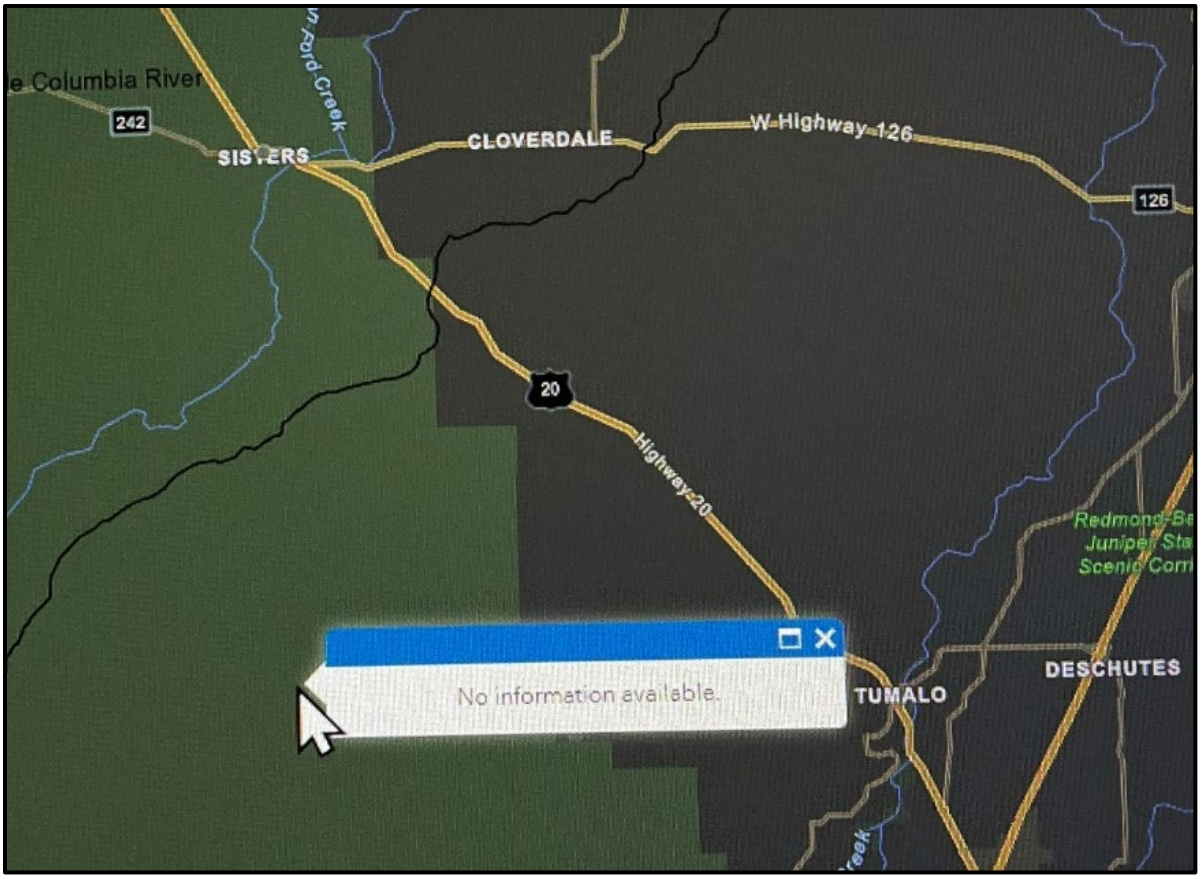
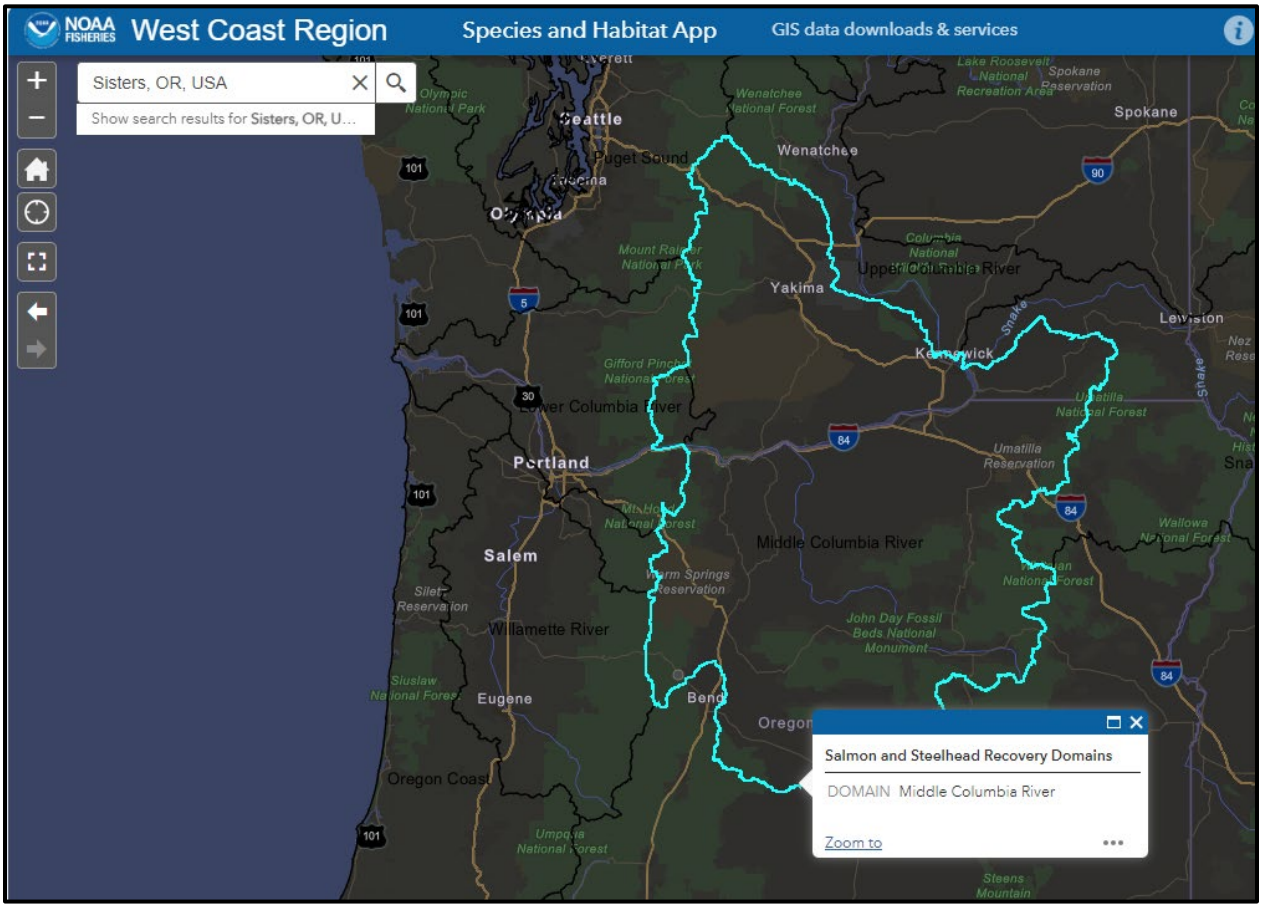


Figure 8 shows that Sisters, OR is located in the Middle Columbia River Recovery Domain, identified with a blue-green outline. Because Sisters, OR is located in a recovery domain, it is also located in the plan area.

Figure 8. Information Box Identifying Recovery Domain for Sisters, OR

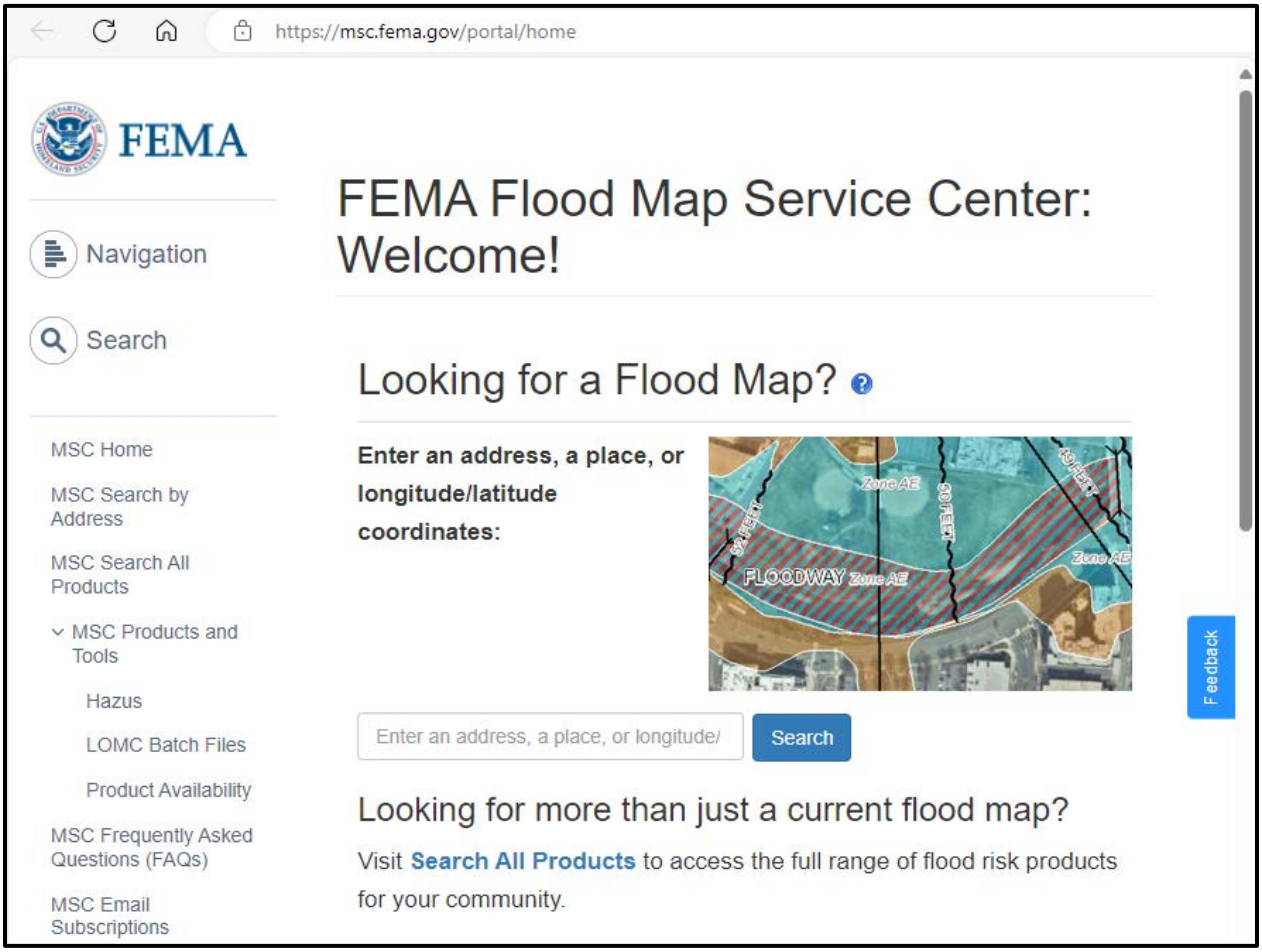


Directions to Determine if a Location is in the Special Flood Hazard Area

Step 1

To determine if a location of interest is in the current effective SFHA, access the FEMA Flood Map Service Center at [FEMA Flood Map Service Center](https://msc.fema.gov/portal/home) or https://msc.fema.gov/portal/home, as shown in Figure 9.

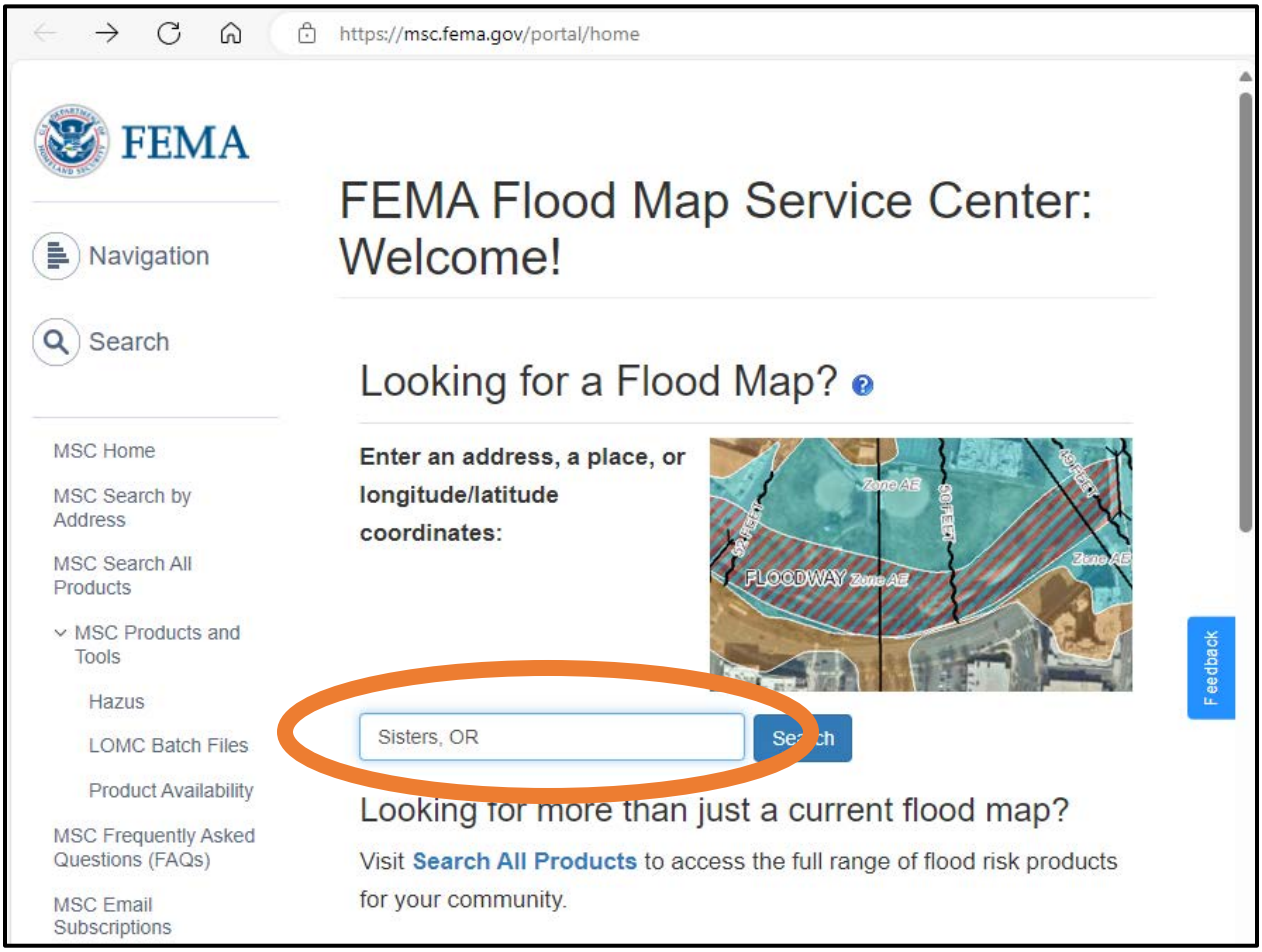
Figure 9. FEMA Flood Map Service Center



Step 2

Enter the location of interest in the Looking for a Flood Map? search bar indicated in an orange oval below. Click search. Sisters, OR is used as an example in Figure 10.

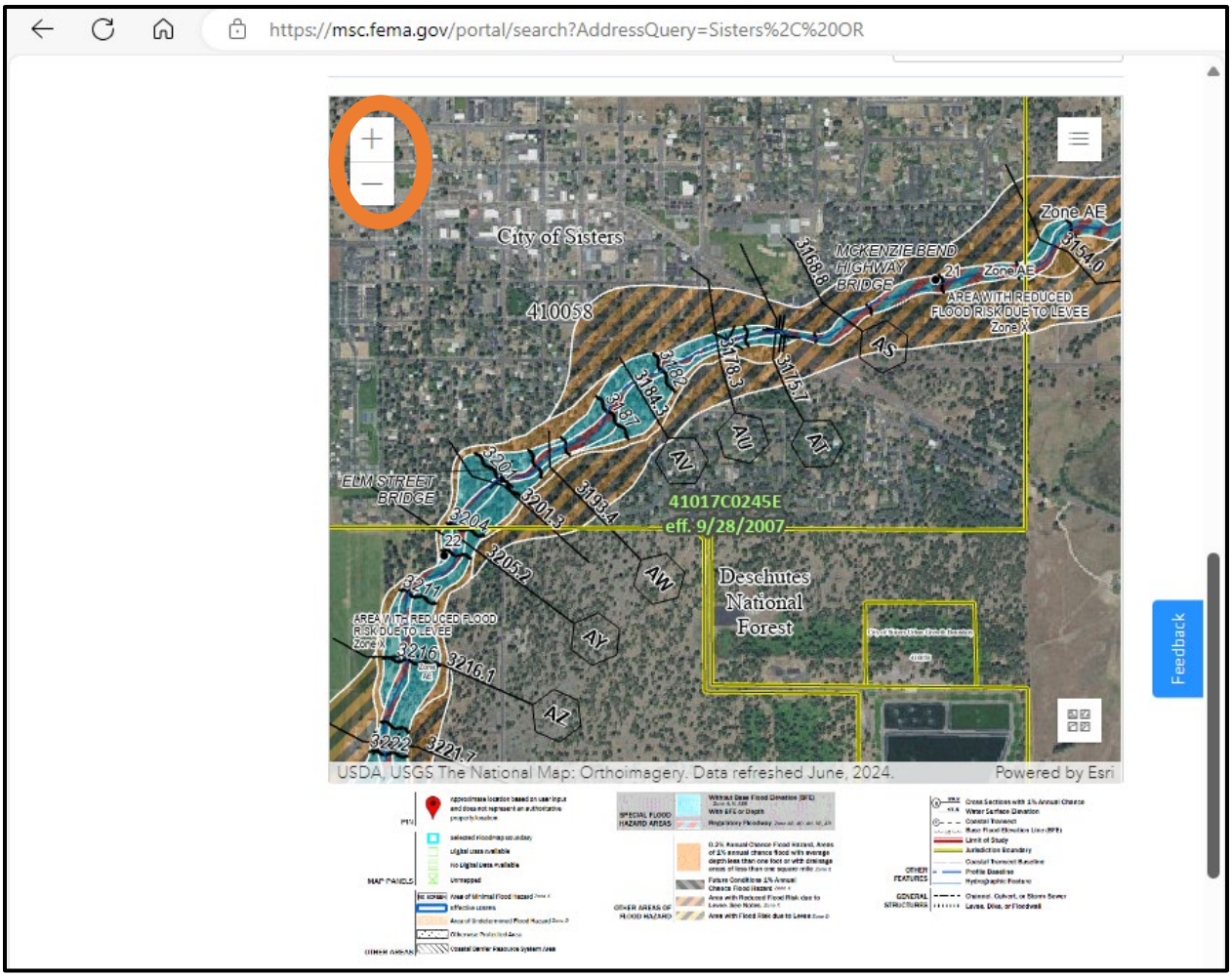
Figure 10. Looking for a Flood Map? Search Bar



Step 3

Scroll down on the page until you see the map with your location identified. Using the plus or minus buttons at the upper left portion of the map, zoom in or out as needed. The plus and minus buttons are indicated in an orange oval in Figure 11.

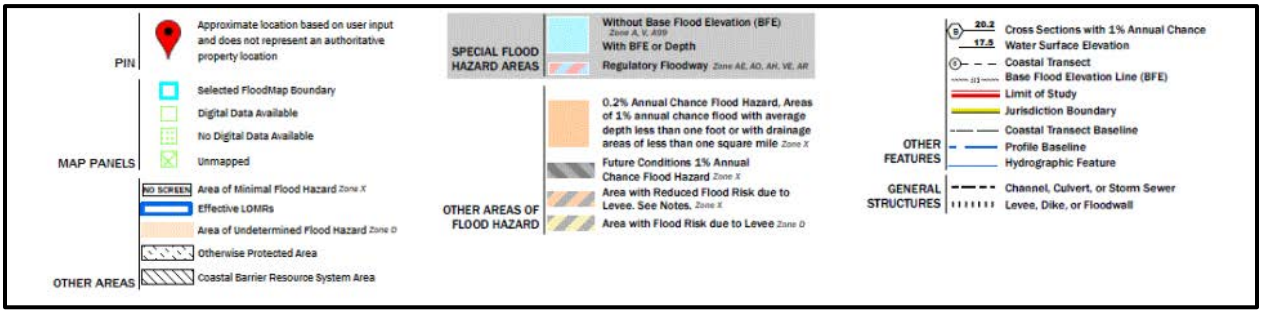
Figure 11. Zooming In or Out on the Location Map



Step 4

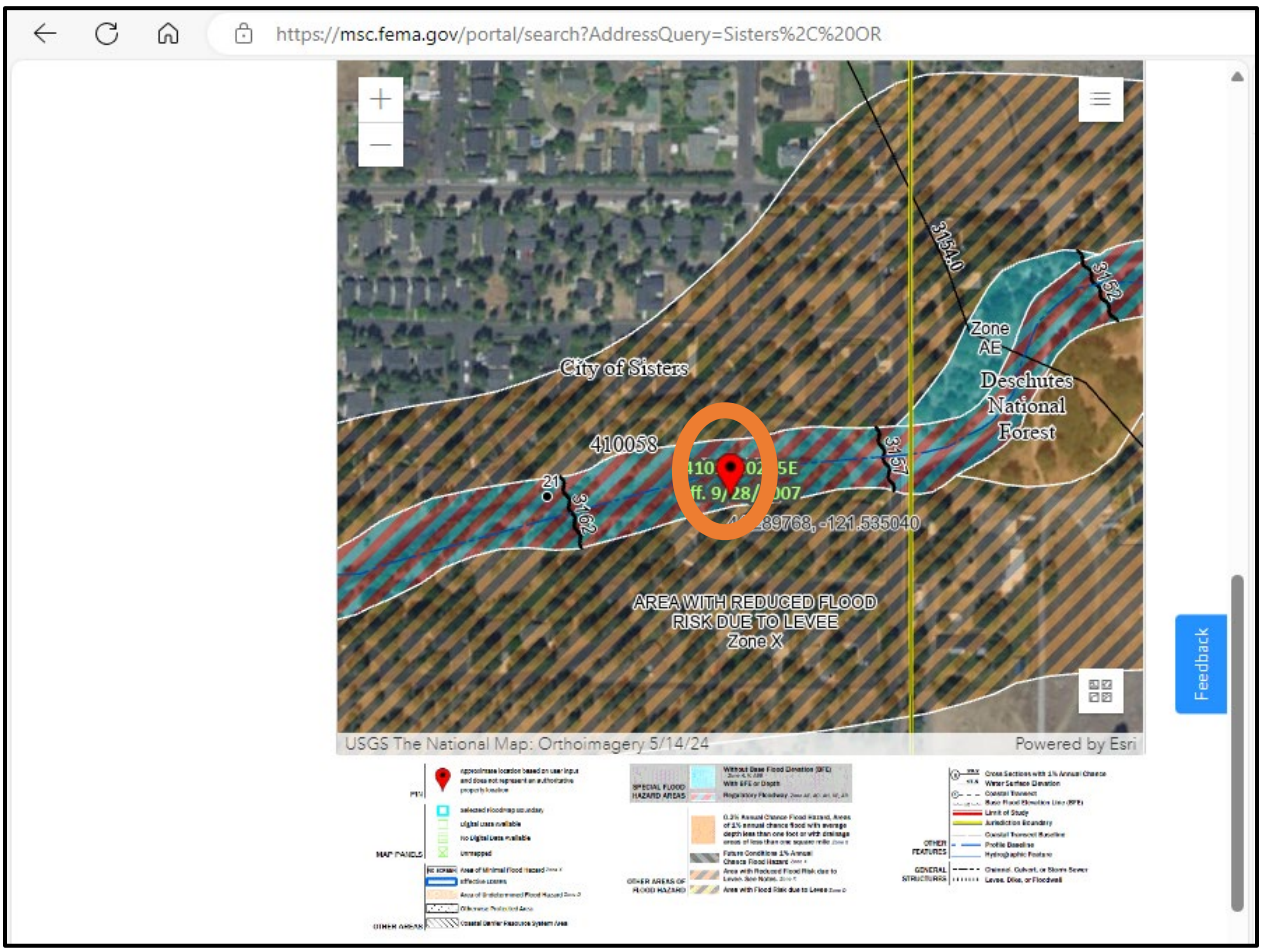
Compare your location of interest to the legend below the map. The SFHA is indicated as either a light blue area, or a red and blue hashed area. If your location is within the light blue or red and blue hashed area, it is located within the SFHA. Figure 12 shows the legend. SFHA zones are shaded in grey in the legend.

Figure 12. Special Flood Hazard Area Indicated in Legend



The Sisters, OR example location is depicted in Figure 13. The location indicated by the orange oval is within the red and blue hashed area, which means that it is within the SFHA.

Figure 13. Sisters, OR Example Location in the Special Flood Hazard Area



Directions to Determine if a Location is Within a National Flood Insurance Program Participating Community

To determine if a location of interest is within an NFIP participating community, access the FEMA Community Status Book Report at https://www.fema.gov/cis/OR.html. If your community is listed in the community status book report, it is a NFIP participating community. If you have any additional questions about NFIP participation, reach out to your local floodplain administrator.

Summary

The Oregon NFIP-ESA integration performance standards apply to communities that are (1) located in the Oregon plan area, (2) located within the mapped special flood hazard area (SFHA), and (3) located within a community participating in the NFIP. These directions help to determine if a location of interest is within the plan area, within the SFHA, and within a NFIP participating community. If all three of these considerations are true for your location of interest, the Oregon NFIP-ESA integration performance standards are applicable. If one or more of the three considerations is not true for your location of interest, the Oregon NFIP-ESA integration performance standards do not apply.

2024 Revised Draft Implementation Plan
Appendix B Model Ordinance

Draft NFIP-ESA Oregon Implementation Plan Guidance

Model Floodplain Management Ordinance

For Participating Communities in the Implementation Plan Area

August 2025

FEMA

Federal Emergency Management Agency
Region X
Department of Homeland Security
130 – 228th Street SW
Bothell, WA 98021

Cover Photo Credits:

Top Left and Right: stock photos from Federal Emergency Management Agency archives
Bottom Left: Salmon swimming across the road: Nature Pic of the Day (NPOD), https://www.naturepicoftheday.com/archive/2019-03-23

Table of Contents

Acronyms and Abbreviations

BFE	base flood elevation
BiOp	Biological Opinion
CFR	Code of Federal Regulations
CLOMR	Conditional Letter of Map Revision
CRS	Community Rating System
dbh	diameter at breast height
EC	Elevation Certificate
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FHBM	Flood Hazard Boundary Maps
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
HUC	Hydrologic Unit Code
LID	Low-Impact Development
LiMWA	Limit of Moderate Wave Action
LOMC	Letter of Map Change
LOMR	Letter of Map Revision
MHHW	mean higher-high water
NFIP	National Flood Insurance Program
NMFS	National Marine Fisheries Service
OHWM	ordinary high water mark
ORS	Oregon Revised Statutes
ORSC	Oregon Residential Specialty Code

OSSC	Oregon Structural Specialty Code
RBZ	riparian buffer zone
SD	Substantial Damage
SFHA	Special Flood Hazard Area
SI	Substantial Improvement
SMR	Stormwater Management Regulation
TB	Technical Bulletin

SECTION 1. Introduction

The Federal Emergency Management Agency (FEMA) has developed this model flood hazard management ordinance to address the requirements outlined in the revised 2024 Draft Oregon Implementation Plan for National Flood Insurance Program (NFIP)-Endangered Species Act (ESA) Integration ("2024 Draft Implementation Plan"). This model ordinance is referred to as the "2024 NFIP-ESA Integration model ordinance" henceforth. The FEMA consulted with the National Marine Fisheries Service (NMFS) on potential effects of the implementation of the NFIP in Oregon on listed species under NMFS authority. In 2016, NMFS issued a Biological Opinion (BiOp), which recommended changes to the implementation of the NFIP in Oregon within the plan area (see the 2024 Draft Implementation Plan for a description of the plan area).

The 2024 NFIP-ESA Integration model ordinance provides the tools a community would need to implement "Path A" of the 2024 Draft Implementation Plan. Any variation from the model ordinance language to achieve the no net loss standards through alternative means would be "Path B" or "Path C" in the 2024 Draft Implementation Plan. Any other community specific alterations such as an ecologically relevant definition of a riparian buffer zone (RBZ) would also be considered Path C implementation proposals. All Path C proposals must be reviewed by FEMA and potentially the National Marine Fisheries Service before being implemented.

The regulatory language contained within the 2024 NFIP-ESA Integration model ordinance can be adopted verbatim and incorporated into local floodplain and land use regulations, or a community may select those sections that are missing from its current floodplain ordinance and adopt those sections. The State of Oregon's Model Flood Hazard Management Ordinance (2020) was used as a starting point, with additions to provide compliance with the 2024 Draft Implementation Plan. The additional sections are clearly noted with yellow highlighting to simplify implementation for Oregon communities in the plan area that have already adopted the Oregon Model Flood Hazard Management Ordinance (2020).

This 2024 NFIP-ESA Integration model ordinance provides a set of provisions to protect the built environment from flood damage and to minimize potential impacts of construction and reconstruction on public health and safety, property, water quality, and aquatic and riparian habitats. The requirements pertain to development in the Special Flood Hazard Area (see definitions), which includes the maintenance, repair, or remodel of existing structures and utilities when the existing footprint is expanded and/or the floodplain is further encroached upon.

The 2024 Draft Implementation Plan and this model ordinance do not change the definition of development in 44 Code of Federal Regulations (CFR) 59.1.

> "Development" is defined as "any man-made change to improved or unimproved real estate, including, but not limited to, buildings or other structures, mining, filling, grading, paving, excavation or drilling operations, or storage of equipment or materials." (44 CFR 59.1)

The 2024 NFIP-ESA Integration model ordinance provides compliance with federal and state statutes and with the 2024 Draft Implementation Plan. The 2024 NFIP-ESA Integration model ordinance conforms to the following:

1. The requirements of the NFIP, as specified in 44 CFR 59 and 60.
2. Oregon State codes to protect structures from flood damage that are specified in Oregon Structural Specialty Code (OSSC), Section 1612 and Oregon Residential Specialty Code (ORSC), Section R322.
3. Oregon Statewide Land Use Planning Goals.
4. Provisions needed to meet the requirements of the 2024 Draft Implementation Plan. These sections are highlighted in yellow.

The 2024 NFIP-ESA Integration model ordinance provides communities with ordinance language that complies with the 2024 Draft Implementation Plan. Adoption of the ordinance language will ensure compliance with the minimum standards for participation in the NFIP in the plan area in Oregon. Prior to adoption of the ordinance language, communities must have their locally proposed draft language reviewed by FEMA and/or the Oregon Department of Land Conservation and Development.

The 2024 NFIP-ESA Integration model ordinance includes standards and provisions that encourage sound floodplain management. The language is based on the minimum requirements of the NFIP found in 44 CFR 59 and 60, Oregon's statewide land use planning Goal 7, and Oregon specialty codes. The new language added to the state model floodplain ordinance, highlighted in yellow, provides compliance with the ESA for floodplain development in the plan area.

1.1. How to Use this Document

This 2024 NFIP-ESA Integration model ordinance includes a Table of Contents and a Regulatory Crosswalk that identifies the federal and state standards that align to and are reflected in each section. Communities will need to review their ordinances and ensure that all the required components are included.

Please refer to the 2024 Draft Implementation Plan for more information on how to determine if your community and the specific proposed development parcel is in the plan area, alternatives for compliance to use instead of the model ordinance, and technical guidance on the implementation of NFIP-ESA integration in Oregon. Please refer to FEMA's website for information on how to determine whether or not your community is within the plan area.

1.1.1. ORDINANCE LANGUAGE LEGEND

The following colors are used in the text in the model ordinance to denote specific actions or sections with specific applicability.

- Black: Represents the existing NFIP and current state minimum requirements that are found in the 2020 Oregon Model Flood Hazard Management Ordinance.
- Red: Represents language that must be replaced with community specific information. Only include the appropriate language for your community.
- Purple: Represents language required for communities with Coastal High Hazard Areas mapped by FEMA (V Zones or Coastal A Zones). *(DELETE ALL PURPLE LANGUAGE IF NOT A COASTAL COMMUNITY).*
- Blue: Represents hyperlinks to other sections of the document or external websites.
- Yellow highlighting: Represents new ordinance language not in the 2020 Oregon Model Flood Hazard Management Ordinance. Communities that have previously adopted the state model ordinance may focus on the yellow highlighted sections.

1.2. Changes from the 2020 Oregon Model Flood Hazard Management Ordinance

Note: the language in this section will be updated once the updated DLCD Model Ordinance is available.

This 2024 NFIP-ESA Integration model ordinance varies from the 2020 Oregon Model Flood Hazard Management Ordinance with the addition of new content to be included for ESA compliance for NFIP-participating communities in the plan area. If no part of the Special Flood Hazard Area (SFHA) in your NFIP-participating community is in the Oregon plan area, your community may continue to use the 2020 Oregon Model Flood Hazard Management Ordinance.

In general, the ordinance was revised to ensure that the implementation of the NFIP-ESA no net loss standards avoids or offsets adverse impacts on threatened and endangered species and their critical habitat. A summary of the primary changes is provided below:

1. New language has been added to incorporate the following no net loss standards:
    a. No net loss of flood storage capacity (see Section 6.1.1 of the model ordinance).
    b. No net loss of pervious surface (see Section 6.1.2 of the model ordinance).
    c. No net loss of trees equal to or greater than 6 inches in diameter at breast height (dbh) (i.e., tree diameter measured at 4.5 feet from the ground surface) (See Section 6.1.3 of the model ordinance).
2. Some definitions (see Section 2.0) have been added to provide context for the no net loss standards from the 2024 Draft Implementation Plan.

3. Language has been added:

    a. To address activities that may require a floodplain development permit but are exempt from the no net loss requirement per the 2016 NMFS BiOp (see Section 6.3).

    b. To address the specific requirements of the RBZ (see Section 6.4).

4. In general, the language in the 2024 NFIP-ESA Integration model ordinance mirrors the language from the 2020 Oregon Model Flood Hazard Management Ordinance. Minor edits to the 2020 language have been made for clarity, punctuation, and grammar.

1.3. Community Rating System

Participation in the Community Rating System (CRS) requires communities to participate in the NFIP. Implementation of the no net loss standards are required for Oregon communities in the plan area to participate in the NFIP. Thus, communities in the Oregon plan area must implement the no net loss standards to be eligible for CRS credit. However, the no net loss standards could also support certain components of CRS activities and, as such, may contribute to earning credit toward reduced flood insurance premiums. The CRS is explained further in CRS Credit for Habitat Protection, available online at: https://crsresources.org/files/guides/crs-credit-for-habitat-protection.pdf, and the 2017 CRS Coordinators' Manual, available online at: https://www.fema.gov/floodplain-management/community-rating-system, and the 2021 Addendum to the 2017 CRS Coordinator's Manual, available online at: https://www.fema.gov/sites/default/files/documents/fema_community-rating-system_coordinators-manual_addendum-2021.pdf. The Association of State Floodplain Managers' Green Guide also provides useful information on development techniques that avoid impacts on natural functions and values of floodplains. This document is available at: www.floodsciencecenter.org/products/crs-community-resilience/green-guide/. Communities interested in CRS credits should contact their CRS specialist for additional information and review.

Implementation of the no net loss standards would most likely contribute to the following CRS activities:

- Activity 430 Higher Regulatory Standards
    - Development Limitations
        - Prohibition of all fill (DL1a): This credit is for prohibiting all filling in the regulatory floodplain. To meet this standard, communities may NOT approve Conditional Letters or Letters of Map Revision based on Fill (CLOMR-F or LOMR-F). If a CLOMR-F or LOMR-F is issued for a property in a community, then DL1 credit will be denied. This applies to CLOMRs and LOMRs that include filling as part of the reason for requesting a map change. Minor filling may be allowed where needed

to protect or restore natural floodplain functions, such as part of a channel restoration project.

- The CRS manual describes a number of regulatory approaches that do not warrant credit under DL1; however, because the Oregon NFIP-ESA integration no net loss standards exceed the approaches described in the manual, a community meeting the Oregon no net loss standards should qualify for credit under DL1.

- Compensatory storage (DL1b): This credit is for regulations that require development to provide compensatory storage at hydraulically equivalent sites up to a ratio of 1.5:1. Credit is not provided for:

    - Compensatory storage requirements in floodways only or in V Zones only, or

    - Stormwater management regulations that require a developer to compensate for any increase in runoff created by the development. This is credited under Activity 450.

- Activity 450 Stormwater Management

    - Stormwater management regulations (SMR – 452a): This credit is the sum of four sub-elements: Size of development (Section 452.a(1), SZ); design storm used (Section 452.a(2), DS); low-impact development (LID) regulations (Section 452.a(3), LID); and public agency authority to inspect and maintain, at the owner's expense, private facilities constructed to comply with the ordinance (Section 452.a.(4), PUB).

        - LID credits the community's regulatory language that requires the implementation of LID techniques to the maximum extent feasible to control peak runoff when new development occurs. LID techniques can significantly reduce or eliminate the increase in stormwater runoff created by traditional development, encourage aquifer recharge, and promote better water quality.

SECTION 2. Regulatory Crosswalk

The following table presents a crosswalk of the model ordinance sections against the relevant federal and state laws, regulations, and policies. The new sections related to the Oregon NFIP-ESA integration implementation (yellow highlighted sections of the model ordinance) are not listed in this table and are related to compliance with the ESA.

Ordinance Section	44 CFR and Technical Bulletin (TB) Citation(s)	State of Oregon Citation(s) (Goal 7, Specialty Codes,* Oregon Revised Statutes [ORS])
1.1 Statutory Authorization	59.22(a)(2)	Goal 7; ORS 203.035 (Counties), ORS 197.175 (Cities)
1.2 Findings of Fact	59.22(a)(1)	Goal 7
1.3 Statement of Purpose	59.2; 59.22(a)(1) and (8); 60.22	Goal 7
1.4 Methods of Reducing Flood Losses	60.22	Goal 7
2.0 Definitions	59.1; 33 CFR 328.3(c)(7)	Goal 7
3.1 Lands to Which this Ordinance Applies	59.22(a)	Goal 7
3.2 Basis for Establishing the Special Flood Hazard Areas	59.22(a)(6); 60.2(h)	Goal 7
3.3 Coordination with Specialty Codes Adopted by the State of Oregon Building Codes Division		ORS 455
3.4.1 Compliance	60.1(b) – (d)	Goal 7
3.4.2 Penalties for Noncompliance	60.1(b) – (d)	Goal 7
3.5.1 Abrogation	60.1(b) – (d)	Goal 7
3.5.2 Severability		
3.6 Interpretation	60.1(b) – (d)	Goal 7
3.7.1 Warning		
3.7.2 Disclaimer of Liability		
4.1 Designation of the Floodplain Administrator	59.22(b)(1)	Goal 7
4.2.1 Permit Review	60.3(a)(1) – (3); 60.3(c)(10)	Goal 7

Ordinance Section	44 CFR and Technical Bulletin (TB) Citation(s)	State of Oregon Citation(s) (Goal 7, Specialty Codes,* Oregon Revised Statutes [ORS])
4.2.2 Information to be Obtained and Maintained	59.22(a)(9)(iii); 60.3(b)(5)(i) and (iii); 60.3(c)(4); 60.3(b)(3); 60.6(a)(6)	Goal 7; 105.9; 110.33; R106.1.4; R109.1.3; R109.1.6.1; R322.1.10; R322.3.6
4.2.3.1 Community Boundary Alterations	59.22(a)(9)(v)	Goal 7
4.2.3.2 Watercourse Alterations	60.3(b)(6) – (7), 65.6(12-13)	Goal 7
4.2.3.3 Requirement to Submit New Technical Data	65.3, 65.6, 65.7, 65.12	Goal 7
4.2.4 Substantial Improvement and Substantial Damage Assessments and Determinations	59.1; 60.3(a)(3); 60.3(b)(2); 60.3(b)(5)(i); 60.3(c)(1), (2), (3), (5)–(8), (10), (12); 60.3(d)(3); 60.3(e)(4), (5), (8)	Goal 7
4.3.1 Floodplain Development Permit Required	60.3(a)(1)	Goal 7
4.3.2 Application for Development Permit	60.3(a)(1); 60.3(b)(3); 60.3(c)(4)	Goal 7; Oregon Residential Specialty Code (R) 106.1.4; R322.3.6
4.4 Variance Procedure	60.6(a)	Goal 7
4.4.1 Conditions for Variances	60.6(a)	Goal 7
4.4.2 Variance Notification	60.6(a)(5)	Goal 7
5.1.1 Alteration of Watercourses	60.3(b)(6) and (7)	Goal 7
5.1.2 Anchoring	60.3(a)(3); 60.3(b)(1), (2), and (8)	Goal 7; R322.1.2
5.1.3 Construction Materials and Methods	60.3(a)(3), TB 2; TB 11	Goal 7; R322.1.3; R322.1.3
5.1.4.1 Water Supply, Sanitary Sewer, and On-Site Waste Disposal Systems	60.3(a)(5) and (6)	Goal 7; R322.1.7
5.1.4.2 Electrical, Mechanical, Plumbing, and Other Equipment	60.3(a)(3)	Goal 7; R322.1.6;
5.1.5 Tanks		R322.2.4; R322.3.7

Ordinance Section	44 CFR and Technical Bulletin (TB) Citation(s)	State of Oregon Citation(s) (Goal 7, Specialty Codes,* Oregon Revised Statutes [ORS])
5.1.6 Subdivision Proposals	60.3(a)(4)(i) – (iii); 60.3(b)(3)	Goal 7
5.1.7 Use of Other Base Flood Data	60.3(a)(3); 60.3(b)(4); 60.3(b)(3); TB 10-01	Goal 7; R322.3.2
5.1.8 Structures Located in Multiple or Partial Flood Zones		R322.1
5.2.1 Flood Openings	60.3(c)(5); TB 1; TB 11	Goal 7; R322.2.2; R322.2.2.1
5.2.2 Garages	TB 7-93	R309
5.2.3.1 Before Regulatory Floodway	60.3(c)(10)	Goal 7
5.2.3.2 Residential Construction	60.3(c)(2)	Goal 7
5.2.3.3 Non-residential Construction	60.3(c)(3) – (5); TB 3	Goal 7; R322.2.2; R322.2.2.1
5.2.3.4 Manufactured Dwellings	60.3(b)(8); 60.3(c)(6)(iv); 60.3(c)(12)(ii)	Goal 7; State of OR Manufactured Dwelling Installation Specialty Code (MDISC) and associated statewide Code Interpretation dated 1/1/2011
5.2.3.5 Recreational Vehicles	60.3(c)(14)(i) – (iii)	Goal 7
5.2.3.6 Appurtenant (Accessory) Structures	60.3(c)(5); TB 1; TB 7-93	Oregon Structural Specialty Code (S) 105.2; R105.2
5.2.4 Floodways	60.3(d); FEMA Region X Fish Enhancement Memo (Mark Riebau)	Goal 7
5.2.5 Standards for Shallow Flooding Areas	60.3(c)(7), (8), (11), and (14)	Goal 7
5.3 Specific Standards for Coastal High Hazard Flood Zones, and 5.3.1 Development Standards	60.3(e); TB 5; TB 8; TB 9	Goal 7; R322.3.1; R322.3.2; R322.3.3; R322.3.4; R322.3.5
5.3.1.1 Manufactured Dwelling Standards for Coastal High Hazard Zones	60.3(e)(8)(i) – (iii)	Goal 7; RR322.3.2; State of OR Manufactured Dwelling Installation Specialty Code (MDISC) and associated statewide Code Interpretation dated 1/1/2011

Ordinance Section	44 CFR and Technical Bulletin (TB) Citation(s)	State of Oregon Citation(s) (Goal 7, Specialty Codes,* Oregon Revised Statutes [ORS])
5.3.1.2 Recreational Vehicle Standards for Coastal High Hazard Zones	60.3(e)(9)(i)- (iii)	Goal 7
5.3.1.3 Tank Standards for Coastal High Hazard Zones		R322.2.4; R322.3.7

*Link to Oregon Specialty Codes (https://www.oregon.gov/bcd/codes-stand/Pages/adopted-codes.aspx)

SECTION 3. Model Ordinance Language

1.0 STATUTORY AUTHORITY, FINDINGS OF FACT, PURPOSE, AND METHODS

1.1 STATUTORY AUTHORIZATION

The State of Oregon has in ORS 203.035 (COUNTIES) OR ORS 197.175 (CITIES) delegated the responsibility to local governmental units to adopt floodplain management regulations designed to promote the public health, safety, and general welfare of its citizenry.

Therefore, the COMMUNITY NAME does ordain as follows:

1.2 FINDINGS OF FACT

A. The flood hazard areas of COMMUNITY NAME may include natural and beneficial floodplain functions and values and are subject to periodic inundation which may result in loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety, and general welfare.

B. These flood losses may be caused by the cumulative effect of obstructions in special flood hazard areas which increase flood heights and velocities, and when inadequately anchored, cause damage in other areas. Uses that are inadequately floodproofed, elevated, or otherwise protected from flood damage also contribute to flood loss.

1.3 STATEMENT OF PURPOSE

It is the purpose of this ordinance to promote public health, safety, and general welfare, and to minimize public and private losses due to flooding in special flood hazard areas by provisions designed to:

A. Protect human life and health;

B. Minimize expenditure of public money for costly flood control projects;

C. Preserve natural and beneficial floodplain functions and values;

D. Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;

E. Minimize prolonged business interruptions;

F. Minimize damage to public facilities and utilities such as water and gas mains; electric, telephone and sewer lines; and streets and bridges located in special flood hazard areas;

G. Help maintain a stable tax base by providing for the sound use and development of flood hazard areas so as to minimize blight areas caused by flooding;

H. Notify potential buyers that the property is in a special flood hazard area;

I. Notify those who occupy special flood hazard areas that they assume responsibility for their actions;

J. Participate in and maintain eligibility for flood insurance and disaster relief.

1.4 METHODS OF REDUCING FLOOD LOSSES

In order to accomplish its purposes, this ordinance includes methods and provisions for:

A. Restricting or prohibiting development which is dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities;

B. Requiring that development vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;

C. Controlling the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel flood waters;

D. Controlling filling, grading, dredging, and other development which may increase flood damage;

E. Preventing or regulating the construction of flood barriers which will unnaturally divert flood waters or may increase flood hazards in other areas.

F. Employing a standard of "no net loss" of natural and beneficial floodplain functions and values.

2.0 DEFINITIONS

Unless specifically defined below, words or phrases used in this ordinance shall be interpreted so as to give them the meaning they have in common usage.

Appeal: A request for a review of the interpretation of any provision of this ordinance or a request for a variance.

Area of shallow flooding: A designated Zone AO, AH, AR/AO or AR/AH on a community's Flood Insurance Rate Map (FIRM) with a one percent or greater annual chance of flooding to an average depth of one to three feet where a clearly defined channel does not exist, where the path of flooding is unpredictable, and where velocity flow may be evident. Such flooding is characterized by ponding or sheet flow.

Area of special flood hazard: The land in the floodplain within a community subject to a 1 percent or greater chance of flooding in any given year. It is shown on the Flood

Insurance Rate Map (FIRM) as Zone A, AO, AH, A1-30, AE, A99, AR (V, V1-30, VE). "Special flood hazard area" is synonymous in meaning and definition with the phrase "area of special flood hazard."

Base flood: The flood having a one percent chance of being equaled or exceeded in any given year.

Base flood elevation (BFE): The elevation to which floodwater is anticipated to rise during the base flood.

Basement: Any area of the building having its floor subgrade (below ground level) on all sides.

Beneficial Gain: An area within the riparian buffer zone, within the same reach as the project, and that is equivalent to 5 percent of the area impacted within the RBZ that is not a functionally dependent use would be planted with native riparian herbaceous, shrub, and tree vegetation.

Breakaway wall: A wall that is not part of the structural support of the building and is intended through its design and construction to collapse under specific lateral loading forces, without causing damage to the elevated portion of the building or supporting foundation system.

Coastal high hazard area: An area of special flood hazard extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources.

Development: Any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials.

Fill: Placement of any materials such as soil, gravel, crushed stone, or other materials that change the topographic elevation within the floodplain. The placement of fill is considered "development."

Fish: A diverse group of animals with gills and fins that live in water, including all life stages.

Fish Accessible: Available for fish to enter.

Fish Egressable: Available for fish to exit or leave from.

Flood or Flooding:

(a) A general and temporary condition of partial or complete inundation of normally dry land areas from:

(1) The overflow of inland or tidal waters.

(2) The unusual and rapid accumulation or runoff of surface waters from any source.

(3) Mudslides (i.e., mudflows) which are proximately caused by flooding as defined in paragraph (a)(2) of this definition and are akin to a river of liquid and flowing mud on the surfaces of normally dry land areas, as when earth is carried by a current of water and deposited along the path of the current.

(b) The collapse or subsidence of land along the shore of a lake or other body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels or suddenly caused by an unusually high water level in a natural body of water, accompanied by a severe storm, or by an unanticipated force of nature, such as flash flood or an abnormal tidal surge, or by some similarly unusual and unforeseeable event which results in flooding as defined in paragraph (a)(1) of this definition.

Flood elevation study: an examination, evaluation and determination of flood hazards and, if appropriate, corresponding water surface elevations, or an examination, evaluation and determination of mudslide (i.e., mudflow) and/or flood-related erosion hazards.

Flood Insurance Rate Map (FIRM): The official map of a community, on which the Federal Insurance Administrator has delineated both the special hazard areas and the risk premium zones applicable to the community. A FIRM that has been made available digitally is called a Digital Flood Insurance Rate Map (DFIRM).

Flood Insurance Study (FIS): See "Flood elevation study."

Flood Storage: The three-dimensional space (i.e., volume) between the existing ground and the base flood elevation in which floodwaters flow during the 1-percent annual chance flood (See "Base Flood Elevation" and "Area of Special Flood Hazard" definitions).

Flood Storage Capacity: The flood storage volume that is unoccupied by any development including, but not limited to fill, structures, concrete structures (vaults or tanks), pilings, levees and dikes, or any other development that reduces flood storage and fish refugia. See "Flood Storage" definition.

Floodway: The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height. Also referred to as "Regulatory Floodway."

Functionally Dependent Use: A use which cannot perform its intended purpose unless it is located or carried out in proximity to water. The term includes bridges, docking facilities, port facilities that are necessary for the loading and unloading of cargo or passengers, and ship building and ship repair facilities, but does not include long-term storage or related manufacturing facilities.

Green Infrastructure: Use of natural or human-made hydrologic features to manage water, water quality, and provide environmental and community benefits. Green infrastructure uses approaches and technologies that use, enhance, and/or mimic the natural hydrologic cycle processes of infiltration, evapotranspiration, and reuse. At a large scale, it is an interconnected network of green space that conserves natural systems and provides assorted benefits to human populations. At a local scale, green infrastructure manages stormwater by infiltrating it into the ground where it is generated using vegetation or porous surfaces, or by capturing it for later reuse. Green infrastructure practices can be used to achieve no net loss of pervious surface by creating infiltration of stormwater in an amount equal to or greater than the infiltration lost by the placement of new impervious surface.

Habitat Restoration Activities: Activities with the sole purpose of restoring natural fish and wildlife habitats that have only temporary impacts and long-term benefits to habitat. Such projects cannot include ancillary structures such as a storage shed for maintenance equipment, must demonstrate that no rise in the BFE would occur as a result of the project, must obtain a CLOMR and LOMR, and have obtained any other required permits (e.g., CWA Section 404 permit).

Hazard Trees: Standing dead, dying, diseased, infested trees, or ones with a structural defect that makes it likely to fail in whole or in part and that present a potential hazard to a structure, pose a safety threat from the risk of falling on a road, building, or otherwise creates a risk of damage or injury.

Highest adjacent grade: The highest natural elevation of the ground surface prior to construction next to the proposed walls of a structure.

Historic structure: Any structure that is:

(a) Listed individually in the National Register of Historic Places (a listing maintained by the Department of Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register;

(b) Certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district;

(c) Individually listed on a state inventory of historic places in states with historic preservation programs which have been approved by the Secretary of Interior; or

(d) Individually listed on a local inventory of historic places in communities with historic preservation programs that have been certified either:

(1) By an approved state program as determined by the Secretary of the Interior or

(2) Directly by the Secretary of the Interior in states without approved programs.

Hydraulically Equivalent Elevation: A location (e.g., a site where no net loss standards are implemented) in which the difference between the ground surface elevation and the 100-year water surface elevation or base flood elevation is equivalent to another location (e.g., the impacted site). Hydraulically equivalent elevations can be determined by elevation data, observed ordinary-high water mark, ordinary-high water marks determined by a state or federal agency, or best available water surface profiles.

Hydrologically Connected: Connected in such a manner that precipitation will run off directly into a watercourse.

Impervious Surface: A surface that cannot be penetrated by water and thereby prevents infiltration.

Low Impact Development: An approach to land development (or redevelopment) that works with nature to manage stormwater at or near its source. It employs principles such as preserving and recreating natural landscape features and minimizing imperviousness to create functional site drainage. Low Impact Development refers to designing and implementing practices that can be employed at the site level to control stormwater and help replicate the predevelopment hydrology of the site. Low impact development helps achieve no net loss of pervious surface by infiltrating stormwater in an amount equal to or greater than the infiltration lost by the placement of new impervious surface. Low impact development is a subset of green infrastructure.

Lowest floor: The lowest floor of the lowest enclosed area (including basement). An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access or storage in an area other than a basement area is not considered a building's lowest floor, provided that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of this ordinance.

Manufactured dwelling: A structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when attached to the required utilities. The term "manufactured dwelling" does not include a "recreational vehicle" and is synonymous with "manufactured home."

Manufactured dwelling park or subdivision: A parcel (or contiguous parcels) of land divided into two or more manufactured dwelling lots for rent or sale.

Mean Higher-High Water: The 19-year average of the higher high-tide water height of each tidal day observed over the National Tidal Datum Epoch.

Mean sea level: For purposes of the National Flood Insurance Program, the National Geodetic Vertical Datum (NGVD) of 1929 or other datum, to which Base Flood Elevations shown on a community's Flood Insurance Rate Map are referenced.

New construction: For floodplain management purposes, "new construction" means structures for which the "start of construction" commenced on or after the effective date of a floodplain management regulation adopted by COMMUNITY NAME and includes any subsequent improvements to such structures.

No Net Loss: A standard wherein adverse impacts on floodplain functions must be avoided or offset through mitigation so that there is no net change in the function from the authorized existing condition. The floodplain functions of flood storage, water quality, and vegetation must be maintained.

Offsite: Mitigation occurring on tax lots or parcels that are not contiguous with the tax lots or parcels containing the impact area.

Onsite: Mitigation occurring within the tax lots or parcels contiguous with the tax lots or parcels containing the impact area.

Ordinary High Water Mark: The line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank; shelving; changes in the character of soil; destruction of terrestrial vegetation; the presence of litter and debris; or other appropriate means that consider the characteristics of the surrounding areas.

Qualified Professional: Appropriate subject matter expert that is defined by the community. Qualified professionals may include surveyors, biologists, hydrologists, engineers, arborists, or other specialties depending on the expertise needed.

Reach: A section of a stream or river along which similar hydrologic conditions exist, such as discharge, depth, area, and slope. It can also be the length of a stream or river (with varying hydrologic conditions) between major tributaries or two stream gages, or a length of river for which the characteristics are well described by readings at a single stream gage.

Recreational vehicle: A vehicle which is:

(a) Built on a single chassis;

(b) 400 square feet or less when measured at the largest horizontal projection;

(c) Designed to be self-propelled or permanently towable by a light duty truck; and

(d) Designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel, or seasonal use.

Riparian Buffer Zone (RBZ): The boundary of the riparian buffer zone is measured from the ordinary high water mark (OHWM) of a fresh waterbody (lake; pond; ephemeral, intermittent, or perennial stream) or mean higher-high water (MHHW) line of a marine shoreline or tidally influenced river reach to 170 feet inland. The riparian buffer zone includes the area between these boundaries on each side of

the stream, including the stream channel. Where the RBZ is larger than the special flood hazard area, the no net loss standards shall only apply to the area within the special flood hazard area.

Silviculture: The art and science of controlling the establishment, growth, composition, health, and quality of forests and woodlands.

Special flood hazard area: See "Area of special flood hazard" for this definition.

Start of construction: Includes substantial improvement and means the date the building permit was issued, provided the actual start of construction, repair, reconstruction, rehabilitation, addition, placement, or other improvement was within 180 days from the date of the permit. The actual start means either the first placement of permanent construction of a structure on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufactured dwelling on a foundation. Permanent construction does not include land preparation, such as clearing, grading, and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for a basement, footings, piers, or foundations or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure. For a substantial improvement, the actual start of construction means the first alteration of any wall, ceiling, floor, or other structural part of a building, whether or not that alteration affects the external dimensions of the building.

Structure: For floodplain management purposes, a walled and roofed building, including a gas or liquid storage tank, that is principally above ground, as well as a manufactured dwelling.

Substantial damage: Damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

Substantial improvement: Any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the "start of construction" of the improvement. This term includes structures which have incurred "substantial damage," regardless of the actual repair work performed. The term does not, however, include either:

(a) Any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions; or

(b) Any alteration of a "historic structure," provided that the alteration will not preclude the structure's continued designation as a "historic structure."

Variance: A grant of relief by COMMUNITY NAME from the terms of a floodplain management regulation.

Violation: The failure of a structure or other development to be fully compliant with the community's floodplain management regulations. A structure or other development without the elevation certificate, other certifications, or other evidence of compliance required in this ordinance is presumed to be in violation until such time as that documentation is provided.

Additional Optional Language Provided in Appendix A of the Oregon 2020 Model Ordinance

3.0 GENERAL PROVISIONS

3.1 LANDS TO WHICH THIS ORDINANCE APPLIES

This ordinance shall apply to all special flood hazard areas within the jurisdiction of COMMUNITY NAME.

3.2 BASIS FOR ESTABLISHING THE SPECIAL FLOOD HAZARD AREAS

The special flood hazard areas identified by the Federal Insurance Administrator in a scientific and engineering report entitled "The Flood Insurance Study (FIS) for "EXACT TITLE OF FLOOD INSURANCE STUDY FOR COMMUNITY", dated DATE (MONTH DAY, FOUR DIGIT YEAR), with accompanying Flood Insurance Rate Maps (FIRMs) LIST ALL EFFECTIVE FIRM PANELS HERE (UNLESS ALL PANELS ARE BEING REPLACED THROUGH A NEW COUNTY_WIDE MAP THAT INCORPORATES ALL PREVIOUS PANELS/VERSIONS, IN THAT SITUATION PANELS DO NOT NEED TO BE INDIVIDUALLY LISTED) are hereby adopted by reference and decolared to be a part of this ordinance. The FIS and FIRM panels are on file at INSERT THE LOCATION (I.E. COMMUNITY PLANNING DEPARTMENT LOCATED IN THE COMMUNITY ADMINISTRATIVE BUILDING).

3.3 COORDINATION WITH STATE OF OREGON SPECIALTY CODES

Pursuant to the requirement established in ORS 455 that the COMMUNITY NAME administers and enforces the State of Oregon Specialty Codes, the COMMUNITY NAME does hereby acknowledge that the Oregon Specialty Codes contain certain provisions that apply to the design and construction of buildings and structures located in special flood hazard areas. Therefore, this ordinance is intended to be administered and enforced in conjunction with the Oregon Specialty Codes.

3.4 COMPLIANCE AND PENALTIES FOR NONCOMPLIANCE

3.4.1 COMPLIANCE

All development within special flood hazard areas is subject to the terms of this ordinance and required to comply with its provisions and all other applicable regulations.

3.4.2 PENALTIES FOR NONCOMPLIANCE

No structure or land shall hereafter be constructed, located, extended, converted, or altered without full compliance with the terms of this ordinance and other applicable regulations. Violations of the provisions of this ordinance by failure to comply with any of its requirements (including violations of conditions and safeguards established in connection with conditions) shall constitute a (INFRACTION TYPE (I.E. MISDEMEANOR) AND PENALTIES PER STATE/LOCAL LAW ASSOCIATED WITH SPECIFIED INFRACTION TYPE (I.E. ANY PERSON WHO VIOLATES THE REQUIREMENTS OF THIS ORDINANCE SHALL UPON CONVICTION THEREOF BE FINED NOT MORE THAN A SPECIFIED AMOUNT OF MONEY…) Nothing contained herein shall prevent the COMMUNITY NAME from taking such other lawful action as is necessary to prevent or remedy any violation.

3.5 ABROGATION AND SEVERABILITY

3.5.1 ABROGATION

This ordinance is not intended to repeal, abrogate, or impair any existing easements, covenants, or deed restrictions. However, where this ordinance and another ordinance, easement, covenant, or deed restriction conflict or overlap, whichever imposes the more stringent restrictions shall prevail.

3.5.2 SEVERABILITY

This ordinance and the various parts thereof are hereby declared to be severable. If any section clause, sentence, or phrase of the Ordinance is held to be invalid or unconstitutional by any court of competent jurisdiction, then said holding shall in no way effect the validity of the remaining portions of this Ordinance.

3.6 INTERPRETATION

In the interpretation and application of this ordinance, all provisions shall be:

A. Considered as minimum requirements;

B. Liberally construed in favor of the governing body; and

C. Deemed neither to limit nor repeal any other powers granted under state statutes.

3.7 WARNING AND DISCLAIMER OF LIABILITY

3.7.1 WARNING

The degree of flood protection required by this ordinance is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Larger floods can and will occur on rare occasions. Flood heights may be increased by man-made or natural causes. This ordinance does not imply

that land outside the areas of special flood hazards or uses permitted within such areas will be free from flooding or flood damages.

3.7.2 DISCLAIMER OF LIABILITY

This ordinance shall not create liability on the part of the COMMUNITY NAME, any officer or employee thereof, or the Federal Insurance Administrator for any flood damages that result from reliance on this ordinance, or any administrative decision lawfully made hereunder.

4.0 ADMINISTRATION

4.1 DESIGNATION OF THE FLOODPLAIN ADMINISTRATOR

The INDIVIDUAL JOB TITLE is hereby appointed to administer, implement, and enforce this ordinance by granting or denying development permits in accordance with its provisions. The Floodplain Administrator may delegate authority to implement these provisions.

Additional Recommended Language Provided in Appendix B of the Oregon 2020 Model Ordinance.

4.2 DUTIES AND RESPONSIBILITIES OF THE FLOODPLAIN ADMINISTRATOR

Duties of the floodplain administrator, or their designee, shall include, but not be limited to:

4.2.1 PERMIT REVIEW

Review all development permits to:

A. Determine that the permit requirements of this ordinance have been satisfied;

B. Determine that all other required local, state, and federal permits have been obtained and approved;

C. Determine if the proposed development is located in a floodway.

   i. If located in the floodway assure that the floodway provisions of this ordinance in section **5.2.4** are met; and

D. Determine if the proposed development is located in an area where Base Flood Elevation (BFE) data is available either through the Flood Insurance Study (FIS) or from another authoritative source. If BFE data is not available, then ensure compliance with the provisions of sections **5.1.7**; and

E. Provide to building officials the Base Flood Elevation (BFE) (ADD FREEBOARD IF COMMUNITY HAS HIGHER ELEVATION STANDARDS) applicable to any building requiring a development permit.

F. Determine if the proposed development qualifies as a substantial improvement as defined in section **2.0**.

G. Determine if the proposed development activity is a watercourse alteration. If a watercourse alteration is proposed, ensure compliance with the provisions in section **5.1.1**.

H. Determine if the proposed development activity includes the placement of fill or excavation.

I. Determine whether the proposed development activity complies with the no net loss standards in section **6.0**.

4.2.2 INFORMATION TO BE OBTAINED AND MAINTAINED

The following information shall be obtained and maintained and shall be made available for public inspection as needed:

A. The actual elevation (in relation to mean sea level) of the lowest floor (including basements) and all attendant utilities of all new or substantially improved structures where Base Flood Elevation (BFE) data is provided through the Flood Insurance Study (FIS), Flood Insurance Rate Map (FIRM), or obtained in accordance with section **5.1.7**.

B. The elevation (in relation to mean sea level) of the natural grade of the building site for a structure prior to the start of construction and the placement of any fill and ensure that the requirements of sections **4.2.1(B), 5.2.4, and 5.3.1(F),** are adhered to.

C. Upon placement of the lowest floor of a structure (including basement) but prior to further vertical construction, documentation, prepared and sealed by a professional licensed surveyor or engineer, certifying the elevation (in relation to mean sea level) of the lowest floor (including basement).

D. Where base flood elevation data are utilized, As-built certification of the elevation (in relation to mean sea level) of the lowest floor (including basement) prepared and sealed by a professional licensed surveyor or engineer, prior to the final inspection.

E. Maintain all Elevation Certificates (EC) submitted to the community.

F. The elevation (in relation to mean sea level) to which the structure and all attendant utilities were floodproofed for all new or substantially improved floodproofed structures where allowed under this ordinance and where

Base Flood Elevation (BFE) data is provided through the FIS, FIRM, or obtained in accordance with section **5.1.7**.

G. All floodproofing certificates required under this ordinance.

H. All variance actions, including justification for their issuance.

I. All hydrologic and hydraulic analyses performed as required under section **5.2.4**.

J. All Substantial Improvement and Substantial Damage calculations and determinations as required under section **4.2.4**.

K. Documentation demonstrating compliance with no net loss standards of section **6.0**.

L. All records pertaining to the provisions of this ordinance.

4.2.3 REQUIREMENT TO NOTIFY OTHER ENTITIES AND SUBMIT NEW TECHNICAL DATA

4.2.3.1 COMMUNITY BOUNDARY ALTERATIONS

The Floodplain Administrator shall notify the Federal Insurance Administrator in writing whenever the boundaries of the community have been modified by annexation or the community has otherwise assumed authority or no longer has authority to adopt and enforce floodplain management regulations for a particular area, to ensure that all Flood Hazard Boundary Maps (FHBM) and Flood Insurance Rate Maps (FIRM) accurately represent the community's boundaries. Include within such notification a copy of a map of the community suitable for reproduction, clearly delineating the new corporate limits or new area for which the community has assumed or relinquished floodplain management regulatory authority.

4.2.3.2 WATERCOURSE ALTERATIONS

A. Notify adjacent communities, the Department of Land Conservation and Development, and other appropriate state and federal agencies, prior to any alteration or relocation of a watercourse, and submit evidence of such notification to the Federal Insurance Administration. This notification shall be provided by the applicant to the Federal Insurance Administration as a Letter of Map Revision (LOMR) along with either:

   i. A proposed maintenance plan to assure the flood carrying capacity within the altered or relocated portion of the watercourse is maintained; or

ii. Certification by a registered professional engineer that the project has been designed to retain its flood carrying capacity without periodic maintenance.

B. The applicant shall be required to submit a Conditional Letter of Map Revision (CLOMR) when required under section **4.2.3.3**. Ensure compliance with all applicable requirements in sections **4.2.3.3** and **5.1.1**.

4.2.3.3 REQUIREMENT TO SUBMIT NEW TECHNICAL DATA

A. A community's base flood elevations may increase or decrease resulting from physical changes affecting flooding conditions. As soon as practicable, but not later than six months after the date such information becomes available, a community shall notify the Federal Insurance Administrator of the changes by submitting technical or scientific data in accordance with Title 44 of the Code of Federal Regulations (CFR), Section 65.3. The community may require the applicant to submit such data and review fees required for compliance with this section through the applicable FEMA Letter of Map Change (LOMC) process.

B. The Floodplain Administrator shall require a Conditional Letter of Map Revision prior to the issuance of a floodplain development permit for:

i. Proposed floodway encroachments that increase the base flood elevation; and

ii. Proposed development which increases the base flood elevation by more than one foot in areas where FEMA has provided base flood elevations but no floodway.

C. An applicant shall notify FEMA within six (6) months of project completion when an applicant has obtained a Conditional Letter of Map Revision (CLOMR) from FEMA. This notification to FEMA shall be provided as a Letter of Map Revision (LOMR).

Additional Recommended Language Provided in Appendix B of the Oregon 2020 Model Ordinance.

4.2.4 SUBSTANTIAL IMPROVEMENT AND SUBSTANTIAL DAMAGE ASSESSMENTS AND DETERMINATIONS

Conduct Substantial Improvement (SI) (as defined in section 2.0) reviews for all structural development proposal applications and maintain a record of SI calculations within permit files in accordance with section **4.2.2**. Conduct Substantial Damage (SD) (as defined in section 2.0) assessments when structures are damaged due to a natural hazard event or other causes. Make SD determinations whenever structures within the special flood hazard area (as

established in section 3.2) are damaged to the extent that the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

4.3 ESTABLISHMENT OF DEVELOPMENT PERMIT

4.3.1 FLOODPLAIN DEVELOPMENT PERMIT REQUIRED

A development permit shall be obtained before construction or development begins within any area horizontally within the special flood hazard area established in section 3.2. The development permit shall be required for all structures, including manufactured dwellings, and for all other development, as defined in section 2.0, including fill and other development activities.

4.3.2 APPLICATION FOR DEVELOPMENT PERMIT

Application for a development permit may be made on forms furnished by the Floodplain Administrator and may include, but not be limited to, plans in duplicate drawn to scale showing the nature, location, dimensions, and elevations of the area in question; existing or proposed structures, fill, storage of materials, drainage facilities, and the location of the foregoing. Specifically, the following information is required:

A. In riverine flood zones, the proposed elevation (in relation to mean sea level), of the lowest floor (including basement) and all attendant utilities of all new and substantially improved structures; in accordance with the requirements of section 4.2.2.

B. In coastal flood zones (V zones and coastal A zones), the proposed elevation in relation to mean sea level of the bottom of the lowest structural member of the lowest floor (excluding pilings and columns) of all structures, and whether such structures contain a basement.

C. Proposed elevation in relation to mean sea level to which any non-residential structure will be floodproofed.

D. Certification by a registered professional engineer or architect licensed in the State of Oregon that the floodproofing methods proposed for any non-residential structure meet the floodproofing criteria for non-residential structures in section 5.2.3.3.

E. Description of the extent to which any watercourse will be altered or relocated.

F. Base Flood Elevation data for subdivision proposals or other development when required per sections 4.2.1 and 5.1.6.

G. Substantial improvement calculation for any improvement, addition, reconstruction, renovation, or rehabilitation of an existing structure.

H. The amount and location of any fill or excavation activities proposed.

4.4 VARIANCE PROCEDURE

The issuance of a variance is for floodplain management purposes only. Flood insurance premium rates are determined by federal statute according to actuarial risk and will not be modified by the granting of a variance.

4.4.1 CONDITIONS FOR VARIANCES

A. Generally, variances may be issued for new construction and substantial improvements to be erected on a lot of one-half acre or less in size contiguous to and surrounded by lots with existing structures constructed below the base flood level, in conformance with the provisions of sections **4.4.1 (C) and (E)**, and **4.4.2**. As the lot size increases beyond one-half acre, the technical justification required for issuing a variance increases.

B. Variances shall only be issued upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief.

C. Variances shall not be issued within any floodway if any increase in flood levels during the base flood discharge would result.

D. Variances shall only be issued upon:

i. A showing of good and sufficient cause;

ii. A determination that failure to grant the variance would result in exceptional hardship to the applicant; and,

iii. A determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, create nuisances, cause fraud on or victimization of the public, or conflict with existing laws or ordinances.

E. Variances may be issued by a community for new construction and substantial improvements and for other development necessary for the conduct of a functionally dependent use provided that the criteria of section **4.4.1 (B) – (D)** are met, and the structure or other development is protected by methods that minimize flood damages during the base flood and create no additional threats to public safety.

F. Variances shall not be issued unless it is demonstrated that the development will result in no net loss of the following three floodplain functions in the SFHA, as determined by proxy: flood storage capacity; pervious surface; and trees 6-inches dbh or greater. (see section **6.0** and associated options in Table 1).

Additional Optional Language Provided in Appendix B of the Oregon 2020 Model Ordinance.

4.4.2 VARIANCE NOTIFICATION

Any applicant to whom a variance is granted shall be given written notice that the issuance of a variance to construct a structure below the Base Flood Elevation will result in increased premium rates for flood insurance and that such construction below the base flood elevation increases risks to life and property. Such notification and a record of all variance actions, including justification for their issuance shall be maintained in accordance with section **4.2.2**.

5.0 PROVISIONS FOR FLOOD HAZARD REDUCTION

5.1 GENERAL STANDARDS

In all special flood hazard areas, the no net loss standards (see section **6.0**) and the following standards shall be adhered to:

5.1.1 ALTERATION OF WATERCOURSES

Require that the flood carrying capacity within the altered or relocated portion of said watercourse is maintained. Require that maintenance is provided within the altered or relocated portion of said watercourse to ensure that the flood carrying capacity is not diminished. Require compliance with sections **4.2.3.2** and **4.2.3.3**.

5.1.2 ANCHORING

A. All new construction and substantial improvements shall be anchored to prevent flotation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy.

B. All manufactured dwellings shall be anchored per section **5.2.3.4**.

5.1.3 CONSTRUCTION MATERIALS AND METHODS

A. All new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage.

B. All new construction and substantial improvements shall be constructed using methods and practices that minimize flood damage.

5.1.4 UTILITIES AND EQUIPMENT

5.1.4.1 WATER SUPPLY, SANITARY SEWER, AND ON-SITE WASTE DISPOSAL SYSTEMS

A. All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the system.

B. New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharge from the systems into flood waters.

C. On-site waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding consistent with the Oregon Department of Environmental Quality.

5.1.4.2 ELECTRICAL, MECHANICAL, PLUMBING, AND OTHER EQUIPMENT

Electrical, heating, ventilating, air-conditioning, plumbing, duct systems, and other equipment and service facilities shall be elevated at or above the base flood level (ANY COMMUNITY FREEBOARD REQUIREMENT) or shall be designed and installed to prevent water from entering or accumulating within the components and to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during conditions of flooding. In addition, electrical, heating, ventilating, air- conditioning, plumbing, duct systems, and other equipment and service facilities shall:

A. If replaced as part of a substantial improvement shall meet all the requirements of this section.

B. Not be mounted on or penetrate through breakaway walls.

5.1.5 TANKS

A. Underground tanks shall be anchored to prevent flotation, collapse and lateral movement under conditions of the base flood.

B. Above-ground tanks shall be installed at or above the base flood level (COMMUNITY FREEBOARD REQUIREMENT) or shall be anchored to prevent flotation, collapse, and lateral movement under conditions of the base flood.

C. In coastal flood zones (V Zones or coastal A Zones) when elevated on platforms, the platforms shall be cantilevered from or knee braced to the building or shall be supported on foundations that conform to the requirements of the State of Oregon Specialty Code.

5.1.6 SUBDIVISION PROPOSALS AND OTHER PROPOSED DEVELOPMENTS

A. All new subdivision proposals and other proposed new developments (including proposals for manufactured dwelling parks and subdivisions) greater than 50 lots or 5 acres, whichever is the lesser, shall include within such proposals Base Flood Elevation data.

B. All new subdivision proposals and other proposed new developments (including proposals for manufactured dwelling parks and subdivisions) shall:

i. Be consistent with the need to minimize flood damage.

ii. Have public utilities and facilities such as sewer, gas, electrical, and water systems located and constructed to minimize or eliminate flood damage.

iii. Have adequate drainage provided to reduce exposure to flood hazards.

iv. Comply with no net loss standards in section **6.0**.

5.1.7 USE OF OTHER BASE FLOOD ELEVATION DATA

A. When Base Flood Elevation data has not been provided in accordance with section **3.2** the local floodplain administrator shall obtain, review, and reasonably utilize any Base Flood Elevation data available from a federal, state, or other source, in order to administer section **5.0**. All new subdivision proposals and other proposed new developments (including proposals for manufactured dwelling parks and subdivisions) must meet the requirements of section **5.1.6**.

B. Base Flood Elevations shall be determined for development proposals that are 5 acres or more in size or are 50 lots or more, whichever is lesser in any A zone that does not have an established base flood elevation. Development proposals located within a riverine unnumbered A Zone shall be reasonably safe from flooding; the test of reasonableness includes use of historical data, high water marks, FEMA provided Base Level Engineering data, and photographs of past flooding, etc… where available. (REFERENCE TO ANY OF THIS TYPE OF INFORMATION TO BE USED FOR REGULATORY PURPOSES BY YOUR COMMUNITY, I.E. BASE LEVEL ENGINEERING DATA, HIGH WATER MARKS, HISTORICAL OR OTHER DATA THAT WILL BE REGULATED TO. THIS MAY BE NECESSARY TO ENSURE THAT THE STANDARDS APPLIED TO RESIDENTIAL STRUCTURES ARE CLEAR AND OBJECTIVE. IF UNCERTAIN SEEK LEGAL ADVICE, **AT A MINIMUM REQUIRE THE ELEVATION OF RESIDENTIAL STRUCTURES AND NON-RESIDENTIAL STRUCTURES THAT ARE NOT DRY FLOODPROOFED TO BE 2 FEET ABOVE**

HIGHEST ADJACENT GRADE). Failure to elevate at least two feet above grade in these zones may result in higher insurance rates.

5.1.8 STRUCTURES LOCATED IN MULTIPLE OR PARTIAL FLOOD ZONES

In coordination with the State of Oregon Specialty Codes:

A. When a structure is located in multiple flood zones on the community's Flood Insurance Rate Maps (FIRM) the provisions for the more restrictive flood zone shall apply.

B. When a structure is partially located in a special flood hazard area, the entire structure shall meet the requirements for new construction and substantial improvements.

Additional Recommended Language Provided in Appendix B of the Oregon 2020 Model Ordinance.

5.2 SPECIFIC STANDARDS FOR RIVERINE (INCLUDING ALL NON-COASTAL) FLOOD ZONES

These specific standards shall apply to all new construction and substantial improvements in addition to the General Standards contained in section **5.1** of this ordinance and the no net loss standards contained in section **6.0** of this ordinance.

5.2.1 FLOOD OPENINGS

All new construction and substantial improvements with fully enclosed areas below the lowest floor (excluding basements) are subject to the following requirements. Enclosed areas below the Base Flood Elevation, including crawl spaces shall:

A. Be designed to automatically equalize hydrostatic flood forces on walls by allowing for the entry and exit of floodwaters;

B. Be used solely for parking, storage, or building access;

C. Be certified by a registered professional engineer or architect or meet or exceed all of the following minimum criteria:

i. A minimum of two openings;

ii. The total net area of non-engineered openings shall be not less than one square inch for each square foot of enclosed area, where the enclosed area is measured on the exterior of the enclosure walls;

iii. The bottom of all openings shall be no higher than one foot above grade;

iv. Openings may be equipped with screens, louvers, valves, or other coverings or devices provided that they shall allow the automatic flow of floodwater into and out of the enclosed areas and shall be accounted for in the determination of the net open area; and,

v. All additional higher standards for flood openings in the State of Oregon Residential Specialty Codes Section R322.2.2 shall be complied with when applicable.

5.2.2 GARAGES

A. Attached garages may be constructed with the garage floor slab below the Base Flood Elevation (BFE) in riverine flood zones, if the following requirements are met:

i. If located within a floodway the proposed garage must comply with the requirements of section **5.2.4**;

ii. The floors are at or above grade on not less than one side;

iii. The garage is used solely for parking, building access, and/or storage;

iv. The garage is constructed with flood openings in compliance with section **5.2.1** to equalize hydrostatic flood forces on exterior walls by allowing for the automatic entry and exit of floodwater;

v. The portions of the garage constructed below the BFE are constructed with materials resistant to flood damage;

vi. The garage is constructed in compliance with the standards in section **5.1**; and,

vii. The garage is constructed with electrical, and other service facilities located and installed so as to prevent water from entering or accumulating within the components during conditions of the base flood.

B. Detached garages must be constructed in compliance with the standards for appurtenant structures in section **5.2.3.6** or non-residential structures in section **5.2.3.3** depending on the square footage of the garage.

5.2.3 FOR RIVERINE (NON-COASTAL) SPECIAL FLOOD HAZARD AREAS WITH BASE FLOOD ELEVATIONS

In addition to the general standards listed in section **5.1** the following specific standards shall apply in Riverine (non-coastal) special flood hazard areas with Base Flood Elevations (BFE): Zones A1-A30, AH, and AE.

5.2.3.1 BEFORE REGULATORY FLOODWAY

In areas where a regulatory floodway has not been designated, no new construction, substantial improvement, or other development (including fill) shall be permitted within Zones A1-30 and AE on the community's Flood Insurance Rate Map (FIRM), unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community and will not result in the net loss of flood storage capacity per section **6.1.1**.

5.2.3.2 RESIDENTIAL CONSTRUCTION

A. New construction, conversion to, and substantial improvement of any residential structure shall have the lowest floor, including basement, elevated at or above the Base Flood Elevation (BFE) (ADDITIONAL FREEBOARD FOR YOUR COMMUNITY – RECOMMEND MINIMUM OF 1FT ABOVE BFE).

B. Enclosed areas below the lowest floor shall comply with the flood opening requirements in section **5.2.1**.

Additional Recommended Language Provided in Appendix B of the Oregon 2020 Model Ordinance.

5.2.3.3 NON-RESIDENTIAL CONSTRUCTION

A. New construction, conversion to, and substantial improvement of any commercial, industrial, or other non-residential structure shall:

i. Have the lowest floor, including basement elevated at or above the Base Flood Elevation (BFE) (ANY ADDITIONAL FREEBOARD REQUIREMENTS FOR YOUR COMMUNITY); or

ii. Together with attendant utility and sanitary facilities:

Additional Recommended Language Provided in Appendix B of the Oregon 2020 Model Ordinance.

a. Be floodproofed so that below the base flood level the structure is watertight with walls substantially impermeable to the passage of water;

b. Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy; and,

c. Be certified by a registered professional engineer or architect that the design and methods of construction

are in accordance with accepted standards of practice for meeting provisions of this section based on their development and/or review of the structural design, specifications and plans. Such certifications shall be provided to the Floodplain Administrator as set forth section **4.2.2**.

B. Non-residential structures that are elevated, not floodproofed, shall comply with the standards for enclosed areas below the lowest floor in section **5.2.1**.

C. Applicants floodproofing non-residential buildings shall be notified that flood insurance premiums will be based on rates that are one (1) foot below the floodproofed level (e.g. a building floodproofed to the base flood level will be rated as one (1) foot below.

Additional Recommended Language Provided in Appendix B of the Oregon 2020 Model Ordinance.

5.2.3.4 MANUFACTURED DWELLINGS

A. Manufactured dwellings to be placed (new or replacement) or substantially improved that are supported on solid foundation walls shall be constructed with flood openings that comply with section **5.2.1**;

B. The bottom of the longitudinal chassis frame beam shall be at or above Base Flood Elevation;

C. Manufactured dwellings to be placed (new or replacement) or substantially improved shall be anchored to prevent flotation, collapse, and lateral movement during the base flood. Anchoring methods may include, but are not limited to, use of over-the-top or frame ties to ground anchors (Reference FEMA's "Manufactured Home Installation in Flood Hazard Areas" guidebook for additional techniques), and;

D. Electrical crossover connections shall be a minimum of twelve (12) inches above Base Flood Elevation (BFE).

5.2.3.5 RECREATIONAL VEHICLES

Recreational vehicles placed on sites are required to:

A. Be on the site for fewer than 180 consecutive days, and

B. Be fully licensed and ready for highway use, on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions; or

C. Meet the requirements of section 5.2.3.4, including the anchoring and elevation requirements for manufactured dwellings.

5.2.3.6 APPURTENANT (ACCESSORY) STRUCTURES

Relief from elevation or floodproofing requirements for residential and non-residential structures in Riverine (Non-Coastal) flood zones may be granted for appurtenant structures that meet the following requirements:

A. Appurtenant structures located partially or entirely within the floodway must comply with requirements for development within a floodway found in section 5.2.4;

B. Appurtenant structures must only be used for parking, access, and/or storage and shall not be used for human habitation;

C. In compliance with State of Oregon Specialty Codes, appurtenant structures on properties that are zoned residential are limited to one-story structures less than 200 square feet, or 400 square feet if the property is greater than two (2) acres in area and the proposed appurtenant structure will be located a minimum of 20 feet from all property lines. Appurtenant structures on properties that are zoned as non-residential are limited in size to 120 square feet;

D. The portions of the appurtenant structure located below the Base Flood Elevation must be built using flood resistant materials;

E. The appurtenant structure must be adequately anchored to prevent flotation, collapse, and lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy, during conditions of the base flood;

F. The appurtenant structure must be designed and constructed to equalize hydrostatic flood forces on exterior walls and comply with the requirements for flood openings in section 5.2.1;

G. Appurtenant structures shall be located and constructed to have low damage potential;

H. Appurtenant structures shall not be used to store toxic material, oil, or gasoline, or any priority persistent pollutant identified by the Oregon Department of Environmental Quality unless confined in a tank installed incompliance with section 5.1.5; and,

I. Appurtenant structures shall be constructed with electrical, mechanical, and other service facilities located and installed so as to prevent water from entering or accumulating within the components during conditions of the base flood.

Additional Recommended Language Provided in Appendix B of the Oregon 2020 Model Ordinance.

5.2.4 FLOODWAYS

Located within the special flood hazard areas established in section 3.2 are areas designated as floodways. Since the floodway is an extremely hazardous area due to the velocity of the floodwaters which carry debris, potential projectiles, and erosion potential, the following provisions apply:

A. Prohibit encroachments, including fill, new construction, substantial improvements, and other development within the adopted regulatory floodway unless:

   i. Certification by a registered professional civil engineer is provided demonstrating through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment shall not result in any increase in flood levels within the community during the occurrence of the base flood discharge; or

   ii. A community may permit encroachments within the adopted regulatory floodway that would result in an increase in base flood elevations, provided that a Conditional Letter of Map Revision (CLOMR) is applied for and approved by the Federal Insurance Administrator, and the requirements for such revision as established under Volume 44 of the Code of Federal Regulations, section 65.12 are fulfilled, and the development(s) complies with the no net loss standards in section 6.0.

B. If the requirements of section 5.2.4 (A) are satisfied, all new construction, substantial improvements, and other development shall comply with all other applicable flood hazard reduction provisions of section 5.0 and 6.0.

5.2.5 STANDARDS FOR SHALLOW FLOODING AREAS

Shallow flooding areas appear on FIRMs as AO zones with depth designations or as AH zones with Base Flood Elevations. For AO zones the base flood depths range from one (1) to three (3) feet above ground where a clearly defined channel does not exist, or where the path of flooding is unpredictable and where velocity flow may be evident. Such flooding is usually characterized as sheet flow. For both AO and AH zones, adequate drainage paths are required around structures on slopes to guide floodwaters around and away from proposed structures.

5.2.5.1 STANDARDS FOR AH ZONES

Development within AH Zones must comply with the standards in sections 5.1, 5.2, and 5.2.5.

5.2.5.2 STANDARDS FOR AO ZONES

In AO zones, the following provisions apply in addition to the requirements in sections **5.1** and **5.2.5**:

A. New construction, conversion to, and substantial improvement of residential structures and manufactured dwellings within AO zones shall have the lowest floor, including basement, elevated above the highest grade adjacent to the building, at minimum to or above the depth number specified on the Flood Insurance Rate Maps (FIRM) (COMMUNITY FREEBOARD REQUIREMENT) (at least two (2) feet if no depth number is specified). For manufactured dwellings the lowest floor is considered to be the bottom of the longitudinal chassis frame beam.

B. New construction, conversion to, and substantial improvements of non-residential structures within AO zones shall either:

   i. Have the lowest floor (including basement) elevated above the highest adjacent grade of the building site, at minimum to or above the depth number specified on the Flood Insurance Rate Maps (FIRMS) (COMMUNITY FREE BOARD REQUIREMENT) (at least two (2) feet if no depth number is specified); or

   ii. Together with attendant utility and sanitary facilities, be completely floodproofed to or above the depth number specified on the FIRM (COMMUNITY FREEBOARD REQUIREMENT) or a minimum of two (2) feet above the highest adjacent grade if no depth number is specified, so that any space below that level is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and the effects of buoyancy. If this method is used, compliance shall be certified by a registered professional engineer or architect as stated in section **5.2.3.3(A)(4)**.

C. Recreational vehicles placed on sites within AO Zones on the community's Flood Insurance Rate Maps (FIRM) shall either:

   i. Be on the site for fewer than 180 consecutive days, and

   ii. Be fully licensed and ready for highway use, on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions; or

   iii. Meet the elevation requirements of section **5.2.5.2(A)**, and the anchoring and other requirements for manufactured dwellings of section **5.2.3.4**.

D. In AO zones, new and substantially improved appurtenant structures must comply with the standards in section 5.2.3.6.

E. In AO zones, enclosed areas beneath elevated structures shall comply with the requirements in section 5.2.1.

5.3 SPECIFIC STANDARDS FOR COASTAL HIGH HAZARD FLOOD ZONES

Located within special flood hazard areas established in section 3.2 are Coastal High Hazard Areas, designated as Zones V1-V30, VE, V, or coastal A zones as identified on the FIRMs as the area between the Limit of Moderate Wave Action (LiMWA) and the Zone V boundary. These areas have special flood hazards associated with high velocity waters from surges and, therefore, in addition to meeting all provisions of this ordinance and the State of Oregon Specialty Codes, the following provisions shall apply in addition to the general standards provisions in section 5.1.

5.3.1 DEVELOPMENT STANDARDS

A. All new construction and substantial improvements in Zones V1-V30 and VE, V, and coastal A zones (where base flood elevation data is available) shall be elevated on pilings and columns such that:

   i. The bottom of the lowest horizontal structural member of the lowest floor (excluding the pilings or columns) is elevated a minimum of one foot above the base flood level; and

   ii. The pile or column foundation and structure attached thereto is anchored to resist flotation, collapse and lateral movement due to the effects of wind and water loads acting simultaneously on all building components. Water loading values used shall be those associated with the base flood. Wind loading values used shall be those specified by the State of Oregon Specialty Codes;

B. A registered professional engineer or architect shall develop or review the structural design, specifications and plans for the construction, and shall certify that the design and methods of construction to be used are in accordance with accepted standards of practice for meeting the provisions of this section.

C. Obtain the elevation (in relation to mean sea level) of the bottom of the lowest horizontal structural member of the lowest floor (excluding pilings and columns) of all new and substantially improved structures and whether or not such structures contain a basement. The floodplain administrator shall maintain a record of all such information in accordance with section 4.2.2.

D. Provide that all new construction and substantial improvements have the space below the lowest floor either free of obstruction or constructed with non- supporting breakaway walls, open wood lattice-work, or insect

screening intended to collapse under wind and water loads without causing collapse, displacement, or other structural damage to the elevated portion of the building or supporting foundation system.

For the purpose of this section, a breakaway wall shall have a design safe loading resistance of not less than 10 and no more than 20 pounds per square foot. Use of breakaway walls which exceed a design safe loading resistance of 20 pounds per square foot (either by design or when so required by local or state codes) may be permitted only if a registered professional engineer or architect certifies that the designs proposed meet the following conditions:

i. Breakaway wall collapse shall result from water load less than that which would occur during the base flood; and

ii. Such enclosed space created by breakaway walls shall be useable solely for parking of vehicles, building access, or storage. Such space shall not be used for human habitation.

iii. Walls intended to break away under flood loads shall have flood openings that meet or exceed the criteria for flood openings in section 5.2.1.

E. The elevated portion of the building and supporting foundation system shall not be subject to collapse, displacement, or other structural damage due to the effects of wind and water loads acting simultaneously on all building components (structural and nonstructural). Maximum water loading values to be used in this determination shall be those associated with the base flood. Maximum wind loading values used shall be those specified by the State of Oregon Specialty Codes.

F. Prohibit the use of fill for structural support of buildings.

G. All new construction shall be located landward of the reach of mean high tide.

H. Prohibit man-made alteration of sand dunes which would increase potential flood damage.

I. All structures, including but not limited to residential structures, non-residential structures, appurtenant structures, and attached garages shall comply with all the requirements of section 5.3.1 Floodproofing of non-residential structures is prohibited.

5.3.1.1 MANUFACTURED DWELLING STANDARDS FOR COASTAL HIGH HAZARD ZONES

All manufactured dwellings to be placed (new or replacement) or substantially improved within Coastal High Hazard Areas (Zones V, V1-30, VE, or Coastal A) shall meet the following requirements:

A. Comply with all of the standards within section 5.3;

B. The bottom of the longitudinal chassis frame beam shall be elevated to a minimum of one foot above the Base Flood Elevation (BFE); and

C. Electrical crossover connections shall be a minimum of 12 inches above the BFE.

5.3.1.2 RECREATIONAL VEHICLE STANDARDS FOR COASTAL HIGH HAZARD ZONES

Recreational Vehicles within Coastal High Hazard Areas (Zones V, V1-30, VE, or Coastal A) shall either:

A. Be on the site for fewer than 180 consecutive days, and

B. Be fully licensed and ready for highway use, on wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices and has no permanently attached additions.

5.3.1.3 TANK STANDARDS FOR COASTAL HIGH HAZARD ZONES

Tanks shall meet the requirements of section 5.1.5 and 6.0.

6.0 STANDARDS FOR PROTECTION OF SPECIAL FLOOD HAZARD AREA FLOODPLAIN FUNCTIONS

The standards described below apply to all special flood hazard areas as defined in section 2.0.

6.1 NO NET LOSS STANDARDS

A. No net loss of the three floodplain functions, which are flood storage, water quality, and vegetation, is required for development in the special flood hazard area that would reduce flood storage capacity, reduce pervious surface, or result in a loss of trees that are 6-inches dbh or greater. No net loss can be achieved by avoiding impacts, minimizing remaining impacts, and mitigating or otherwise compensating for, offsetting, or rectifying the adverse impacts to the three floodplain functions.

B. Compliance with no net loss for flood storage capacity, pervious surface, and trees 6-inches dbh or greater is preferred to occur prior to the loss of floodplain function but,

at a minimum, shall be completed before the floodplain development permit is closed or a certificate of occupancy is issued.

C. No net loss must be provided, in order of preference, within: 1) the special flood hazard area of the lot or parcel that floodplain functions were removed from, 2) the special flood hazard area and the same reach of the waterbody where the development is proposed, or 3) the special flood hazard area within the same watershed (10-digit hydrologic unit code) as the proposed development. Table 1 presents the no net loss ratios, which increase based on the preferences listed above.

6.1.1 FLOOD STORAGE CAPACITY (COMPENSATORY STORAGE)

Mitigation for net reductions in flood storage capacity shall occur based on the ratios in Table 1. Compensatory flood storage capacity must be:

A. Fish-accessible and egressable to the greatest extent possible as determined by a QUALIFIED PROFESSIONAL SUCH AS A BIOLOGIST;

B. At a hydraulically equivalent elevation, which is the same elevation relative to the BFE as the development that causes an impact or within 1 foot of the hydraulically equivalent elevation. Hydraulically equivalent elevations can be determined by elevation data or best available water surface profiles;

C. Hydrologically connected to the waterbody that is the flooding source;

D. Designed so that there is no increase in velocity and vegetated with non-invasive plants.

6.1.2 PERVIOUS SURFACES

Mitigation for net reductions in pervious surface shall occur through any of the following options:

A. Development shall not result in a net reduction in pervious surface area within the special flood hazard area; or

B. The reduction of pervious surfaces must be offset by removing an equal area of impervious surface; or

C. Low impact development or green infrastructure shall be used to infiltrate and treat stormwater produced from new impervious surfaces, as documented by a QUALIFIED PROFESSIONAL SUCH AS A HYDROLOGIST OR ENGINEER; or

D. If **6.1.2 (A)-(C)** are not feasible, as documented by a QUALIFIED PROFESSIONAL SUCH AS A HYDROLOGIST OR ENGINEER, stormwater retention shall be required to ensure no increase in peak volume or flow and

to maximize infiltration. Treatment is required to minimize pollutant loading. See section **6.2.C** for stormwater retention specifications.

6.1.3 TREES

A. Development shall result in no net loss of trees 6-inches dbh or greater within the special flood hazard area. This requirement does not apply to silviculture practices that do not meet the definition of development.

i. Trees of or exceeding 6-inches dbh that are removed must be replaced at the ratio in Table 1 and planted within the special flood hazard area.

ii. Replacement trees must be tree species native to the project area.

6.2 STORMWATER MANAGEMENT

Any development that cannot achieve no net loss of pervious surface as specified in **6.1.2 (A)-(C)** must include the following:

A. Water quality (pollution reduction) treatment for post-construction stormwater runoff from any net increase in impervious area; and

B. Water quantity treatment (retention or detention facilities), unless the water discharges into the ocean.

C. Retention and detention facilities must:

i. Limit discharge to match the pre-development peak discharge rate (i.e., the discharge rate of the site based on its natural groundcover and grade before any development occurred) for the 10-year peak flow using a continuous simulation for flows between 50 percent of the 2-year event and the 10-year flow event (annual series).

ii. Treat stormwater to remove sediment and pollutants from impervious surfaces such that at least 80 percent of the suspended solids are removed from the stormwater prior to discharging to the receiving water body.

iii. Be designed to not entrap fish.

iv. Be designed by a QUALIFIED PROFESSIONAL AS DETERMINED BY THE COMMUNITY SUCH AS A HYDROLOGIST OR ENGINEER.

D. Detention facilities must:

i. Drain to the source of flooding.

E. Stormwater treatment practices for multi-parcel facilities, including subdivisions or proposals with a common plan of development, shall have an enforceable operation and maintenance agreement to ensure the system functions as designed. This agreement will include:

i. Access to stormwater treatment facilities at the site by the COMMUNITY TYPE (e.g., city, county) for the purpose of inspection and repair.

ii. A legally binding document specifying the parties responsible for the proper maintenance of the stormwater treatment facilities. The agreement shall be recorded with the COMMUNITY TYPE (e.g., city, county) Recorder's Office and shall remain with the title of the property regardless of ownership.

iii. For stormwater controls that include vegetation and/or soil permeability, the operation and maintenance manual must include maintenance of these elements to maintain the functionality of the feature.

iv. The responsible party for the operation and maintenance of the stormwater facility shall have the operation and maintenance manual available at all times. Records of the maintenance and repairs shall be retained and made available for inspection by the COMMUNITY TYPE (e.g., city, county).

6.3 ACTIVITIES EXEMPT FROM NO NET LOSS STANDARDS

The following activities are not subject to the no net loss standards in section **6.1**; however, they may not be exempt from floodplain development permit requirements.

A. Maintenance, repair, or remodel of existing buildings, facilities, and utilities within their existing footprints, such as re-roofing, replacing siding, or replacing downed power lines and utility poles, provided there is no net change in footprint. This includes in-kind repair and replacement that occurs after a disaster (e.g., wildfire) so long as the footprint remains the same as that of the pre-disaster building, facility, or utility.

B. Normal street, sidewalk, and road maintenance, including farm and forest roads, and including filling potholes, repaving, and installing signs and traffic signals, that does not alter contours, uses, or culverts. Exempt activities do not include vertical or horizonal expansion of paved areas.

C. Routine maintenance of landscaping that does not involve grading, excavation, or filling.

D. Lawn care, gardening, removal of noxious weeds and hazard trees, and replacement of non-native vegetation with native vegetation.

E. Routine agricultural practices such as tilling, plowing, harvesting, soil amendments, and ditch cleaning that does not alter the ditch configuration provided the spoils are removed from special flood hazard area or tilled into fields as a soil amendment.

F. Routine silviculture practices (i.e., harvesting of trees), including hazardous fuels reduction and hazard tree removal, as long as root balls are left in place.

G. Normal maintenance of above ground utilities and facilities, such as replacing downed power lines and utility poles provided there is no net change in footprint.

H. Normal maintenance of a levee or other flood control facility prescribed in the operations and maintenance plan for the levee or flood control facility. Normal maintenance does not include repair from flood damage, expansion of the prism, expansion of the face or toe or addition of protection on the face or toe with rock armor.

I. Habitat restoration activities.

J. Temporary stockpiling or storage of materials and equipment. Temporary is defined as up to 6 months.

K. Pre-emptive removal of documented susceptible trees to manage the spread of invasive species.

6.4 RIPARIAN BUFFER ZONE (RBZ)

All development in the riparian buffer zone (RBZ, defined in section **2.0**) except those listed in section **6.3** of this ordinance must comply with the following requirements:

A. Functionally dependent uses as defined in section **2.0** are subject to the no net loss standards in section **6.1** for development in the RBZ.

B. Non-functionally dependent uses as defined in section **2.0** are subject to no net loss as described in section **6.1** and the beneficial gain standard as defined in section **2.0**.

i. To comply with the beneficial gain standard, the mitigation site must be:

1. Located within the RBZ and within the same reach as the project; and

2. Equivalent in area to 5 percent of the project area within the RBZ that is a non-functionally dependent use; and

3. Planted with herbaceous, shrub, and tree vegetation native to the project area.

C. Ancillary features that are associated with a functionally dependent use and located in in the RBZ are subject to no net loss as described in section **6.1** and the beneficial gain standard as defined in section **2.0** and **6.4(b)(i)**.

Table 1. Propposed No Net Loss Mitigation Ratios and Multipliers

Location of Impact	Proportion of Mitigation to Impact (Mitigation : Impact)				
	Flood Storage Capacity	Pervious Surface	Trees [3]		
			(6-inches dbh to 20-inches dbh)	(Greater than 20-inches dbh to 39-inches dbh)	(Greater than 39-inches dbh)
Impact Occurring in the Mapped Floodway [1]	2:1	1:1	3:1	5:1	6:1
Impact Occurring in the Riparian Buffer Zone (RBZ) [2]	2:1	1:1	3:1	5:1	6:1
Impact Occurring Outside the Floodway and RBZ, in remainder of SFHA	1.5:1	1:1	2:1	4:1	5:1
Mitigation Location Multipliers [4]					
Mitigation occurring on-site or off-site in the same reach [5]	100%	100%	100%	100%	100%
Mitigation occurring off-site, in a different reach, but within the same watershed (i.e., 10-digit Hydrologic Unit Code [HUC]) [6]	200%	200%	200%	200%	200%

Conditions:

1. When the floodway is not mapped, the mitigation ratios for the RBZ and remainder of the SFHA would be used.
2. Impacts that occur in the RBZ must be mitigated in the RBZ.
3. Trees planted for mitigation do not have a specified dbh; however, they must be native species.
4. Mitigation multipliers of 100 percent result in the required mitigation occurring at the same value described by the ratios above, while multipliers of 200 percent result in the required mitigation being doubled.
    a. For example, if a development would create 1,000 square feet of new impervious surface, then 1,000 square feet of new pervious surface would need to be created. However, if only 500 square feet can be created on-site and in the same reach, the remaining 500 square feet created off-site along a different reach would need to be created at double the required amount as a result of the 200 percent multiplier. That is, another 1,000 square feet of pervious surface would need to be created at the off-site location, in addition to the 500 square feet created on-site.
5. Reach is defined as a section of a stream or river along which similar hydrologic conditions exist, such as discharge, depth, area, and slope. It can also be the length of a stream or river (with varying hydrologic conditions) between major tributaries or two stream gages, or a length of river for which the characteristics are well described by readings at a single stream gage.
6. Watersheds are determined by the U.S. Geological Survey using the 10-digit HUC area.

2024 Revised Draft Implementation Plan
Appendix C Ordinance Checklist

Draft NFIP-ESA Oregon Implementation Plan Guidance

Ordinance Checklist

For Participating Communities in the Implementation Plan Area

August 2025

FEMA

Federal Emergency Management Agency
Region 10
Department of Homeland Security
130 – 228th Street SW
Bothell, WA 98021

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Bottom Left: Salmon swimming across the road: Nature Pic of the Day (NPOD), https://www.naturepicoftheday.com/archive/2019-03-23

Table of Contents

Acronyms and Abbreviations

CLOMR	Conditional letter or map revision
dbh	diameter at breast height
FEMA	Federal Emergency Management Agency
HUC	Hydrologic Unit Code
MS4	Municipal Separate Storm Sewer System
NFIP	National Flood Insurance Program
RBZ	riparian buffer zone
SFHA	Special Flood Hazard Area

CHAPTER 1 Introduction

The Federal Emergency Management Agency (FEMA) has developed this ordinance checklist to address the requirements outlined in the 2024 Draft Oregon Implementation Plan for National Flood Insurance Program (NFIP)-Endangered Species Act (ESA) Integration ("2024 Draft Implementation Plan"). This ordinance checklist provides the tools a community would need to implement "Path B" of the 2024 Draft Implementation Plan.

An NFIP participating community located in the Oregon plan area may have elements of the model floodplain management ordinance (Path A) spread across multiple ordinances or elements may be implemented through other local, regional, or state-wide enforceable requirements. For example, a community may already have compliant requirements for impervious surfaces codified in stormwater management codes. This ordinance checklist (Path B) provides communities the opportunity to demonstrate compliance with the no net loss standards without having to adopt duplicative rules through the model ordinance. Communities would submit this ordinance checklist to FEMA to document how the existing, revised, and newly adopted codes collectively meet the no net loss standards for flood storage, water quality, and vegetation. FEMA would review the checklist and approve it, or provide feedback, to ensure consistency with the no net loss standards.

FEMA appreciates that Oregon has a variety of land use and environmental protection laws, including the Oregon Removal-Fill Law (ORS 196.795-990) and Municipal Separate Storm Sewer System (MS4) requirements that may at least partially address implementation of the no net loss standards. If any of these local, regional, or state-wide enforceable requirements address one or more of the no net loss standards, an NFIP community may use the ordinance checklist (Path B) to demonstrate compliance with those applicable elements, if they achieve or exceed the no net loss standard for a given floodplain function or geographic area. For example, the Oregon Removal-Fill Law applies to development in a state wetland or waterway but does not account for the entire Special Flood Hazard Area (SFHA). MS4 does not apply to all types of development or outside of an urbanized area. If existing codes or requirements do not cover all the no net loss standards, communities would need to adopt elements of the model ordinance for the elements of the no net loss standards that are not covered to incorporate the missing standards in its code.

FEMA anticipates that communities may use this approach most commonly for the water quality floodplain function, to demonstrate no net loss of function in the SFHA as mitigated through stormwater and water quality management. In the future, if state requirements change and apply to other types of development or geographic areas, communities could update their ordinance checklist to demonstrate compliance and remove redundant requirements.

Communities choosing this path would use the checklist in Chapter 2 to identify existing requirements that are equivalent to the standards in the model ordinance. The checklist may also be used to provide comments or explain the adequacy of existing requirements to achieve each no net loss standard. **Table 1** presents the mitigation ratios required to offset impacts on each floodplain function to achieve no net loss of floodplain functions. Communities should show how existing requirements achieve or exceed these mitigation ratios.

Table 1. Mitigation Ratios to Offset Development Impacts on Floodplain Functions

Location of Impact	Proportion of Mitigation to Impact (Mitigation: Impact)				
	Flood Storage Capacity	Pervious Surface	Trees[3]		
			(6-inches dbh to 20-inches dbh)	(Greater than 20-inches dbh to 39-inches dbh)	(Greater than 39-inches dbh)
Impact Occurring in the Mapped Floodway[1]	2:1	1:1	3:1	5:1	6:1
Impact Occurring in the Riparian Buffer Zone (RBZ)[2]	2:1	1:1	3:1	5:1	6:1
Impact Occurring Outside the Floodway and RBZ, in remainder of SFHA	1.5:1	1:1	2:1	4:1	5:1
Mitigation Location Multipliers[4]					
Mitigation occurring on-site or off-site in the same reach[5]	100%	100%	100%	100%	100%
Mitigation occurring off-site, in a different reach, but within the same watershed (i.e., 10-digit Hydrologic Unit Code [HUC])[6]	200%	200%	200%	200%	200%

Conditions:

1. When the floodway is not mapped, the mitigation ratios for the RBZ and remainder of the SFHA would be used.
2. Impacts that occur in the RBZ must be mitigated in the RBZ.
3. Trees planted for mitigation do not have a specified dbh; however, they must be native species.
4. Mitigation multipliers of 100 percent result in the required mitigation occurring at the same value described by the ratios above, while multipliers of 200 percent result in the required mitigation being doubled.
   a. For example, if a development would create 1,000 square feet of new impervious surface, then 1,000 square feet of new pervious surface would need to be created. However, if only 500 square feet can be created on-site and in the same reach, the remaining 500 square feet created off-site along a different reach would need to be created at double the required amount as a result of the 200 percent multiplier. That is, another 1,000 square feet of pervious surface would need to be created at the off-site location, in addition to the 500 square feet created on-site.
5. Reach is defined as a section of a stream or river along which similar hydrologic conditions exist, such as discharge, depth, area, and slope. It can also be the length of a stream or river (with varying hydrologic conditions) between major tributaries or two stream gages, or a length of river for which the characteristics are well described by readings at a single stream gage.
6. Watersheds are determined by the U.S. Geological Survey using the 10-digit HUC area.

CHAPTER 2 Ordinance Checklist

This checklist is intended to provide a format for implementation of Path B of the 2024 Draft Implementation Plan for NFIP-ESA Integration in the Oregon plan area. The recommended language from the model ordinance is noted in the first column. If a community has already adopted the provision, the specific ordinance or code citation or other regulatory reference should be entered in the third column under "Community Regulations Citation." Any comments from the community on how existing requirements meet the element of the model ordinance should be included in the fourth column "Community Comments and Explanations." If a community's regulations do not fulfill the provision, the noted language from the model ordinance in the first column "Model Ordinance Text" would need to be adopted.

2024 NFIP-ESA Integration Model Ordinance Text	Ordinance Section	Community Regulations Citation	Community Comments and Explanations	FEMA Reviewer Comments	In compliance (Y/N)
Definitions:					
Beneficial Gain: An area within the riparian buffer zone, within the same reach as the project, and that is equivalent to 5 percent of the area impacted within the RBZ that is not a functionally dependent use would be planted with native riparian herbaceous, shrub, and tree vegetation.	2.0				
Fill: Placement of any materials such as soil, gravel, crushed stone, or other materials that change the topographic elevation within the floodplain. The placement of fill is considered "development."	2.0				
Fish: A diverse group of animals with gills and fins that live in water, including all life stages.	2.0				
Fish Accessible: Available to fish to access.	2.0				
Fish Egressable: Available to fish to exit or leave from.	2.0				
Flood Storage: The three-dimensional space (i.e., volume) between the existing ground and the base flood elevation in which floodwaters flow during the 1-percent annual chance flood.	2.0				
Flood Storage Capacity: The flood storage volume that is unoccupied by any development including, but not limited to fill, structures, concrete structures (vaults or tanks), pilings, levees and dikes, or any other development that reduces flood storage and fish refugia. See "Flood Storage" definition.	2.0				
Green Infrastructure: Use of natural or human-made hydrologic features to manage water, water quality, and provide environmental and community benefits. Green infrastructure uses approaches and technologies that use, enhance, and/or mimic the natural hydrologic cycle processes of infiltration, evapotranspiration, and reuse. At a large scale, it is an interconnected network of green space that conserves natural systems and provides assorted benefits to human populations. At a local scale, green infrastructure manages stormwater by infiltrating it into the ground where it is generated using vegetation or porous surfaces, or by capturing it for later reuse. Green infrastructure practices can be used to achieve no net loss of pervious surface by creating infiltration of stormwater in an amount equal to or greater than the infiltration lost by the placement of new impervious surface.	2.0				
Habitat Restoration Activities: Activities with the sole purpose of restoring natural fish and wildlife habitats that have only temporary impacts and long-term benefits to habitat. Such projects cannot include ancillary structures such as a storage shed for maintenance equipment, must demonstrate that no rise in the BFE would occur as a result of the project, must obtain a CLOMR and LOMR, and have obtained any other required permits (e.g., CWA Section 404 permit).	2.0				

2024 NFIP-ESA Integration Model Ordinance Text	Ordinance Section	Community Regulations Citation	Community Comments and Explanations	FEMA Reviewer Comments	In compliance (Y/N)
Hazard Trees: Standing dead, dying, diseased, infested trees, or ones with a structural defect that makes it likely to fail in whole or in part and that present a potential hazard to a structure, pose a safety threat from the risk of falling on a road, building, or otherwise creates a risk of damage or injury.	2.0				
Hydraulically Equivalent Elevation: A location (e.g., a site where no net loss standards are implemented) in which the difference between the ground surface elevation and the 100-year water surface elevation or base flood elevation is equivalent to another location (e.g., the impacted site). Hydraulically equivalent elevations can be determined by elevation data, observed ordinary-high water mark, ordinary-high water marks determined by a state or federal agency, or best available water surface profiles.	2.0				
Hydrologically Connected: Connected in such a manner that precipitation will run off directly into a watercourse.	2.0				
Impervious Surface: A surface that cannot be penetrated by water and thereby prevents infiltration.	2.0				
Low Impact Development: An approach to land development (or redevelopment) that works with nature to manage stormwater at or near its source. It employs principles such as preserving and recreating natural landscape features, and minimizing imperviousness to create functional site drainage. Low Impact Development refers to designing and implementing practices that can be employed at the site level to control stormwater and help replicate the predevelopment hydrology of the site. Low impact development helps achieve no net loss of pervious surface by infiltrating stormwater in an amount equal to or greater than the infiltration lost by the placement of new impervious surface. Low Impact Development is a subset of green infrastructure.	2.0				
Mean Higher-High Water: The 19-year average of the higher high-tide water height of each tidal day observed over the National Tidal Datum Epoch.	2.0				
No Net Loss: A standard wherein adverse impacts on floodplain functions must be avoided or offset through mitigation so that there is no net change in the function from the authorized existing condition. The floodplain functions of flood storage, water quality, and vegetation must be maintained.	2.0				
Offsite: Mitigation occurring on tax lots or parcels that are not contiguous with the tax lots or parcels containing the impact area.	2.0				
Onsite: Mitigation occurring within tax lots or parcels contiguous with the tax lots or parcels containing the impact area.	2.0				

2024 NFIP-ESA Integration Model Ordinance Text	Ordinance Section	Community Regulations Citation	Community Comments and Explanations	FEMA Reviewer Comments	In compliance (Y/N)
Ordinary High Water Mark: The line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank; shelving; changes in the character of soil; destruction of terrestrial vegetation; the presence of litter and debris; or other appropriate means that consider the characteristics of the surrounding areas.	2.0				
Qualified Professional: Appropriate subject matter expert that is defined by the community. Qualified professionals may include surveyors, biologists, hydrologists, engineers, arborists, or other specialties depending on the expertise needed.	2.0				
Reach: A section of a stream or river along which similar hydrologic conditions exist, such as discharge, depth, area, and slope. It can also be the length of a stream or river (with varying hydrologic conditions) between major tributaries or two stream gages, or a length of river for which the characteristics are well described by readings at a single stream gage.	2.0				
Riparian Buffer Zone (RBZ): The boundary of the riparian buffer zone is measured from the ordinary high water mark (OHWM) of a fresh waterbody (lake; pond; ephemeral, intermittent, or perennial stream) or mean higher-high water (MHHW) line of a marine shoreline or tidally influenced river reach to 170 feet inland. The riparian buffer zone includes the area between these boundaries on each side of the stream, including the stream channel. Where the RBZ is larger than the special flood hazard area, the no net loss standards shall only apply to the area within the special flood hazard area.	2.0				
Silviculture: The art and science of controlling the establishment, growth, composition, health, and quality of forests and woodlands.	2.0				
Modifications/Additions to Oregon Model Flood Hazard Ordinance					
Review all development permits to determine whether the proposed development activity complies with the no net loss standards.	4.2.1.I				
The following information shall be obtained and maintained and shall be made available for public inspection as needed: documentation demonstrating compliance with no net loss standards.	4.2.2.K				
Variances shall not be issued unless it is demonstrated that the development will result in no net loss of the following three floodplain functions in the SFHA, as determined by proxy: flood storage capacity; pervious surface; and trees 6-inches diameter at breast height (dbh)[1] or greater.	4.4.1.F				
In all special flood hazard areas, the no net loss standards shall be adhered to.	5.1				
All new subdivision proposals and other proposed new developments (including proposals for manufactured dwelling parks and subdivisions) must comply with no net loss standards.	5.1.6.B				

2024 NFIP-ESA Integration Model Ordinance Text	Ordinance Section	Community Regulations Citation	Community Comments and Explanations	FEMA Reviewer Comments	In compliance (Y/N)
In areas where a regulatory floodway has not been designated, no new construction, substantial improvement, or other development (including fill) shall be permitted within Zones A1-30 and AE on the community's Flood Insurance Rate Map (FIRM), unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community and will not result in the net loss of flood storage capacity.	5.2.3.1				
A community may permit encroachments within the adopted regulatory floodway that would result in an increase in base flood elevations, provided that a Conditional Letter of Map Revision (CLOMR) is applied for and approved by the Federal Insurance Administrator, and the requirements for such revision as established under Volume 44 of the Code of Federal Regulations, section 65.12 are fulfilled, and the encroachment(s) complies with the no net loss standards.	5.2.4.A				
All new construction, substantial improvements, and other development shall comply with the no net loss standards.	5.2.4.B				
Tanks in the Coastal High Hazard Area shall meet the no net loss standards.	5.3.1.3				
No Net Loss Standards					
No net loss of the three floodplain functions, which are flood storage, water quality, and vegetation, is required for development in the special flood hazard area that would reduce flood storage capacity, reduce pervious surface, or result in a loss of trees that are 6-inches diameter at breast height (dbh) or greater. No net loss can be achieved by avoiding impacts, minimizing remaining impacts, and mitigating/or otherwise compensating for, offsetting, or rectifying the adverse impacts to the three floodplain functions.	6.1.A				
Compliance with no net loss for flood storage capacity, pervious surface, and trees 6-inches dbh or greater is preferred to occur prior to the loss of floodplain function but, at a minimum, shall be completed before the floodplain development permit is closed or a certificate of occupancy is issued.	6.1.B				
No net loss must be provided, in order of preference, within: 1) the special flood hazard area of the lot or parcel that floodplain functions were removed from, 2) the special flood hazard area and the same reach of the waterbody where the development is proposed, or 3) the special flood hazard area within the same watershed (10-digit hydrologic unit code) as the proposed development. Table 1 presents the mitigation ratios required to achieve no net loss of floodplain functions, which increase based on the preferences listed above.	6.1.C				
Mitigation for net reductions in flood storage capacity shall occur based on the ratios in Table 1.	6.1.1				

2024 NFIP-ESA Integration Model Ordinance Text	Ordinance Section	Community Regulations Citation	Community Comments and Explanations	FEMA Reviewer Comments	In compliance (Y/N)
Compensatory flood storage capacity must be fish-accessible and egressable to the greatest extent possible as determined by a qualified professional.	6.1.1.A				
Compensatory volume for flood storage capacity must be at a hydraulically equivalent elevation, which is the same elevation relative to the BFE as the development that causes an impact or within 1 foot of the hydraulically equivalent elevation. Hydraulically equivalent elevations can be determined by elevation data or best available water surface profiles.	6.1.1.B				
Compensatory volume for flood storage capacity must be hydrologically connected to the waterbody that is the flooding source.	6.1.1.C				
Compensatory volume for flood storage capacity must be designed so that there is no increase in velocity and vegetated with non-invasive plants.	6.1.1.D				
Development shall not result in a net reduction in pervious surface area within the special flood hazard area.	6.1.2.A				
The reduction of pervious surfaces must be offset by removing an equal area of impervious surface.	6.1.2.B				
Low impact development or green infrastructure shall be used to infiltrate and treat stormwater produced from new impervious surfaces, as documented by a qualified professional.	6.1.2.C				
If **6.1.2 (A)-(C)** are not feasible [i.e., avoid reductions in pervious surface or mitigate through removal of impervious surface or low impact development or green infrastructure], as documented by a qualified professional, stormwater retention shall be required to ensure no increase in peak volume or flow and to maximize infiltration. Treatment is required to minimize pollutant loading. See section **6.2.C** [i.e., stormwater management requirements] for stormwater retention specifications.	6.1.2.D				
Development shall result in no net loss of trees 6-inches dbh or greater within the special flood hazard area. This requirement does not apply to silviculture practices that do not meet the definition of development.	6.1.3.A				
Trees of or exceeding 6-inches dbh that are removed must be replaced at the ratio in Table 1 and planted within the special flood hazard area.	6.1.3.A.i				
Replacement trees must be tree species native to the project area.	6.1.3.A.ii				
Any development that cannot achieve no net loss of pervious surface as specified in **6.1.2 (A)-(C)** [i.e., avoid reductions in pervious surface or mitigate through removal of impervious surface or low impact development or green infrastructure] must include the following: A. Water quality (pollution reduction) treatment for post-construction stormwater runoff from any net increase in impervious area; and B. Water quantity treatment (retention or detention facilities), unless the water discharges into the ocean.	6.2.A-B				

2024 NFIP-ESA Integration Model Ordinance Text	Ordinance Section	Community Regulations Citation	Community Comments and Explanations	FEMA Reviewer Comments	In compliance (Y/N)
Retention and detention facilities must: i. Limit discharge to match the pre-development peak discharge rate (i.e., the discharge rate of the site based on its natural groundcover and grade before any development occurred) for the 10-year peak flow using a continuous simulation for flows between 50 percent of the 2-year event and the 10-year flow event (annual series). ii. Treat stormwater to remove sediment and pollutants from impervious surfaces such that at least 80 percent of the suspended solids are removed from the stormwater prior to discharging to the receiving water body. iii. Be designed to not entrap fish. iv. Be designed by a qualified professional. Detention facilities must: i. Drain to the source of flooding.	6.2.C-D				
Stormwater treatment practices for multi-parcel facilities, including subdivisions or proposals with a common plan of development, shall have an enforceable operation and maintenance agreement to ensure the system functions as designed. This agreement will include: i. Access to stormwater treatment facilities at the site by the community staff for the purpose of inspection and repair. ii. A legally binding document specifying the parties responsible for the proper maintenance of the stormwater treatment facilities. The agreement shall be recorded with the community Recorder's Office and shall remain with the title of the property regardless of ownership. iii. For stormwater controls that include vegetation and/or soil permeability, the operation and maintenance manual must include maintenance of these elements to maintain the functionality of the feature. iv. The responsible party for the operation and maintenance of the stormwater facility shall have the operation and maintenance manual available at all times. Records of the maintenance and repairs shall be retained and made available for inspection by the community.	6.2.E				

2024 NFIP-ESA Integration Model Ordinance Text	Ordinance Section	Community Regulations Citation	Community Comments and Explanations	FEMA Reviewer Comments	In compliance (Y/N)
The following activities are not subject to the no net loss standards; however, they may not be exempt from floodplain development requirements. A. Maintenance, repair, or remodel of existing buildings, facilities, and utilities within their existing footprints, such as re-roofing, replacing siding, or replacing downed power lines and utility poles, provided there is no net change in footprint. This includes in-kind repair and replacement that occurs after a disaster (e.g., wildfire) so long as the footprint remains the same as that of the pre-disaster building, facility, or utility. B. Normal street, sidewalk, and road maintenance, including farm and forest roads, and including filling potholes, repaving, and installing signs and traffic signals, that does not alter contours, uses, or culverts. Exempt activities do not include vertical or horizonal expansion of paved areas. C. Routine maintenance of landscaping that does not involve grading, excavation, or filling. D. Lawn care, gardening, removal of noxious weeds and hazard trees, and replacement of non-native vegetation with native vegetation D. Routine agricultural practices such as tilling, plowing, harvesting, soil amendments, and ditch cleaning that does not alter the ditch configuration provided the spoils are removed from special flood hazard area or tilled into fields as a soil amendment. E. Routine silviculture practices (harvesting of trees), including hazardous fuels reduction and hazard tree removal, as long as root balls are left in place. F. Normal maintenance of above ground utilities and facilities, such as replacing downed power lines and utility poles provided there is no net change in footprint. H. Normal maintenance of a levee or other flood control facility prescribed in the operations and maintenance plan for the levee or flood control facility. Normal maintenance does not include repair from flood damage, expansion of the prism, expansion of the face or toe or addition of protection on the face or toe with rock armor. I. Habitat restoration activities. J. Temporary stockpiling or storage of materials and equipment. Temporary is defined as up to 6 months. K. Pre-emptive removal of documented susceptible trees to manage the spread of invasive species.	6.3				

2024 NFIP-ESA Integration Model Ordinance Text	Ordinance Section	Community Regulations Citation	Community Comments and Explanations	FEMA Reviewer Comments	In compliance (Y/N)
All development in the riparian buffer zone except those listed in section **6.3** [i.e., avoid reductions in pervious surface or mitigate through removal of impervious surface or low impact development or green infrastructure] must comply with the following requirements: A. Functionally dependent uses as defined in section 2.0 (i.e., definitions) are subject to the no net loss standards for development in the RBZ. B. Non-functionally dependent uses as defined in section 2.0 (i.e., definitions) are subject to no net loss as described in section 6.1 (i.e., no net loss standards) and the beneficial gain standard as defined in section 2.0. C. Ancillary features that are associated with a functionally dependent use and located in in the RBZ are subject to no net loss as described in section **6.1** (i.e., no net loss standards) and the beneficial gain standard as defined in section **2.0.** To comply with the beneficial gain standard, the mitigation site must be: A. Located within the RBZ and within the same reach as the project; and B. Equivalent in area to 5 percent of the project area within the RBZ that is a non-functionally dependent use; and C. Planted with herbaceous, shrub, and tree vegetation native to the project area.	6.4				
Mitigation Ratios: Confirm that the mitigation ratios for flood storage capacity, pervious surface, and trees 6 inches dbh and greater conform to those in Table 1. Mitigation ratios vary by tree size and location of impacts (i.e., within the floodway, RBZ, or outside of the RBZ in the remainder of the SFHA) as well as multipliers for mitigation occurring offsite, within a different reach, but within the same watershed (i.e., 10-digit Hydrologic Unit Code [HUC]).	Table 1				

Note:
[1] Diameter at breast height is tree diameter measured at 4.5 feet from the ground surface.

2024 Revised Draft Implementation Plan
Appendix D Customized Community Plan Procedures

Draft NFIP-ESA Oregon Implementation Plan Guidance

Customized Community Plan Procedures

August 2025

FEMA

Federal Emergency Management Agency
Region 10
Department of Homeland Security
130 – 228th Street SW
Bothell, WA 98021

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Table of Contents

Attachment

Figures

Tables

Acronyms and Abbreviations

CFR	Code of Federal Regulations
CCP	Customized Community Plan
EFH	Essential Fish Habitat
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
NFIP	National Flood Insurance Program
NMFS	National Marine Fisheries Service
PBF	Physical and Biological Features
RBZ	Riparian Buffer Zone
SFAM	Stream Function Assessment Method
SFHA	Special Flood Hazard Area
USFWS	United States Fish and Wildlife Service

Chapter 1. Introduction

1.1. Purpose

The purpose of this guidance is to assist National Flood Insurance Program (NFIP) participating communities in the Oregon plan area in developing a Customized Community Plan (CCP). This guidance is structured to describe the necessary components of a CCP; however, the complexity and level of detail in a CCP may vary widely depending on a community's proposed approach to achieve no net loss. Examples are provided throughout this document to help describe what a CCP shall encompass and how the CCP shall be developed. All CCPs would need to be reviewed and approved by the Federal Emergency Management Agency (FEMA) before the community could be determined to be in compliance with the no net loss standards.

1.2. Background

FEMA implements the NFIP, which was designed so that floodplain management would be regulated and carried out at the state and local levels, where land use authority resides. Communities are not legally required to participate in the program; they participate voluntarily to obtain access to federally underwritten flood insurance and certain federal financial assistance. Communities choosing to participate in the NFIP are required to adopt and enforce floodplain management regulations (e.g., ordinances, bylaws, resolutions, codes, or policies) that meet the NFIP minimum floodplain management standards (44 Code of Federal Regulations [CFR] 59.2(b), 59.22(a)(3), 60.1(d), 60.3(a)-(f), 60.6).

In 2011, FEMA consulted with the National Marine Fisheries Service (NMFS) under the ESA on the implementation of the NFIP in Oregon. NMFS concluded in their 2016 Biological Opinion (BiOp) that implementation of the NFIP in the Oregon plan area is likely to jeopardize the continued existence of 16 ESA-listed fish species and the Southern Resident killer whale and adversely modify essential fish habitat (EFH).

"Jeopardize the continued existence of" means to engage in an action that would reasonably be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR 402.02).

In developing the 2024 Draft Oregon Implementation Plan for NFIP-ESA Integration (revised 2024 Draft Implementation Plan), FEMA worked with the Oregon Department of Land Conservation and Development (DLCD) and interested stakeholders, and considered input provided by NMFS, to integrate ESA considerations into the NFIP in the Oregon plan area (**Figure 1-1**). The 2024 Draft Implementation Plan outlines no net loss standards for NFIP-ESA integration in Oregon, which includes mitigation ratios to offset impacts on three floodplain functions, riparian buffer zone (RBZ) requirements, as well as reporting requirements.

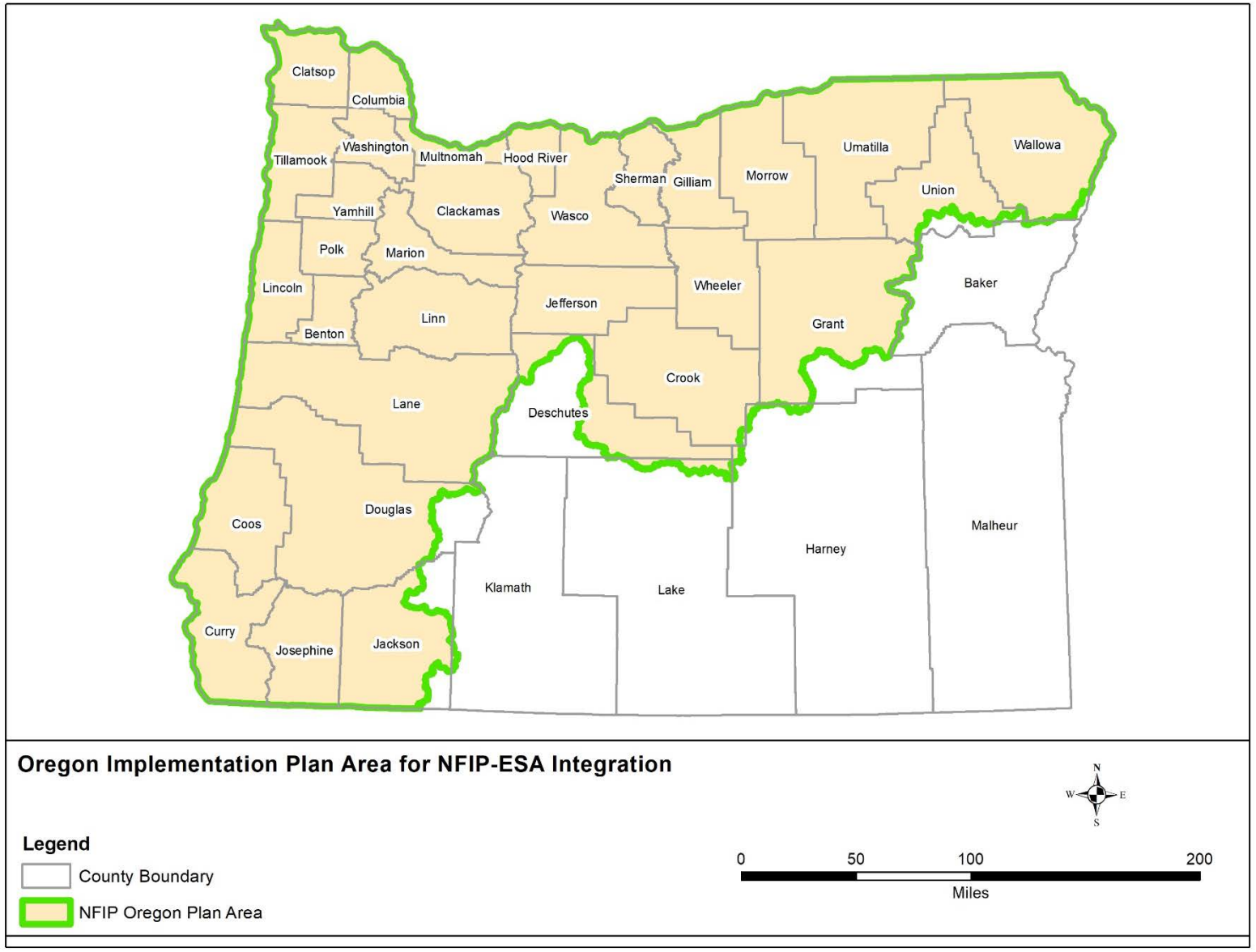


Figure 1-1. Oregon National Flood Insurance Program Plan Area for Endangered Species Act Integration

What is no net loss?

No net loss is a standard wherein adverse impacts must be avoided or offset through mitigation so that there is no net change in the function from the authorized existing condition.

The authorized existing condition is the state of the site when a floodplain permit application is submitted and assumes the resolution of all violations (e.g., unpermitted development).

All communities participating in the NFIP in the Oregon plan area would be required to implement the minimum floodplain management standards codified in 44 CFR Part 59-60 and the no net loss standards.

The no net loss standards would apply to development actions that: 1) occur in an Oregon NFIP participating community within the plan area; 2) are in the Special Flood Hazard Area (SFHA) (e.g., Zones AE and VE as depicted on **Figure 1-2**); and 3) meet FEMA's definition of development.

Definition of Development and Special Flood Hazard Area

Development, as defined in 44 CFR 59.1, means any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation, or drilling operations, or storage of equipment or materials (44 CFR 59.1).

Note that the term “development” for the NFIP is not restricted to a building with walls and a roof. It includes any disturbance (permanent or temporary) of the ground, which may include structures with walls, but would also include development such as a new or expanded culvert, road, or driveway.

The SFHA is the land in the floodplain within a community subject to a 1 percent or greater chance of flooding in any given year. It is shown on the Flood Insurance Rate Map (FIRM) as Zone A, AO, AH, A1-30, AE, A99, AR, AR/A1-30, AR/AE, AR/AO, AR/AH, AR/A, VO, or V1-30, VE, or V (44 CFR 59.1).

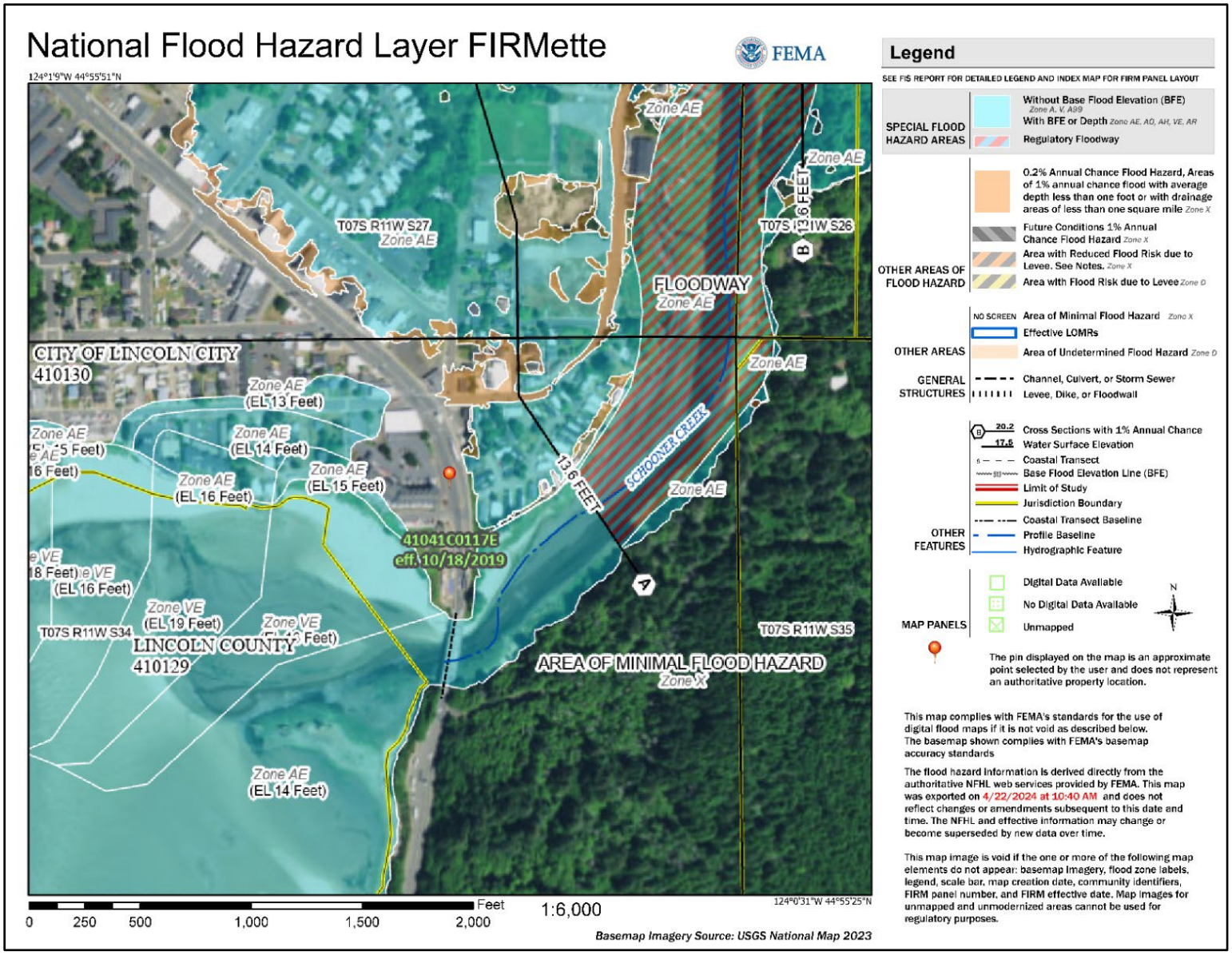


Figure 1-2. Special Flood Hazard Area (SFHA) Depicted on a Flood Insurance Rate Map

FEMA identified three floodplain functions for which the no net loss standards would apply. The floodplain functions FEMA identified are flood storage, water quality, and vegetation. FEMA identified the following proxies to measure impacts on the three floodplain functions from SFHA development:

1) Flood Storage Proxy: The flood storage capacity, which is the three-dimensional space (i.e., volume) between the existing ground and the base flood elevation with impacts measured as the volume occupied by a development.[1]

2) Water Quality Proxy: The extent of pervious surface in the SFHA measured as an area that is impacted by the creation of new impervious surface.

3) Vegetation Proxy: Trees 6 inches in diameter at breast height (dbh) or larger in the SFHA with impacts measured as the number of such trees removed by a development.

More information on the floodplain functions, proxies, and what would be mitigated is provided in the 2024 Draft Implementation Plan).

Mitigation is required to offset impacts on the three floodplain functions, with increased mitigation ratios depending on the location of the impact (development) and mitigation as shown in **Table 1.1**. Development may be located in the floodway, RBZ, or in the remainder of the SFHA.

The RBZ, based in part on its adjacency to waterways, provides a number of benefits to fish species both during and between flooding events. FEMA identified RBZ requirements as part of the no net loss standards, which include establishing a 170-foot buffer around waterbodies and planting requirements for development that is not dependent on being located in proximity to waterways.

The boundary of the RBZ is measured from the ordinary high water mark of a freshwater body (e.g., lake, pond, ephemeral/intermittent/perennial stream) or from the mean higher-high water mark of a marine shoreline or tidally influenced river reach to 170 feet inland (**Figure 1-3**).[2] The RBZ includes the area between these boundaries on each side of the stream, including the stream channel. Where the RBZ is larger than the SFHA, the no net loss standards would only apply to the area within the SFHA.

[1] The base flood elevation identifies the height that water will rise above the surface of the ground during the 1-percent annual chance flood (i.e., 100-year flood, SFHA).

[2] The U.S. Geological Survey defines freshwater as water containing less than 1,000 milligrams per liter of dissolved solids, most often salt. However, for the purposes of no net loss, fresh waterbodies are any waterbodies with a mapped SFHA that are not marine waters or tidally influenced waters.

Table 1.1. No Net Loss Mitigation Ratios and Multipliers from 2024 Draft Implementation Plan

Location of Impact	Proportion of Mitigation to Impact (Mitigation : Impact)				
	Flood Storage Capacity	Pervious Surface	Trees 3		
			(6-inches dbh to 20-inches dbh)	(Greater than 20-inches dbh to 39-inches dbh)	(Greater than 39-inches dbh)
Impact Occurring in the Mapped Floodway[1]	2:1	1:1	3:1	5:1	6:1
Impact Occurring in the Riparian Buffer Zone (RBZ)[2]	2:1	1:1	3:1	5:1	6:1
Impact Occurring Outside the Floodway and RBZ, in remainder of SFHA	1.5:1	1:1	2:1	4:1	5:1
Mitigation Location Multipliers [4]					
Mitigation occurring on-site or off-site in the same reach[5]	100%	100%	100%	100%	100%
Mitigation occurring off-site, in a different reach, but within the same watershed (i.e., 10-digit Hydrologic Unit Code [HUC])[6]	200%	200%	200%	200%	200%

Conditions:

1 When the floodway is not mapped, the mitigation ratios for the RBZ and remainder of the SFHA would be used.

2 Impacts that occur in the RBZ must be mitigated in the RBZ.

3 Trees planted for mitigation do not have a specified dbh; however, they must be native species.

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

a For example, if a development would create 1,000 square feet of new impervious surface, then 1,000 square feet of new pervious surface would need to be created. However, if only 500 square feet can be created on-site and in the same reach, the remaining 500 square feet created off-site along a different reach would need to be created at double the required amount as a result of the 200 percent multiplier. That is, another 1,000 square feet of pervious surface would need to be created at the off-site location, in addition to the 500 square feet created on-site.

5 Reach is defined as a section of a stream or river along which similar hydrologic conditions exist, such as discharge, depth, area, and slope. It can also be the length of a stream or river (with varying hydrologic conditions) between major tributaries or two stream gages, or a length of river for which the characteristics are well described by readings at a single stream gage.

6 Watersheds are determined by the U.S. Geological Survey using the 10-digit HUC area.

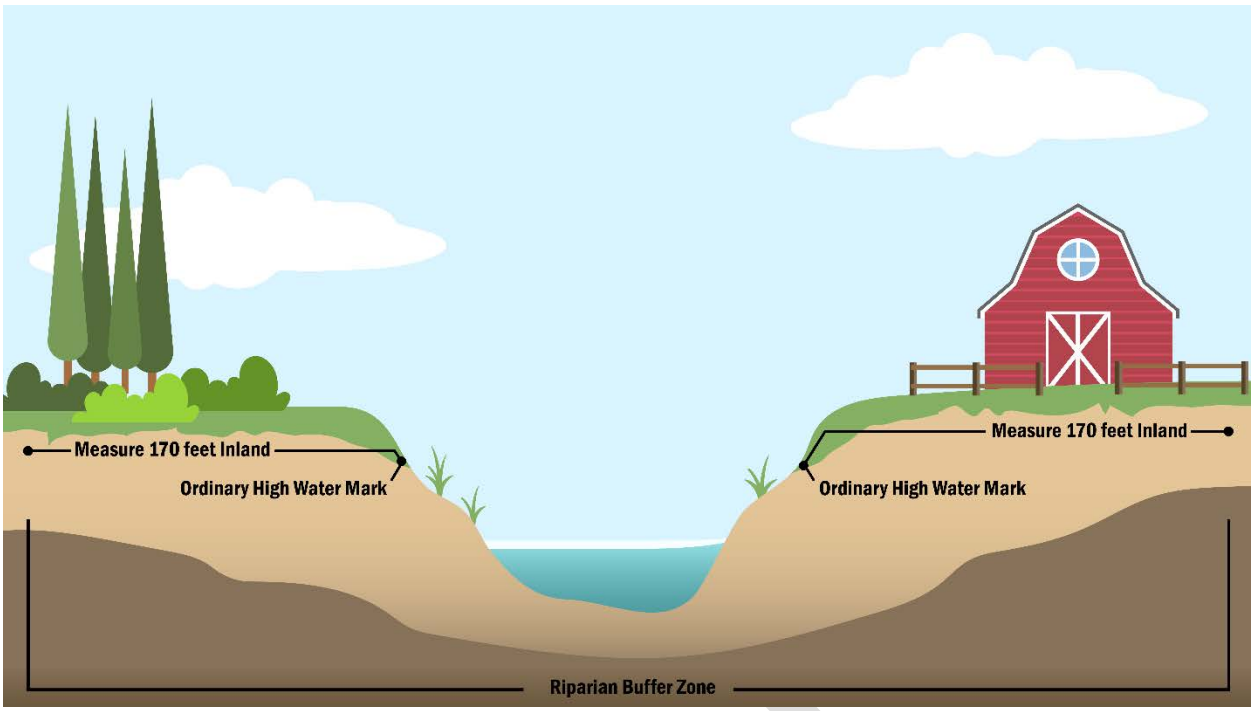


Figure 1-3. Riparian Buffer Zone

Development that is dependent on being located near a waterway would need to be within the RBZ to function. These functionally dependent uses would require no net loss of the three floodplain functions per the mitigation ratios in **Table 1.1**. Development in the RBZ that is not a functionally dependent use would require an additional planting requirement, termed beneficial gain. FEMA is not proposing to limit development in the RBZ. Instead, FEMA identified mitigation ratios that reflect the importance of the RBZ in preserving floodplain functions and established the beneficial gain standard, which allows for development that is not functionally dependent on being located near a waterway to continue to occur in the RBZ while maintaining the floodplain functions of the RBZ in the long term. Beneficial gain plantings are a separate requirement from no net loss of vegetation as expressed by mitigation for the removal of trees greater than 6 inches dbh.

Definition of Functionally Dependent Use and Beneficial Gain

Functionally dependent use: A use which cannot perform its intended purpose unless it is located or carried out in proximity to water. The term includes docking facilities, port facilities that are necessary for the loading and unloading of cargo or passengers, and ship building and ship repair facilities, but does not include long-term storage or related manufacturing facilities.

Beneficial Gain: FEMA's beneficial gain standard would apply to development that is not a functionally dependent use that occurs within the RBZ. The standard would require that an area within the same reach as the project that is equivalent to 5 percent of the area impacted within the RBZ be planted with native riparian herbaceous, shrub, and tree vegetation.

Additional details on applicable development, the floodplain functions and their proxies, and mitigation to address impacts on the three floodplain functions are detailed in the 2024 Draft Implementation Plan.

FEMA and its stakeholders identified four paths that would offer communities flexibility in achieving NFIP-ESA integration:

- Path A – 2024 Draft Model Ordinance: a community would adopt a model ordinance developed by FEMA (Appendix B of the 2024 Draft Implementation Plan).

- Path B – Model Ordinance Checklist: a community would complete an ordinance checklist to demonstrate that all of the required elements in the model ordinance are found in existing or newly adopted local, regional, or state-wide enforceable requirements (Appendix C of the 2024 Draft Implementation Plan).

- Path C – Customized Community Plan: a community would develop a customized community plan identifying their proposed approach to implementing no net loss standards, as further described in this document.

- Path D – Habitat Conservation Plan or Section 4(d) Limit Authorization: a community can pursue compliance with ESA at the community level by working directly with NMFS through the development of a Habitat Conservation Plan or seek inclusion in a Section 4(d) limit. Existing Habitat Conservation Plans and Section 4(d) Limit Authorizations can also be used (Section 4.5 of the 2024 Draft Implementation Plan).

This guidance document describes Path C – Customized Community Plan (CCP). A CCP offers communities flexibility in achieving no net loss based on local context. A CCP could propose alternative floodplain functions, alternative proxies, alternative mitigation ratios, an alternative RBZ width (although it cannot be less than 50 feet), community-wide programs or actions to offset development impacts, or additional requirements to provide a beneficial gain to ESA-listed species. Communities wishing to use methods other than no net loss of floodplain functions to avoid jeopardy of ESA-listed species (e.g., applying conservation measures and obtaining an incidental take permit) would fall under Path D — Habitat Conservation Plan. See the 2024 Draft Implementation Plan for additional detail on Path D.

Chapter 2. Path C – Overview

A CCP allows a community the flexibility to customize its approach to meeting the no net loss standards. For example, a community could propose community-led offset actions, modified mitigation ratios or floodplain functions, or a revised RBZ. Section 2.2 and Section 4.1 provide additional detail on activities a community can incorporate into a CCP. A CCP is a community led effort and would not be a site-specific proposal prepared by a developer. It is recommended that communities work with a qualified professional (e.g., biologist, hydrologist, surveyor) to assist in developing their CCP. Section 4.4 describes grants and assistance that may be available to communities to develop their CCP.

Communities choosing this path must prepare a CCP for FEMA review. After FEMA approval, the community shall require implementation of the CCP through ordinance, mandatory policy, or enforceable process for all development in the SFHA.

A CCP shall:

- identify and substantiate the reasoning for the proposed approach (e.g., revised mitigation ratios or floodplain functions, revised RBZ, offset actions, see Section 2.2),
- describe the methods for achieving no net loss, and
- provide strategies for implementation, monitoring, reporting, and enforcement.

A CCP can identify one approach that is applied uniformly across a community or identify multiple approaches to be applied in different locations based on the types of development anticipated, existing conditions in the SFHA, species presence, or other justifiable reasons. For example, a community can propose an altered RBZ in which mitigation will occur at the ratios specified in the 2024 Draft Implementation Plan and modified mitigation ratios for the remainder of the SFHA. Similarly, a community may propose different mitigation ratios or floodplain functions for different waterways based on the existing condition of habitat and species presence or propose different mitigation ratios or floodplain functions for different types of development (e.g., commercial, industrial, residential, affordable housing). A community might propose prioritizing one type of development over another, for example, affordable housing might be allowed with a lower mitigation ratio, if there is a corresponding increase on another type of development such that no net loss is achieved.

In addition, a community can develop a CCP for only a portion of the community and use Path A, Path B, or Path D for the remainder of the community so long as the entire SFHA in a community is covered by a path and clearly distinguished as to the areas that fall under each path. For example, the CCP can cover the RBZ, a port area, or an industrial zone, and Path A can be used for the remainder of the SFHA. A CCP can also be developed through cooperation of multiple local jurisdictions, allowing for a watershed-scale or integrated regional approach to ensuring no net loss.

A CCP may be simple or complex depending on the approach proposed by a community.[3] A complex plan might analyze the quality of existing habitat in the SFHA or presence of ESA-listed species within the community and propose different, scientifically backed mitigation ratios that achieve no net loss or otherwise result in improved habitat. Revised mitigation ratios could also include variable ratios across the community based on the quality of habitat, proximity to waterways, land use, or other factors. A community may also propose alternative but equivalent, or additional, floodplain functions or other proxies to achieve no net loss. Regardless of the proposed approach, the plan must demonstrate how the community will achieve no net loss of floodplain functions.

Communities can work iteratively with FEMA in developing their CCP. Each community must formally submit their CCP to FEMA for review and approval to ensure that no net loss standards are achieved. FEMA will strive to review submitted CCPs within 30 days (but approval may require up to 6 months depending on the complexity of the plan) and provide feedback or approve the plan. FEMA may confer with NMFS depending on the scale and complexity of the plan prior to FEMA's decision to approve a CCP.

2.1. Is a Customized Community Plan Right for your Community?

As discussed above, developing a CCP is one of four paths an NFIP participating community in the Oregon plan area can take. The purpose of Path C — a CCP — is to provide communities the flexibility to incorporate local conditions and context into their approach to ensure no net loss. There are many reasons why a community may choose to develop a CCP. The following questions may help you to determine if developing a CCP is the best option for your community:

- Does your community currently participate in or is interested in participating in programs or actions that improve the condition of floodplain functions, such as planting vegetation, acquiring land for designation as open space, or replacing impervious surfaces with pervious materials?

- Are staff trained and capable of implementing different compliance methods? For example, is a biologist on staff who is able to inform the development of the CCP and review permit applications for their compliance with the CCP?

- Does your community have varied floodplain conditions that could justify alternative or variable mitigation ratios, alternative floodplain functions, or both to achieve no net loss?

- Does your community have existing standards that go beyond those set forth in the 2024 draft model ordinance (Section 4.1)?

[3] This differs from Path A – Model Ordinance because it does not require revisions to ordinances. Adopting a Path C plan may be more advantageous to some communities than adopting the Path A Model Ordinance. Implementation and enforcement of the provisions of the plan may include revisions to ordinances related to floodplain management permits and other planning tools available to the community such as commitments in a Capital Improvement Plan and budget to implement a community level mitigation project.

- Is any part of your community currently covered by a Habitat Conservation Plan approved by NMFS, U.S. Fish and Wildlife Service, or both, or are specific development actions covered by a Section 4(d) limit?

2.2. Example Activities for a Customized Community Plan

Each CCP is expected to be unique, identifying an approach that is customized to meet the conditions and needs of the community. Below are some example activities that can be included in a CCP. These examples are used throughout this document to provide clarification on what must be included in a CCP; however, this is not a definitive list of approaches a community could implement under Path C. Additional examples are provided in Chapter 4 to more fully depict the flexibility that a CCP allows. Communities are not limited to the examples provided in this guidance.

2.2.1. MODIFIED MITIGATION RATIOS OR FLOODPLAIN FUNCTIONS

A community can analyze the quality of the existing habitat and floodplain functions (Attachment A – Assessment of Habitat Guidance) and provide a rationale for:

- Alternative but scientifically backed mitigation ratios that achieve no net loss of floodplain functions.
- Variable mitigation ratios across the community based on the quality of existing habitat, proximity to waterways, existing conditions, land use, or other factors.
- Alternative but equivalent, or additional, standards to measure and offset floodplain functions (e.g., a standard of improvement instead of no net loss).
- Alternative but equivalent, or additional, floodplain functions or proxies to achieve no net loss (e.g., proxy of shrubs to achieve no net loss of vegetation in communities with minimal trees).

2.2.2. REVISED RIPARIAN BUFFER ZONE

Communities can perform an RBZ analysis and demonstrate that a standard 170-foot RBZ (as determined by the maximum potential tree height of species native to the area and discussed further in Section 4.2) is not applicable based on existing conditions. A community can propose, with evidence, to reduce the RBZ to no less than 50 feet.[4] A reduced RBZ may be appropriate for waterways with narrow riparian corridors (e.g., in urban areas) or where the riparian area is dominated by grasslands, shrubs, and smaller trees as may be the case in arid ecoregions). Additional detail on analyzing the RBZ is provided in Chapter 4.

[4] The minimum of a 50-foot RBZ was established in the Biological Opinion from the National Marine Fisheries Service.

2.2.3. LOCAL FLOODPLAIN IMPACT OFFSET ACTIONS

A community may submit a plan committing to mitigate SFHA development impacts on the three floodplain functions through investments in open space, restoration, or programs that restore flood storage capacity, remove impervious surface, or plant trees in the SFHA. Such investments could provide a local reserve of mitigation that could then be used locally to offset future development impacts within the community. If a community's impact offset actions do not address all three floodplain functions, then individual projects may still need to provide mitigation for the functions that are not fully addressed by the community's offsets.

Local floodplain impact offset actions may encompass a wide variety of activities (and may include mitigation banks) but differ from mitigation banks because they may not require consultation with resources agencies to implement. If a formal mitigation bank were established, available credit for the floodplain functions of flood storage, water quality, and vegetation could be used under Path A, Path B, or Path C to achieve no net loss. However, local offset actions are only able to be used under Path C. See Section 3.4 in the 2024 Draft Implementation Plan for more information on mitigation banks.

For example, a community may initiate habitat restoration projects in the SFHA that could offset future development impacts. When habitat restoration projects, or projects with a primary purpose other than floodplain protection, but which may also provide habitat functions, receive funding or permit approval from a third party (e.g., state or federal agencies), the community must coordinate with the funding or permitting agency, and confirm that the project is able to be used to offset future development impacts.[5] A restoration project undertaken to fulfill a permit condition would only be allowed to offset future development with proper accounting and agreement from the permitting agency. Such restoration projects must be secured in perpetuity with a conservation easement, deed restriction that runs with the land, or other means of protecting the restoration site from future development proposals. Previously completed restoration projects (i.e., those completed prior to the implementation of NFIP-ESA integration) cannot be used as offset actions for future development impacts. The intent of the requirements is forward-looking to ensure no net loss from development that occurs in the future. Past restoration projects contribute to offsetting past adverse effects on aquatic habitat. However, supplemental enhancement or expansion of previously completed restoration projects can be used as offset actions for future development impacts.

[5] This requirement is to ensure that there are no funding or permit violations that would occur because it was not clearly communicated that the restoration project is serving as mitigation for impacts. Restoration projects that are used to offset other development impacts may result in no net improvement in habitat conditions and funding agencies may wish to reserve their funds for projects that result in a net improvement. Mitigation that is required as part of a permit condition may not necessarily be used to offset additional development related impacts as the "value" of the mitigation may all be required for the permitted project. Communication could occur informally, such as through email, or formally, such as through a memo, or as part of the funding/permit application.

Similarly, a green streets program or Tree City USA program that includes planting street trees, installing bioswales, or replacing impervious sidewalks with pervious pavement in the SFHA could be used to offset development impacts on water quality and vegetation. **Figure 2-1** depicts a bioswale that could be implemented through a green streets program. Under this example, bioswales and other green infrastructure features must be designed to not entrap fish.

Figure 2-1. Bioswale Along Roadway

A community may acquire and demolish property in the SFHA and designate it as open space in perpetuity. Removing structures and impervious surfaces through acquisition and demolition could be used to offset development impacts on flood storage and water quality. In this case, a community would track the removal of structures or material (e.g., wood, concrete, buildings, fill, aboveground utilities, or other materials that take up space) and impervious surface associated with acquisition and demolition projects and use it as a basis to offset impacts of permitted development elsewhere in the SFHA at the appropriate mitigation ratios.

A community proposing local floodplain impact offset actions must implement the offset actions (i.e., mitigation) prior to or concurrent with the impacts from development. Similar to a wetland mitigation bank, community-led offset actions must ensure that the mitigation is completed prior to the impact from development, or at minimum by the closeout of the floodplain permit in which the offset action is being mitigated. The community must implement adequate tracking methods to ensure the balance of mitigation from offset actions and development impacts achieves no net loss. That is, adequate documentation must be available to ensure the balance of mitigation and development impacts.

2.3. Standard Path C Outline

The necessary components of a CCP are detailed in Chapter 3. However, the level of detail may vary greatly depending on the approach proposed by a community. To facilitate developing a CCP with all the necessary components, FEMA recommends the following outline:

1. Existing Conditions
    a. Geographic area of the plan.
    b. Relevant background information.
2. The Proposed Approach
    a. Description of the proposed approach to achieving no net loss.
    b. Biological/ecological rationale and how it is equivalent to, or better than, the no net loss standards as implemented through the 2024 Draft Model Ordinance.[6]
3. Strategies for Implementation
    a. Proposed tracking methods for impacts and mitigation.
    b. Roles, responsibilities, funding, and timeline for implementation.
    c. Methods of compliance and enforcement.

[6] If a community is using the "simple Path C plan or policy" discussed in Section 2.0, the 2024 Draft Implementation Plan can be used as the biological/ecological rationale.

Chapter 3. Developing a Customized Community Plan

As described in Chapter 2, a CCP must identify and substantiate the methods proposed to achieve no net loss, describe any variations in floodplain functions, mitigation ratios, or requirements proposed, and identify the strategy to implement the plan. While the methods proposed in a given community's CCP may vary widely, there are common components that are required across all CCPs. These components are described in further detail in this Chapter.

3.1. Existing Conditions Analysis

A CCP must first identify the geographic area that the plan covers. As described in Chapter 2, this may be one or multiple communities, or a portion of a community. Enough information must be provided for FEMA to easily identify the area covered by the plan. The plan should include maps that delineate the SFHA. Plans that encompass multiple jurisdictions or a portion of a community must include an explanation as to how the geography was determined.

The existing conditions analysis must include relevant background information that informed the proposed approach to achieving no net loss with enough detail to justify the approach. The existing conditions analysis may be simple, such as detailing an existing green streets program. Conversely, the existing conditions analysis may be complex, such as analyzing the existing conditions of floodplain functions in the SFHA, performing an assessment of habitat conditions (see Attachment A), or delineating the RBZ.

See the examples below for additional context.

Example CCP Scenarios

Modified Mitigation Ratios or Floodplain Functions

The geographic area covered by the CCP would be described in a narrative and shown on a map or figure. The existing conditions would include an assessment of existing habitat conditions throughout the entire area to be included in the CCP (see Attachment A). The assessment must identify the presence of ESA-listed species, any designated critical habitat or Essential Fish Habitat, and describe existing habitat conditions and functions. The assessment would include, but not be limited to, a description of floodplain functions, vegetation, topography, geographic considerations such as waterfalls or dams, ESA-listed species presence, or other considerations that provide context. Scientific research that supports a community's proposed approach to no net loss may be included. This section must be robust and detailed enough to justify alternate floodplain functions or mitigation ratios.

Revised Riparian Buffer Zone

The geographic area covered by the CCP would be described in a narrative and shown on a map or figure. The existing conditions would identify intermittent and perennial waterways within the SFHA and delineate the RBZ along each waterway for which a revision is being sought. For example, a localized RBZ might be delineated based on the potential maximum height of the dominant native tree species expected in the ecoregion or on stream and riparian functions (see Section 4.2 for additional detail).

Community Floodplain Impact Offset Actions

The geographic area covered under the CCP would be described in a narrative and shown on a map or figure. The existing conditions analysis would identify, and describe in detail, existing programs or actions being taken that relate to conservation of the three floodplain functions. The plan would clearly state how the programs or actions are currently being implemented including how they are funded and the responsible entities. Identifying funding and responsible entities would help FEMA ensure that the programs or actions will be implemented and managed to provide long-term protection of the floodplain functions. Programs and actions must also be structured to offset development-level impacts.

3.2. The Proposed Approach

The CCP must next describe the proposed approach to achieving no net loss. The floodplain functions proposed for no net loss must be clearly identified. If deviations from the floodplain functions, proxies, or mitigation ratios identified in the 2024 Draft Implementation Plan are proposed, the CCP must provide a rationale as to why these deviations are proposed, building upon the analysis in the existing conditions. Methods that would be used to avoid, minimize, and mitigate impacts must be included. If deviations from the mitigation ratios identified in the 2024 Draft Implementation Plan are proposed, a rationale as to how the proposed mitigation ratios were established must be provided and substantiated through the existing conditions analysis, scientific literature, or both. If the proposed mitigation ratios would vary by floodplain function, type of development, or location in the community, this must be explicit. Sufficient detail must be included as to what mitigation would occur, how it would occur, and how it would ensure no net loss. If a community proposes different methods that vary by location, the CCP must describe and show on maps or figures which methods apply to which locations throughout the community.

See the examples below for additional context.

Example CCP Scenarios

Modified Mitigation Ratios or Floodplain Functions

The CCP would clearly state the floodplain functions and mitigation ratios proposed to be modified, referencing the existing conditions analysis and any associated scientific research to justify why the proposed floodplain functions or mitigation ratios are applicable to the community. Scientific research may be included to justify how the alternative floodplain functions are equivalent for NFIP-ESA integration or how alternative mitigation ratios would achieve no net loss. If variable floodplain functions or mitigation ratios across the community are proposed (based on the quality of habitat, proximity to waterways, land use, or other factors), the rationale for the proposed variation would be provided.

Revised Riparian Buffer Zone

The CCP would clearly identify the proposed RBZ for each waterway in the community, referencing the existing conditions analysis to justify the deviation from the standard of 170 feet. The CCP would clarify that the mitigation ratios and floodplain functions in the 2024 Draft Implementation plan would be used to achieve no net loss. The CCP would state the developers would be required to implement mitigation.

Community Floodplain Impact Offset Actions

The CCP would state that local floodplain impact offset actions would be used to mitigate for future development impacts. The specific offset actions (e.g., restoration project, green streets program implementation) a community proposes to take would be described, including specifying which floodplain functions the actions would mitigate. Scientific research or other existing data sources would be used to justify how the proposed offset actions ensure no net loss. The CCP would include information on how the offset actions would be implemented in the community, either referencing the existing conditions analysis or providing additional information. The CCP would include details on how the offset actions would be maintained to ensure no degradation occurs that results in net loss over time.

For example, the CCP may state that an existing green streets program would be used to offset development impacts on vegetation by planting trees along streets in the SFHA. Data on the number and type of trees planted in previous years through the program and the proposed locations of future plantings may be included to depict the scale of the program and its adequacy in addressing future development impacts on vegetation. The plan may include information on how the trees planted through the program are maintained over time or replaced if they do not survive. In this example, the CCP would state that mitigation for the other two floodplain functions (i.e., flood storage and water quality) would be implemented by developers using the mitigation ratios from the 2024 Draft Implementation Plan.

3.3. Strategies for Implementation

The CCP must identify the strategies a community would take to implement their proposed approach of ensuring no net loss. The strategies for implementation are expected to vary but shall include methods to track impacts associated with development against mitigation to ensure no net loss is achieved. This section of the CCP must include a timeline for implementation, descriptions of roles and responsibilities, and methods for compliance and enforcement. Funding methods shall also be included for activities in a CCP where developers do not directly pay for mitigation, such as community-level offset actions. This component of the CCP shall ultimately describe the community's process for implementing the proposed approach and ensuring the implementation occurs as proposed in the CCP.

The CCP shall be formally adopted by a community in a manner that complies with Oregon law to ensure implementation occurs. A community may adopt their approved CCP through policy, resolution, procedures, or a change in the application requirements for a floodplain development permit, as long as each floodplain development permit application demonstrates compliance with the no net loss standards as tailored to the specific community, and the permit, permit conditions, or both are enforceable.

3.3.1. PROPOSED TRACKING METHODS

Achieving no net loss will require communities to ensure that all impacts on the three floodplain functions, or alternative floodplain functions if approved, associated with development are mitigated. Floodplain development permits are one tool a community can use to track impacts against mitigation; however, based on the complexity of a community's proposed approach multiple tools may be necessary.

Floodplain development permit applications could be revised to identify the floodplain functions a particular CCP is proposing to mitigate and quantify the impacts associated with the development. The floodplain development permit application could include a section for the applicant to identify the type and amount of mitigation included in the development proposal. Through the floodplain development permit review process, the floodplain administrator, or other authorized and qualified staff, would ensure that the proposed mitigation adequately offsets the impacts. Communities may also develop questionnaires, worksheets, or use a computerized application system separate from the floodplain permit application for applicants or the permit reviewer to calculate impacts associated with a development and determine the amount of mitigation required to achieve no net loss.

There are other tools a community may use for tracking implementation, such as Microsoft Excel, Google Sheets, geographic information system-based geolocated records, other similar software, or annual reports. These tools may be particularly helpful to communities proposing to perform community-level offset actions that require coordination among multiple staff members or departments (e.g., green streets programs, restoration projects) to implement offset actions.

3.3.2. ROLES, RESPONSIBILITIES, FUNDING, AND TIMELINE

Implementing a CCP may require staff time, additional funding sources, or both. Some communities may benefit from additional staff to review and process floodplain permit applications, or train department specific staff (e.g., public works, parks and recreation) in no net loss implementation. In some cases, communities may choose to hire or train staff to serve as a mitigation officer who reviews completed developments to ensure mitigation was implemented appropriately, or work with a third party such as an environmental group or watershed council. A CCP should specify the roles and responsibilities or points of contact for implementation. For example, the role of the floodplain administrator and inspection personnel could be described. In other cases, communities may develop a watershed-scale or integrated regional approach to their CCP (see Chapter 2), and staff may be coordinating across jurisdictions to achieve no net loss.

Identifying roles and responsibilities can also be helpful for community members to know who to contact for questions about no net loss standards and mitigation requirements.

Based on the proposed approach in a community's CCP, a description of how the approach would be funded may be necessary. This section should provide enough detail to determine that funding limitations would not become a barrier to achieving no net loss. In some cases, developers may incur the cost of mitigation as well as be responsible for implementing mitigation. In other cases, a community may incur the initial cost of mitigation (e.g., to fund a restoration project as a community-led offset action) that would be reimbursed by future developers through fees collected as part of the floodplain permit process. Communities may also choose to apply for grants or use existing funds, such as through a general fund, to implement offset actions. However, in all cases, community-led offset actions would need to be implemented prior to or concurrent with impacts from development.

A timeline for implementation may be required in the CCP. This will apply to any CCPs that propose non-developer led mitigation, such as the use of community-led offset actions, where mitigation and impacts would not occur as part of the same floodplain development permit. In order to achieve no net loss, mitigation must be completed prior to or concurrent with the development. The timeline for implementation shall depict when mitigation would be completed compared to when development would occur. For example, if a community proposes to perform restoration in the SFHA as a community-led offset action, the timeline should show the anticipated completion date for the community project, when the completed community restoration project would become available to developers to offset impacts, and the anticipated timeline for how long the community restoration project will address development impacts (i.e., how many years the restoration project would be expected to offset impacts based on projected development or growth). The timeline for implementation must be detailed enough to show that mitigation would occur prior to or concurrent with development impacts.

3.3.3. COMPLIANCE AND ENFORCEMENT

A CCP must include procedures for compliance and enforcement of no net loss to ensure that mitigation is completed and occurred at the appropriate ratios.

Many types of development permits require a final inspection or certificate of occupancy before the permit process is closed. Photo documentation could also be used to confirm mitigation was completed. Ensuring mitigation was completed if performed by developers shall be a requirement for permit close out. Compliance and enforcement for community-led offset actions may occur through periodic assessments of the condition of floodplain functions or ESA-listed species habitat to ensure the offset action is functioning as intended. Attachment A provides additional detail on performing an assessment of floodplain functions and habitat. The process for corrective action should be described in the CCP for instances where mitigation is deemed insufficient.

Example CCP Scenarios

Modified Mitigation Ratios or Floodplain Functions

The CCP would state that floodplain development permit records would be revised to track impacts associated with the development for each floodplain function and quantify the required mitigation. The CCP would identify the floodplain administrator, or other authorized and qualified staff, as responsible for reviewing permit applications to ensure the accuracy of information, ensuring mitigation was implemented and maintained, and taking corrective action if necessary. The CCP would explain the process and type of corrective action that would be taken, if needed. The CCP would identify that developers are responsible for the cost of mitigation and that implementing mitigation would be required at the same time as the development. The CCP would identify that compliance and enforcement would occur through the review and close out of floodplain development permits or other appropriate local process.

Revised Riparian Buffer Zone

The CCP would describe a report, worksheet, or other system, to be used by developers to quantify the impacts associated with their development for each floodplain function and quantify the required mitigation. The report, worksheet, or other system used would become a required attachment to the floodplain permit application. The CCP would identify the floodplain administrator, or other authorized and qualified staff, as being responsible for reviewing the report, worksheet, or other system used and the permit application to ensure the accuracy of the information, ensuring mitigation was implemented and maintained, and taking corrective action if necessary. The CCP would explain the process and type of corrective action that would be taken, if needed. The CCP would identify that developers are responsible for the cost of mitigation and that implementing mitigation would be required at the same time as the development. The CCP would identify that compliance and enforcement would occur through the review and close out of floodplain development permits or other local appropriate process.

Community Floodplain Impact Offset Actions

The CCP would describe use of a spreadsheet-based system used to track the quantity of mitigation for each floodplain function that has occurred through local offset actions. The completed mitigation would become available to developers to offset impacts. Developers would reimburse the cost of offset actions based on the quantified impacts of the development and cost of offset action implementation. The floodplain development permit application would be revised to calculate and track impacts associated with a proposed development for each floodplain function. The floodplain administrator, or other authorized and qualified staff, would be identified as responsible for reviewing permit applications, ensuring that adequate mitigation has occurred through offset actions to achieve no net loss, and quantifying the cost to be reimbursed by the developer. The floodplain administrator, or other authorized and qualified staff, would be responsible for collecting fees from the developer and updating the spreadsheet to ensure the reduced availability of mitigation through offset actions is accurately reflected.

The CCP would identify the source of funding for the initial cost of the community impact offset actions, which would be reimbursed through the fees paid by floodplain developers. The CCP would state that the community would implement offset actions on a bi-annual basis, or at whatever frequency is needed, based on anticipated future growth and development in the community. The CCP would state that if adequate mitigation is not available as credit through offset actions, developers would be required to fund and implement mitigation. In such cases, the developer-led mitigation would be required to occur concurrent with the development action to ensure there is no temporal lag between impacts and mitigation.

The CCP would describe a process for monitoring the offset actions and identify how the offset actions would be maintained, if needed, to ensure no net loss. For mitigation completed by developers, rather than through community offset actions (e.g., green streets program may serve as an offset action for trees, but developers implement mitigation for flood storage and water quality themselves), the CCP would state that photos would be taken at the completion of developer-led mitigation to document that mitigation was implemented prior to the closeout of floodplain permits. The CCP would state that photos from the property owner would be required on a regular basis during monitoring periods (e.g., annually for 5 years for tree mitigation to ensure the trees become established), identify who is responsible for documenting monitoring (e.g., staff, technical specialist), and corrective measures that would be taken if needed.

3.4. Modifying a Customized Community Plan

Communities are able to modify their CCPs at any time and resubmit to FEMA for approval. During FEMA's review of a revised CCP, the currently approved CCP must continue to be implemented. Once the revised CCP is approved by FEMA, the revised CCP approach must be implemented. The entire SFHA in a community must be covered by an approved implementation path (Path A, Path B, Path C, or Path D) at all times, although different paths may be used in different parts of the community.

Modified CCPs may be initiated to expand the geographic coverage of the plan such as when a community annexes new land in the SFHA or the mapped SFHA has changed, to add or remove approaches, to adjust implementation strategies, or for other reasons determined by the community. **A CCP must be modified if it includes reference to local, state, or federal regulations that have undergone changes.**

Chapter 4. Additional Information

4.1. Additional Considerations for a Customized Community Plan

A CCP may propose minimal changes from the requirements and methods found in the 2024 Draft Model Ordinance or it may be a significant shift in approach to achieving no net loss of floodplain functions. Section 2.2 provides three examples of activities that require a CCP to remain in compliance with the no net loss standards. Below are some additional examples of approaches a community might consider that would vary from the 2024 Draft Model Ordinance and that could be incorporated into a CCP. FEMA does not have a definitive menu of options that communities can incorporate because this path offers unrestricted flexibility. A community could propose any approach to ensuring no net loss of the three floodplain functions as long as adequate justification as to how no net loss would be achieved is provided.

4.1.1. INCORPORATE EXISTING REGULATIONS

Existing federal, state, and local regulations applied to development applications can be used under Path C to achieve no net loss. Depending on the type of development, the location of the proposed development within Oregon, or existing conditions on-site, existing regulations may apply and require mitigation actions that could result in no net loss. Existing regulations that are more stringent than the no net loss standards can also be used under Path C to achieve compliance with the NFIP-ESA integration measures.

Such regulations may also support but not fully achieve no net loss. For example, existing regulations may only apply to certain types of development or require mitigation but not to the extent that no net loss is achieved. In such cases, the CCP must explicitly state when existing regulations apply, whether or not they achieve no net loss, and what supplemental measures the community would take to ensure all impacts from development are mitigated.

During the public outreach and stakeholder engagement process in developing the previous Draft Oregon Implementation Plan for NFIP-ESA Integration (2021), the following regulations were identified as having the potential to support no net loss: Clean Water Act, Rivers and Harbors Act, and Oregon Removal-Fill Act. The Oregon State legislature may add new requirements in the future that would also support no net loss. In its review of existing regulations in Oregon, FEMA has not yet identified a combination of existing federal, state, and local regulations that would apply to all development in the SFHA and fully achieve no net loss. Any CCP would need to clearly show how no net loss would be achieved for all development in the SFHA, including when federal, state, or local regulations do not apply.

4.1.2. LOCAL FLOODPLAIN IMPACT OFFSET ACTIONS

In addition to the local floodplain impact offset actions described in Section 2.2, a community may identify alternative actions that offset impacts on the three floodplain functions. Additional examples include establishing low impact development standards within the SFHA such as requiring vegetated

roofs, rain gardens, or bioretention facilities to ensure no net loss of water quality (**Figure 4-1**).[7] The design of such facilities must offset the amount of infiltration lost as a result of the increase in impervious surface. Although low impact development and green infrastructure are included in the Path A 2024 Draft Model Ordinance, a community may find expanded opportunities to apply these techniques to provide community offsets.

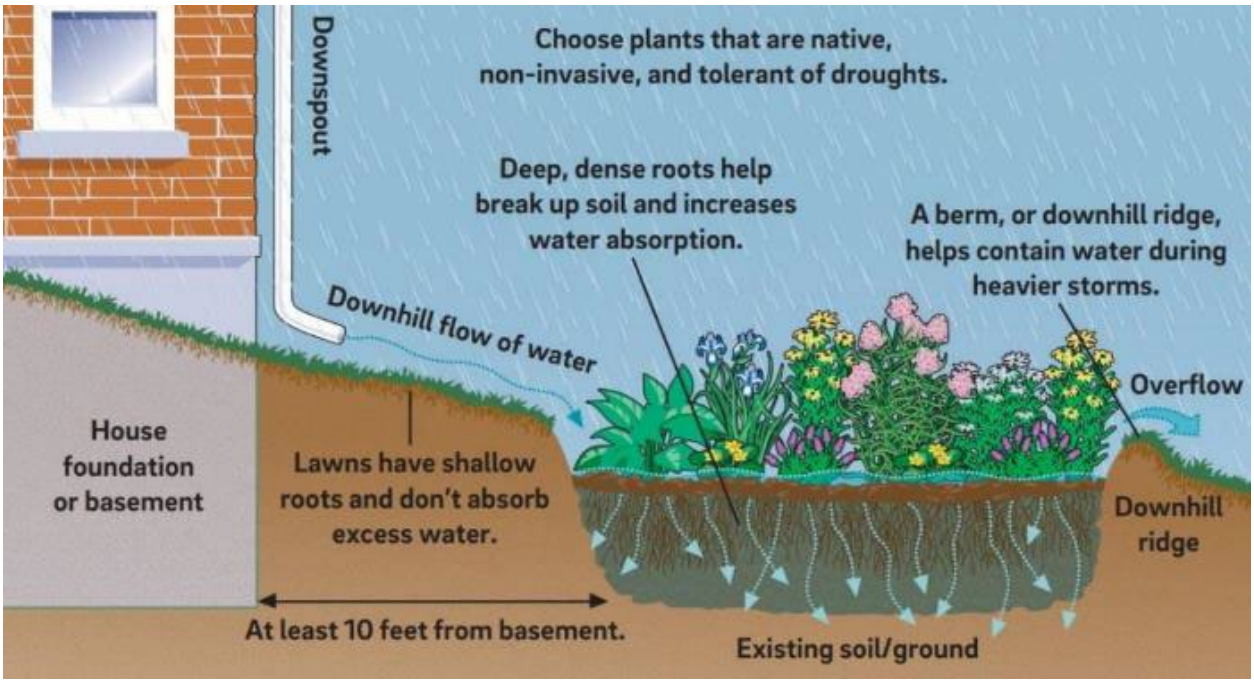


Figure 4-1. Low Impact Development Rain Garden

Communities can include improvements to public stormwater facilities as offset actions to achieve no net loss of water quality.[8] Improvements to stormwater facilities must:

- Limit discharge to match the pre-development peak discharge rate (i.e., the discharge rate of the site based on its natural groundcover and grade before any development occurred) for the 10-year peak flow using a continuous simulation for flows between 50 percent of the 2-year event and the 10-year flow event (annual series). Discharge must occur within the same reach as the increase in impervious surface. This is not required if discharge outfalls into the ocean.

[7] **Figure 4-1** depicts the benefits of deep rooted, native, and drought resistant plants; however, this is not required by FEMA. Low-impact development and green infrastructure should be designed in accordance with available guidance and manuals (e.g., the U.S. Environmental Protection Agency's (EPA) Green Streets Handbook).

[8] Public stormwater facilities do not need to be located in the SFHA, so long as impacts on water quality in the SFHA are addressed through the stormwater facility improvements.

- Treat stormwater to remove sediment and pollutants from impervious surfaces such that at least 80 percent of the suspended solids are removed from the stormwater prior to discharging to the receiving water body.
- Be designed to not entrap fish.
- Be designed by a qualified professional.

Retention or detention facilities must also:

- Drain to the source of flooding.
- Conform to accepted practices for stormwater facility design (e.g., the City of Portland Stormwater Management Manual, Central Oregon Stormwater Manual). If accepted practices for stormwater facility design are more stringent than the specifications listed above, the higher specifications must be used.

A qualified professional is a subject matter expert and is defined by communities. Qualified professionals may include surveyors, biologists, hydrologists, engineers, arborists, or other specialties depending on the expertise needed.

4.1.3. PHYSICAL IMPEDIMENTS

During NEPA scoping, FEMA heard several examples of physical barriers that severely restrict one or more of the three floodplain functions. For example, a community may have some land above a natural waterfall that serves as a permanent fish barrier and therefore only water quality and vegetation (impervious surface and trees) may be relevant. Or a community may have isolated SFHA pockets that have no hydrological connectivity to fish-bearing streams and therefore little connection to the three floodplain functions and the ESA-listed species and habitats. In the CCP, a community must demonstrate and document the restriction and explain which no net loss standards are not applicable and why.

4.1.4. IMPLEMENTING DIFFERENT PATHS ACROSS THE COMMUNITY

A community may determine that implementing multiple paths across a community is most appropriate. For example, Path A – 2024 Draft Model Ordinance could be applied in riverine floodplain areas and alternative floodplain functions could be applied in coastal floodplains. Similarly, certain geographic areas or development types in a community may be covered under Path D – Habitat Conservation Plan or Section 4(d) Limit, while the standard mitigation ratios identified in the 2024 Draft Model Ordinance could be applied to the remaining areas and development types. A CCP might demonstrate that an RBZ less than 170-feet wide (but not less than 50 feet) is appropriate along the coastal shoreline, while the standard 2024 Draft Model Ordinance RBZ of 170 feet is applied to all riverine areas in the SFHA (see Section 4.2 for more information on how to evaluate the RBZ).

4.2. Riparian Buffer Zone Analysis

The RBZ is the area of land that borders rivers, streams, lakes, and other bodies of water and is discussed further in Section 2.4 of the 2024 Draft Implementation Plan. The boundary of the RBZ is measured inland from the ordinary high water mark of a fresh waterbody (e.g., a lake, pond, or ephemeral, intermittent, or perennial stream) or from the mean higher-high water line of a marine shoreline or tidally influenced river reach (**Figure 4-2**). The RBZ includes the area between these boundaries on each side of the waterway, including the waterway channel.

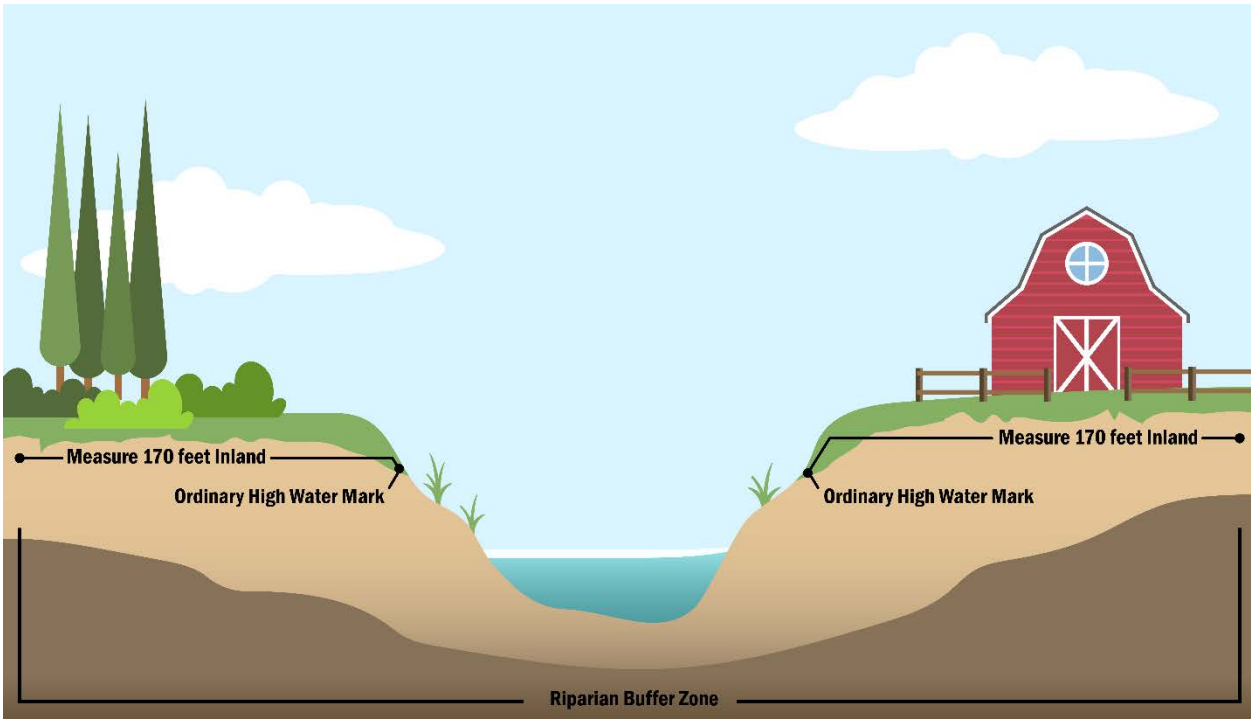


Figure 4-2. Riparian Buffer Zone

FEMA established a standard 170-foot RBZ in the 2024 Draft Implementation Plan. A buffer width that is approximately equal to the maximum tree height of species native to the area is considered to adequately protect most riparian functions associated with vegetation along confined waterbodies (Forest Ecosystem Management Assessment Team 1993). The 170-foot RBZ generally equates to between 75 and 85 percent of the maximum site-potential tree height of common tree species in the Oregon plan area and would be expected to provide an equivalent or greater percentage of associated riparian functions in most instances. It is expected that a 170-foot RBZ would generally conserve at least 95 percent of the associated wood and shade functions of riparian vegetation in the floodplain (McDade et al. 1990, Spies et al. 2013, and Leinenbach et al. 2013). Therefore, NMFS determined that FEMA's proposed 170-foot RBZ would likely be adequate for protecting nearly all the potential wood and shade functions associated with an adjacent channel, assuming that the channel does not move and that the woody vegetation within the RBZ would be maintained (NMFS 2016).

However, any given waterway in a community may have a larger or smaller RBZ based on the local vegetative conditions of the waterway, naturally occurring tree species, or the potential for channel migration. Communities may propose to alter the standard 170-foot RBZ (to no less than 50 feet) based on local conditions. A community may propose a different RBZ based on the trees native to its ecoregion, on a detailed analysis of the existing waterway and riparian zone functions, or another scientifically defensible method. Different waterways within a community may be designated with different RBZ widths if there are defensible reasons for the differences. The following sections describe what analysis must occur to propose a different RBZ.

4.2.1. RIPARIAN BUFFER ZONE BASED ON MAXIMUM POTENTIAL TREE HEIGHT

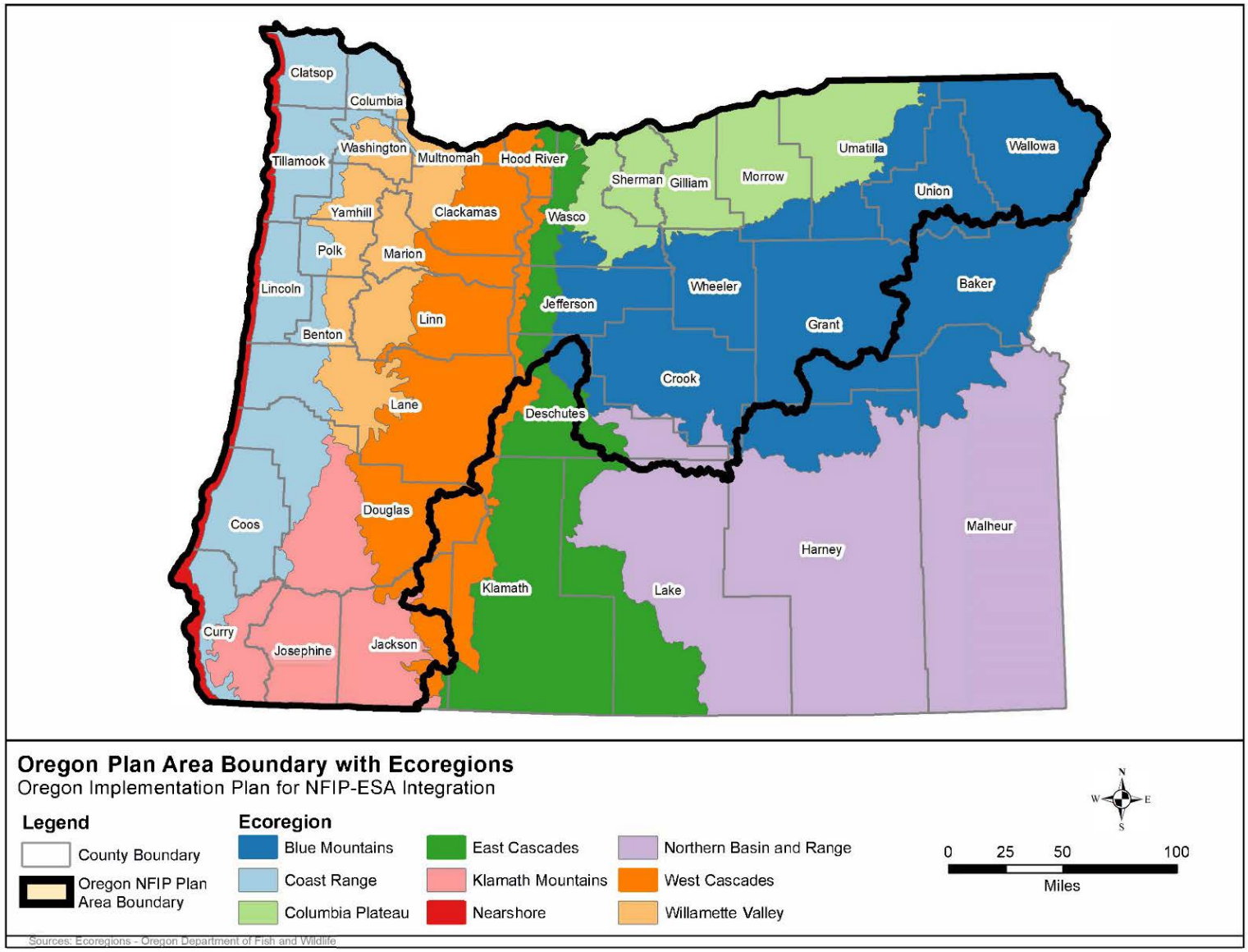
A community would determine the RBZ width based on the maximum potential tree height of the dominant native tree species that would naturally occur within 100 feet of a waterway. The native tree species that would naturally occur in a community is determined by the ecoregion in which the community is located. A community would first identify which Level III Ecoregion it is within. There are eight Level III ecoregions within the Oregon plan area (**Figure 4-3**) (Thorson et al. 2003).

Level III ecoregions are mapped by the U.S. Environmental Protection Agency (EPA) and available at https://www.epa.gov/eco-research/ecoregion-download-files-state-region-10. Once the Levell III Ecoregion is identified, a community would determine the Level IV Ecoregion it is within. Level IV Ecoregions provide more geographic specificity than Level III Ecoregions, and EPA has identified the potential natural vegetation present in Level IV Ecoregions. The potential natural vegetation present in each Level IV ecoregion is described on the back of the EPA ecoregion poster at https://dmap-prod-oms-edc.s3.us-east-1.amazonaws.com/ORD/Ecoregions/or/or_back.pdf. The more detailed information can be used to understand the vegetation at Level III, which are larger geographic areas.[9] In addition, the Oregon Department of Fish and Wildlife provides information on the Level III Ecoregions at: https://www.oregonconservationstrategy.org/ecoregions/.

Table 4.1 presents common tree species native to the ecoregions in the Oregon plan area and their height at maturity. Tree height is used because it represents a distance in which a tree can affect the waterway such as by providing shade and organic material (Oregon Division of State Lands 1998).

The CCP would identify the tree species that would be expected to be dominant under natural conditions within the community. Tree species might be identified based on local conditions or the Level IV Ecoregions. An RBZ that is at least 75 to 85 percent of the maximum potential tree height of the dominant native species expected to occur in the area based on ecoregions may be presented in the CCP as an alternative RBZ.

[9] The ecoregion levels show different geographic specificity. The back of the EPA map shows information at Level IV, which is a subset of the Level III ecoregions. The species information from the back of the map at Level IV provides data on the range of species found in the Level III ecoregion.



Source Oregon Department of Fish and Wildlife. The Oregon Conservation Strategy. https://oregonconservationstrategy.org/ecoregions/

Figure 4-3. Oregon Level III Ecoregions

Table 4.1. Common Tree Species in the Oregon Plan Area and Associated Height at Maturity

Common Name	*Scientific Name*	*Type*	*Approximate Height at Maturity (feet)*	*Dominant in Ecoregion*[a]
Grand fir	*Abies grandis*	Coniferous	150	WV EC BM KM
Western red cedar	*Thuja plicata*	Coniferous	150	CR WC
Ponderosa pine	*Pinus ponderosa*	Coniferous	223	EC CP BM KM
Douglas-fir	*Pseudotsuga menziesii*	Coniferous	200	CR WV WC EC CP BM KM
Sitka spruce	*Picea sitchensis*	Coniferous	200	CR
Western hemlock	*Tsuga heterophylla*	Coniferous	170	CR WC
Black cottonwood	*Populus trichocarpa*	Deciduous	100	WV BM
Oregon oak	*Quercus garryana*	Deciduous	80	WV EC KM
Red alder	*Alnus rubra*	Deciduous	90	CR WV WC
Western larch	*Larix occidentalis*	Deciduous Conifer	200	BM
Big leaf maple	*Acer macrophyllum*	Deciduous	60	CR WV WC KM
Oregon ash	*Fraxinus latifolia*	Deciduous	70	WV

Common Name	*Scientific Name*	*Type*	*Approximate Height at Maturity (feet)*	*Dominant in Ecoregion[a]*
Port Orford cedar	*Chamaecyparis lawsoniana*	Coniferous	200	KM
Western juniper	*Juniperus occidentalis*	Coniferous	33	EC BM KM NBR

Note: a – Level III Ecoregions: CR – Coast Range; WV – Willamette Valley; WC – West Cascades; EC – East Cascades; CP – Columbia Plateau; BM – Blue Mountains; KM – Klamath Mountains; NBR – Northern Basin and Range

4.2.2. RIPARIAN BUFFER ZONE BASED ON STREAM AND RIPARIAN FUNCTIONS

This approach requires an assessment of the existing conditions and functions of the riparian zone. Using this approach, RBZs can be adjusted to reflect the area that provides riparian functions within a community. Although a community may propose a modified RBZ to only a portion of a stream, FEMA recommends that the entire length of the stream in the community be included in the analysis.

The first step in identifying a modified RBZ is to identify the intermittent and perennial streams that occur within the community's jurisdiction that are also in the SFHA. Streams can be identified using the U.S. Geological Survey's (USGS's) National Hydrography Dataset (NHD), which can be accessed at https://www.usgs.gov/national-hydrography/access-national-hydrography-products or using the NHD layer of the Oregon Explorer Oregon Rapid Wetland Assessment Protocol and Stream Function Assessment Method (SFAM) Map Viewer, which can be accessed at https://tools.oregonexplorer.info/ (Oregon State University and Institute for Natural Resources 2024). The NHD identifies surface waters, including intermittent and perennial streams, across the nation and is the national and Oregon state standard for freshwater spatial datasets (ODFW 2024).

Communities may select any approach to conducting a community-wide floodplain habitat assessment to characterize the existing floodplain functions that occur within their community, provided that the assessment includes a thorough and detailed enough description of habitat conditions and functions to support the proposed modified RBZ. The SFAM process is one possible approach to evaluate stream and riparian functions that could be used to develop the necessary information to support a proposed modified RBZ.

SFAM was developed by the U.S. Environmental Protection Agency (EPA), in coordination with the U.S. Army Corps of Engineers and the Oregon Department of State Lands to provide a rapid, science-based approach to assessing the ecological functions and values of a stream reach (EPA et al. 2020). SFAM includes completion of an office component as well as a field component.

SFAM was designed to assess both the functions and values that streams provide. Stream functions are the physical, chemical, and biological processes that create and maintain the character of a stream and the associated riparian system, and determine the flux of energy, materials, and

organisms through or within a stream system. Stream values are the ecological and social benefits that the stream system provides, determined by the particular function and the local significance of that function. That is, a function can either be expressed or not expressed at a given site, but the value of that function depends on the context of the broader landscape (EPA et al. 2020).

SFAM identifies four broad functional groups (Hydrologic, Geomorphic, Biological, and Water Quality functions) within which a suite of 11 specific functions have been identified (EPA 2012). SFAM also identifies measures or metrics that allow a quantitative or qualitative assessment of specific characteristics that may indicate the extent to which a particular function is active. These measures were determined based on science and are designed to be rapid and repeatable. Many of the SFAM function and value measures can be used to characterize the existing condition of a floodplain and the RBZ surrounding a stream within a community. For example, the measures or metrics related to native woody vegetation, large trees and wood, could be used to characterize the quantity and quality of two functions (out of 11 total functions) that relate to shade and wood supply within the SFHA.

The SFAM User Manual instructs users on how to gather data, using desktop and field methods, for each of the function and value measures and record their data in the appropriate locations in the SFAM Workbook Excel spreadsheet, which can be downloaded at https://www.oregon.gov/dsl/WW/Pages/SFAM.aspx.[10] Once the user has entered data in the workbook, it generates sub-scores for each of the function and value measures and overall scores for the specific functions and grouped functions. The scores can be used by a community to support its proposal for a modified RBZ.

4.2.3. OREGON ADMINISTRATIVE RULE 660-023-0090 – SAFE HARBOR METHOD

Oregon Administrative Rule (OAR) 660-023-0090 requires local governments to inventory significant riparian corridors following either the safe harbor methodology or the standard inventory process. The standard setback distances identified by the safe harbor method cannot be used alone to justify a reduction in the RBZ within a CCP because it is not based on the dominant native tree species for the region, is not directly linked to existing riparian functions, and may lack explicit riparian vegetation removal standards. While the standard setback distances from the safe harbor method cannot be used to reduce the RBZ, development limitations and prohibitions under OAR 660-023-0040 (e.g., setbacks) can be incorporated into the CCP and coupled with other approaches (e.g., vegetation removal restrictions) to achieve no net loss.

4.3. Assessment of Habitat Conditions

A community level assessment of habitat conditions may be used by communities to analyze the existing conditions within the SFHA in the community and propose alternative floodplain functions to

[10] SFAM User Manual is available through Oregon Explorer: https://oe.oregonexplorer.info/externalcontent/sfam/SFAM_User_Manual_V1.1.pdf.

which no net loss would apply, or alternative mitigation ratios to achieve no net loss. The assessments must describe existing conditions of ESA-listed populations, and those habitat functions that support ESA-listed species, in or near the area covered by the CCP. Additional guidance on conducting an assessment of habitat conditions is provided in Attachment A of this document. Communities pursuing a Habitat Conservation Plan would fall under Path D for NFIP-ESA integration implementation and the guidance in Attachment A would not apply. NMFS and U.S. Fish and Wildlife Service developed the Habitat Conservation Planning and Incidental Take Permit Processing Handbook[11] to provide guidance in developing a Habitat Conservation Plan and obtaining the associated Incidental Take Permit.

4.4. Grants and Assistance

Grant and assistance funding may be available to help a community implement their CCP. For example, the Oregon Watershed Enhancement Board (OWEB) provides grants to help protect and restore healthy watersheds and natural habitats. OWEB provides grants for a wide range of activities including land acquisition, monitoring, and restoration. Communities using grants and assistance must coordinate with the funding agency to ensure the funding is available to use for offsetting development impacts. Many organizations that fund restoration work aim to achieve a net improvement in ecosystem functions and may not allow funds to be used for activities that do not exceed no net loss or for the secondary purpose of offsetting development impacts. Funding programs, requirements, and grant opportunities can change, so it is not possible to list all potential sources.

[11] https://www.fws.gov/media/habitat-conservation-planning-and-incidental-take-permit-processing-handbook.

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Attachment A – Assessment of Habitat Guidance

Introduction

This guidance was developed to assist National Flood Insurance Program (NFIP) participating Oregon communities implementing Path C – Customized Community Plan (CCP) prepare an assessment of habitats within the community. This guidance differs from the *Floodplain Habitat Assessment and Mitigation: Regional Guidance for Oregon (2024)* because it focuses on a community-wide approach to assessing habitat, rather than a permit-by-permit approach. A community may conduct an assessment to analyze the existing habitat conditions within the special flood hazard area (SFHA). The assessment may draw on previously completed studies, as valid and appropriate. Based on the findings of the assessment, a community may then propose alternative but equivalent floodplain functions or mitigation ratios to achieve no net loss (Section 2.2.1). The objective of the NFIP-Endangered Species Act (ESA) Integration Requirements is to achieve no net loss of existing floodplain functions with a particular emphasis on flood storage, water quality, and vegetation. Through an assessment of habitat conditions, a community can gain a detailed profile of the existing functions in its SFHA and may identify other functions that are critical to the maintenance of salmonid habitat in the community. Communities would present proposals for a modification of the no net loss standards through a CCP. FEMA would review the CCP before approving it for implementation. FEMA may confer with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) depending on the scale and complexity of the CCP prior to FEMA's decision to approve the CCP.

An assessment of habitat must include:

- Identification of *all* ESA-listed species and designated critical habitats, Essential Fish Habitat (EFH), as defined by the Magnuson-Stevens Fishery Conservation and Management Act, and Fish and Wildlife Habitat Conservation Areas that occur in or near the geographic area of a community's proposed CCP.[12]

- A summary of the habitat needs for each species.

- Results of site investigations to determine the condition of suitable habitat associated with ESA-listed species and EFH.

The assessment must focus not only on existing natural habitats, but also on the floodplain functions provided by all areas within the SFHA. The assessment is likely to require technical expertise from biologists, hydrologists, and floodplain managers.

[12] Impacts on floodplain functions and associated impacts on habitat can occur upstream or downstream as well as at the location of development. As such, it is important to identify ESA-listed species, designated critical habitat, EFH, and Fish and Wildlife Habitat Conservation Areas near the geographic area of the community's proposed CCP.

Initial Mapping

The first step in the assessment is to develop a map(s) of the area that is being assessed. The map, drawn to scale, should delineate the following:

- Full analysis area
- All waterbodies, meaning all surface waters including rivers, streams, lakes, wetlands, and shorelines
- SFHA
- The 10- and 100-year flood elevations at representative locations (i.e., enough individual locations to portray the 10- and 100-year flood elevations across the community), where available. These only need to be provided when flood data is available from existing studies or the community.

This map will be used to compare against the habitat map developed in later steps. As such, it should be developed at a scale where differences among conditions are easily differentiated.

Background Research

Existing sources of information relevant to ESA-listed species and their designated critical habitats in or near the geographic area covered by a community's CCP would be reviewed. 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 inventory maps of natural resources; best available science consistency studies; designated fish and wildlife habitat conservation areas; coastal management programs; flood control and floodplain management plans; watershed analyses; and habitat studies.
- The community's parks, natural resources departments' natural area studies, or both.
- National Marine Fisheries Service distribution of Threatened and Endangered Species (https://www.fisheries.noaa.gov/region/west-coast/species).
- National Marine Fisheries Service critical habitat maps (https://www.fisheries.noaa.gov/resource/map/national-esa-critical-habitat-mapper).
- National Marine Fisheries Service Essential Fish Habitat maps (https://www.habitat.noaa.gov/apps/efhmapper/)
- US Fish and Wildlife Service distribution of Threatened and Endangered Species (https://ipac.ecosphere.fws.gov/).

- 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 vicinity.
    - USFWS: (www.fws.gov/pacific)
    - NMFS: (https://www.fisheries.noaa.gov/resources/documents)
- US Department of Agriculture, Natural Resource Conservation Service soil survey maps (http://websoilsurvey.nrcs.usda.gov/app/).
- Oregon Department of Fish and Wildlife Compass Database (https://www.dfw.state.or.us/maps/compass/index.asp).
- Oregon Department of Fish and Wildlife Conservation and Recovery Plans (https://www.dfw.state.or.us/fish/CRP/conservation_recovery_plans.asp).
- Oregon Department of Environmental Quality Water Quality Index (https://www.oregon.gov/deq/wq/pages/wqi.aspx).
- Waterway surveys conducted by Tribes or federal, state, or local agencies. Such surveys may contain detailed information on habitat conditions and fish species presence such as redd surveys or snorkeling or electroshocking surveys.

PROTECTED SPECIES IDENTIFICATION

The background research should identify *all* ESA-listed species and designated critical habitats, EFH as defined by the Magnuson-Stevens Fishery Conservation and Management Act, and fish and wildlife habitat conservation areas that occur in or near (within the same reach or watershed) the geographic area of a community's CCP. The area to be included in the background research would depend on the size of the area included in the CCP; that is, if the CCP is covering a small portion of the community (e.g., one large public parcel in the SFHA), then characterizing the conditions along the same reach may be sufficient. If, for example, the CCP encompasses the entire community and several 10-digit HUC watersheds, then a larger area may need to be evaluated.

This step identifies species and habitats that have the potential to be directly, indirectly, or cumulatively negatively impacted by development actions in the SFHA.

Table A.1 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.

Table A.1. Occurrence of Listed Species and Critical Habitat In or Near the Project Area (Sample)

Common Name	*Scientific Name*	*ESA Status*	*Jurisdiction*	*Critical Habitat Present*
Lower Columbia River Chinook Salmon	Oncorhynchus tshawytscha	Threatened	NMFS	Yes
Lower Columbia River steelhead	O. mykiss	Threatened	NMFS	Yes
Columbia River Distinct Population Segment Bull Trout	Salvelinus confluentus	Threatened	USFWS	Yes

To obtain general maps of the distribution of ESA-listed or proposed species, listed critical habitats, and any areas designated EFH, check with the NMFS and USFWS data sources described above. Please note that the maps of potential fish distribution at these websites are not necessarily the most detailed or accurate that exist. The regional or local offices of NMFS, USFWS, ODFW, 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. However, the floodplain functions upstream of a migration barrier may still provide essential physical and biological features for ESA-listed species.

EFH is managed by NMFS. On the west coast of the United States there are three salmon species with designated EFH that potentially occur in freshwater systems: pink, coho, and Chinook salmon. If future development actions in the SFHA may potentially negatively impact estuarine and marine systems, EFH for groundfish and coastal pelagic species may also need to be considered.

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 information. It is important to note that all ESA-listed species in or near the geographic area covered by the CCP need to be addressed.

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

- Factors of decline:
    - Historical pressures on the species
    - Current pressures on the species
    - Limiting factors for recovery of the species

- Local empirical information (if available):
  - Current local population information
  - Ongoing monitoring programs (if any)
  - Population trend of the species

HABITAT NEEDS IDENTIFICATION

Following the identification and description of all ESA-listed species, there must 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.

Essential physical and biological features (PBFs) are the key elements needed for critical habitat. They are identified in the final critical habitat rules and published in the Federal Register for each listed species (see example in the box). The PBFs must be described when critical habitat may potentially be affected by development in the SFHA. In those cases where listed critical habitat is not present in or near the geographic area covered by a CCP, describing available habitat in terms of the PBF variables is still recommended to concisely depict key habitat needs.

Example Physical and Biological Features

The PBFs for Chinook salmon and steelhead trout include:

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.

(50 CFR Part 226, 81 Federal Register 9251; February 24, 2016)

Site Investigation

Following the protected species and habitat needs identification, site investigations must be conducted to determine the types of habitats present in the area covered by a CCP in which ESA-listed species have a "primary association." "Habitats of primary association" include critical components which, if altered, may reduce the likelihood that the listed species will maintain its

population and reproduce in the long term. Therefore, they are important considerations in identifying the habitats, or components of habitats, within the area covered by a CCP that require no net loss standards to avoid jeopardy to ESA-listed species, their designated critical habitat, and EFH.

This process must identify, but is not limited to, those areas discussed as being PBFs for ESA-listed species. For example, identification of Chinook salmon habitat areas of primary association must consider the presence of those PBFs listed in the box above. A description of the riparian and instream habitat conditions that exist both upstream and downstream is also needed. This description of existing baseline habitat functions must, at a minimum, include the habitat functions identified for each species. In addition, it is especially important to note the locations and distances from the geographic area covered by a community's CCP relative to any waterway reaches that may potentially support ESA-listed species or contain designated critical habitat.

The description of habitat and general conditions must also identify existing modifications to habitat within the SFHA, including existing structures, roads, impervious surfaces, and graded or filled areas. Any existing modification that impairs the habitats of primary association and habitat functions identified must be described. This description sets the existing baseline or conditions of the habitat against which proposed development impacts would be compared to derive the required no net loss mitigation measures. In general, actions that have the potential to result in adverse effects to ESA-listed fish, their designated critical habitat, or EFH involve any of the following:

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

HABITAT NARRATIVE

The findings of the field investigations are used to prepare a description of the habitat areas and condition within the geography of the CCP. The narrative for this part of the assessment report needs to describe the presence and quality of the habitat as it relates to the PBFs for all the species and habitat areas.

As described above, PBFs are the key habitat components required for ESA-listed species, as identified in the final rules that are published in the Federal Register when critical habitat is designated. The narrative must identify what functions are relatively intact and which are impaired by previous site and area (e.g. sub-watershed, watershed, or basin scale) modifications.

It is possible that there may be limited information available. 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 to assess the basis and relative confidence of statements related to current conditions.

The variables listed below must be considered to ensure that the assessment comprehensively addresses existing habitat conditions. The list below is intended to assist jurisdictions in considering all possible effects on habitat, ESA-listed species, and floodplain functions from future land management actions.

The Physical and Biological Features (PBFs)

These are identified in the final rules that designate critical habitat for listed threatened and endangered species (see the NMFS and USFWS critical habitat map links within the background research section to access final rules for ESA-listed species). For example, for an inland site with Chinook salmon habitat, 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, describing the available habitat in terms of the PBF variables is still recommended to concisely depict key habitat features and existing conditions. The distance and locations of the nearest designated critical habitat to the CCP area need to be listed and shown on a map.

Water Quality

Water quality variables that must be considered include turbidity, pH, total dissolved gas (percent of saturation), bacteria, toxins, pollutants, water temperature, and dissolved oxygen. Reaches of waterways 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 reach on one of these lists does not necessarily ensure that it meets all water quality standards for all variables; it may simply mean that no sampling has occurred or that the sampling has not demonstrated that the reach does not meet standards. Data on some water quality variables is extremely limited or non-existent in many waterway reaches. Water body segments only become listed via documented repeated violations that are estimated to be human-caused.

Jurisdictions must include 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. Information on the 303(d) list is found at: https://www.oregon.gov/deq/wq/pages/epaapprovedir.aspx.

Waterway segments (e.g., 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. Development of a TMDL is a lengthy process and many reaches listed on the 303(d) list do not yet have a TMDL developed. The assessments must include consideration of the current status of the water quality and evaluate any potential for development in the floodplain 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, the assessment must describe what the estimated effects to ESA-listed fish species, their designated critical habitats, or both are expected to be, and how this effect was assessed. In addition, the maximum estimated spatial scale and maximum time period when any possible impacts on ESA-listed fish species or their designated critical habitats might occur must be described.

Low Flow Hydrologic Regimes (including hyporheic flows) and High Flow (flood) Hydrologic Regimes

Water flow dynamics and hydrology must be assessed. Flood flow depths, volumes, velocities, and flow paths have an important effect on the way habitat is formed. The habitat narrative must describe these factors with an emphasis placed on the effects of flood events on habitats. Tributary streams, seeps, stormwater outfalls, waterways, and other water sources must be identified and described. This discussion may rely on and reference other flood and site hydrology studies prepared in the community, and it should be focused on how flood dynamics and hydrology impact local habitat areas.

Water quality can usually be described through a semi-quantitative or qualitative assessment. However, more intensive field surveys and possibly 1- or 2-dimensional flow modeling may be required to describe likely extents of inundation, water velocities, and possible changes to instream and riparian habitat due to future flood events.

If there is any potential for changes in flood velocities, flood elevations, or flood extent within the floodplain, the potential impact those changes would have on ESA-listed fish species, their designated critical habitats, or both must be described in the habitat assessment. The assessment should also identify the maximum estimated spatial and temporal scale of the effects.

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

Describe existing processes of sediment movement, including surface erosion, delivery of sediments to waterbodies, or total loadings (volumes) of sediment transported in waterways that provide potential habitat to ESA-listed species. Describe how this was assessed. Impervious surfaces in the floodplain play an important role in the delivery of sediments to waterbodies and an assessment of the existing floodplain conditions relative to impervious surfaces should be included.

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. In some cases, this may include impacts from transport of sediments to the waterway or downstream.

If development actions have the potential to deliver significant quantities of fine-sediments to reaches in designated critical habitat, or in those areas that may otherwise provide potential habitat to ESA-listed species, the percent of fines 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 to estimate how (or if) any additional inputs of fine sediments may degrade the current quality of stream substrate habitat.

In those cases where impacts of sediment may be a significant concern, it may also be necessary to fully describe current substrate conditions in those 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 waterway reaches.

Floodplain Connectivity

Disconnecting a waterway from its floodplain impacts several other functions that directly impact the quality and quantity of habitat that supports ESA-listed species. Floodplain connectivity affects the potential for natural lateral migration and hydrologic connectivity between the waterway and its floodplain, including the groundwater systems, and the production and utilization of organic matter by riparian and aquatic communities.

The hydrologic connections provide temporary storage of floodwaters and refugia from high velocity flows during floods, 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 and resilience against episodic disturbances are impaired if a waterway is largely disconnected from its floodplain.

The assessment needs to describe the current condition of floodplain connectivity and processes. This can usually be accomplished in a brief narrative via a combination of site visits 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 waterway reaches, including the distribution and size of riffles and pools; floodplain extent and depth (review FIRM maps); and identification of any side-channels and tributaries.

Riparian Vegetative Community

The assessment of the riparian vegetation should include, but not necessarily be limited to, a discussion of conditions throughout the riparian buffer zone. Freshwater riparian conditions should be characterized by describing conditions as they relate to the riparian habitat functions. The functions that riparian vegetation affects include water temperature, recruitment of large woody debris, filtering of sediment and pollutants, erosion control, bank stability, and influence on

microclimatology. Characterization of marine shoreline conditions would be similar and may include input from state agencies.

SPECIAL FLOOD HAZARD AREA AND HABITAT AREA MAP

Once all habitat areas of primary association are identified and described, they must be delineated on one or more maps, at a scale that is legible for identifying variations in conditions. Maps must also include the regulatory boundary of the SFHA.

The habitat area map, and background information used to develop the map, will identify the existing functions that are important or critical to maintaining PBFs including variations in functions across the area studied. Similarly, this information will determine which functions may not be present, and therefore, where no net loss may not be applicable or necessary for ESA-listed species protection. This data can be used to justify alternative floodplain functions for the application of no net loss standards in a community's CCP. In addition, this data establishes the baseline against which no net loss is measured and may be used to justify alternative mitigation ratios.

2024 Revised Draft Implementation Plan
Appendix E Model Projects

Draft NFIP-ESA Oregon Implementation Plan Guidance

Model Projects

For Participating Communities in the Implementation Plan Area

August 2025

FEMA

Federal Emergency Management Agency
Region 10
Department of Homeland Security
130 – 228th Street SW
Bothell, WA 98021

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Table of Contents

Figures

Tables

Acronyms and Abbreviations

BFE	Base flood elevation
dbh	diameter at breast height
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
LID	Low-impact development
NFIP	National Flood Insurance Program
OHWM	Ordinary High Water Mark
RBZ	Riparian Buffer Zone
SFHA	Special Flood Hazard Area

Chapter 1. Introduction

The Federal Emergency Management Agency (FEMA) developed model projects to use in the Environmental Impact Statement for the Oregon National Flood Insurance Program (NFIP) Endangered Species Act (ESA) Integration and associated implementation guidance. The purpose of the model projects is to portray scenarios of development in the special flood hazard area (SFHA), how to quantify impacts of those scenarios, and how to quantify mitigation for the three floodplain functions for which no net loss is required (i.e., flood storage, water quality, vegetation). The figures used to depict the model projects are schematic and not to scale. Allowable methods for mitigating impacts on the three floodplain functions (e.g., excavation to create replacement flood storage, removing impervious surface or use of low-impact development, planting trees) are detailed in Chapter 3 of the 2024 Draft Oregon Implementation Plan for NFIP-ESA Integration.

FEMA identified measurable proxies to evaluate the impacts of development within the SFHA on floodplain functions.

- For flood storage, the proxy is the flood storage capacity, which refers to the volume available for floodwater during a 1-percent annual chance flood (100-year floodplain). Any addition to the SFHA that occupies space, such as fill or structures, reduces this capacity.
- For water quality, the proxy is pervious surface area, which impacts the ability of the floodplain to filter stormwater and absorb pollutants.
- For vegetation, the proxy is trees 6 inches in diameter at breast height (dbh) or larger, which provide a variety of ecological services in the floodplain.

Mitigation would be required to offset impacts on the three floodplain functions, with increased mitigation ratios depending on the location of the impact (development) and mitigation as shown in **Table 1.1**. Mitigation requirements apply to development located in the floodway, riparian buffer zone (RBZ), or in the remainder of the SFHA.

The boundary of the RBZ is measured from the ordinary high water mark (OHWM) of a freshwater body (e.g., lake; pond; ephemeral, intermittent, or perennial stream) or mean higher high water line of a marine shoreline or tidally influenced river reach to 170 feet inland. The RBZ includes the area between these boundaries on each side of the waterway, including the waterway channel. Where the RBZ is larger than the SFHA, the no net loss standards would only apply to the area within the SFHA.

Table 1.1. Proposed No Net Loss Mitigation Ratios and Multipliers from 2024 Draft Implementation Plan

Location of Impact	Proportion of Mitigation to Impact (Mitigation: Impact)				
	Flood Storage Capacity	Pervious Surface	Trees[3]		
			(6-inches dbh to 20-inches dbh)	(Greater than 20-inches dbh to 39-inches dbh)	(Greater than 39-inches dbh)
Impact Occurring in the Mapped Floodway[1]	2:1	1:1	3:1	5:1	6:1
Impact Occurring in the Riparian Buffer Zone (RBZ)[2]	2:1	1:1	3:1	5:1	6:1
Impact Occurring Outside the Floodway and RBZ, in remainder of the Special Flood Hazard Area (SFHA)	1.5:1	1:1	2:1	4:1	5:1
Mitigation Location Multipliers[4]					
Mitigation occurring on-site or off-site in the same reach[5]	100%	100%	100%	100%	100%
Mitigation occurring off-site, in a different reach, but within the same watershed (i.e., 10-digit Hydrologic Unit Code [HUC])[6]	200%	200%	200%	200%	200%

Conditions:

1. When the floodway is not mapped, the mitigation ratios for the RBZ and remainder of the SFHA would be used.
2. Impacts that occur in the RBZ must be mitigated in the RBZ.
3. Trees planted for mitigation do not have a specified dbh; however, they must be native species.
4. Mitigation multipliers of 100 percent result in the required mitigation occurring at the same value described by the ratios above, while multipliers of 200 percent result in the required mitigation being doubled.
    a. For example, if a development would create 1,000 square feet of new impervious surface, then 1,000 square feet of new pervious surface would need to be created. However, if only 500 square feet can be created on-site and in the same reach, the remaining 500 square feet created off-site along a different reach would need to be created at double the required amount as a result of the 200 percent multiplier. That is, another 1,000 square feet of pervious surface would need to be created at the off-site location, in addition to the 500 square feet created on-site.
5. Reach is defined as a section of a stream or river along which similar hydrologic conditions exist, such as discharge, depth, area, and slope. It can also be the length of a stream or river (with varying hydrologic conditions) between major tributaries or two stream gages, or a length of river for which the characteristics are well described by readings at a single stream gage.
6. Watersheds are determined by the U.S. Geological Survey using the 10-digit HUC area.

Development that is dependent on being located within the RBZ to function (i.e., is a functionally dependent use, a use that cannot perform its intended purpose unless it is located or carried out in proximity to water) would require no net loss. Development in the RBZ that is not functionally dependent requires an additional planting requirement, termed beneficial gain. Under FEMA's beneficial gain standard, an area within the RBZ, within the same reach of the project, and equivalent to 5 percent of the area impacted within the RBZ would be planted with native riparian herbaceous, shrub, and tree vegetation. Beneficial gain plantings are in addition to plantings required for no net loss of vegetation, which requires mitigation for the removal of trees greater than 6 inches dbh. For additional information on the RBZ, see Chapter 3 of the 2024 Draft Oregon Implementation Plan for NFIP-ESA Integration.

The model projects were developed to depict a range of project scenarios. Assumptions about the existing conditions of each model project site necessary to quantify potential impacts (e.g., the base flood elevation [BFE]) and required mitigation are described in this document with a brief rationale for the mitigation calculation.

Chapter 2. Model Projects

2.1. Residential New Build – Single-Family Home

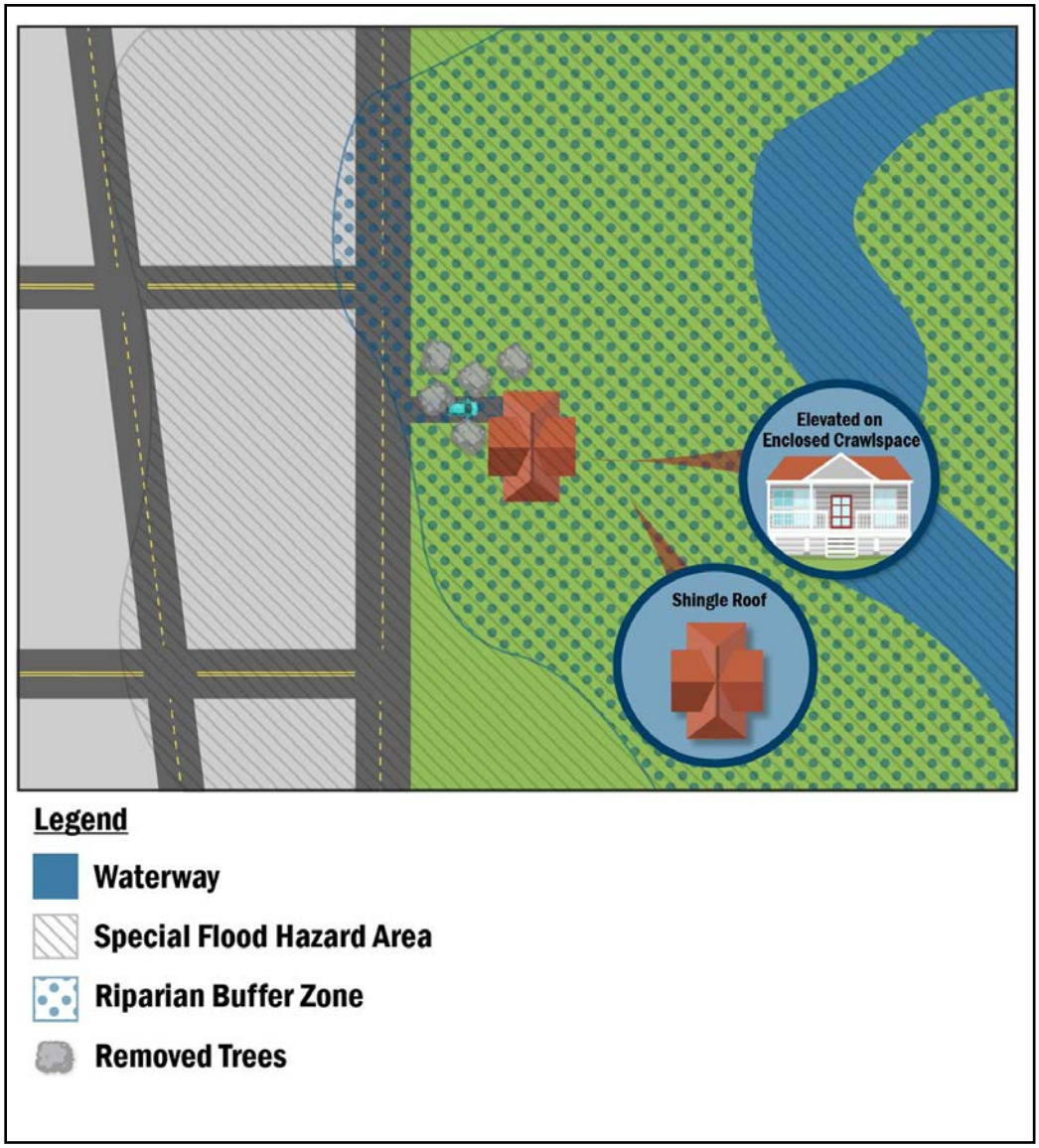

Figure 2-1. Residential New Build – Single-Family Home

FEMA developed this model project to portray the construction of a new single-family home in which the design of the home did not incorporate measures to avoid or minimize impacts on the three floodplain functions. While this model project is portrayed as a single-family home, it could also represent a nonresidential building of the same dimensions. Although this model project is not designed to avoid impacts on the three floodplain functions, it would conform to the current minimum standards for floodplain development. The features and assumptions of this model project include:

- 1,500-square-foot footprint, elevated on an enclosed crawl space
- 40-foot-long by 20-foot-wide (800 square feet total) driveway constructed of 6-inch-thick concrete
    - *Final height of the driveway is 3 inches (0.25 feet) above the ground surface elevation after base preparation*[1]
- 5 trees ranging from 6 to 20 inches dbh removed for construction
- BFE is 1 foot above the ground surface elevation
- Constructed within the RBZ; the floodway is not mapped
    - Non-*functionally* dependent use (i.e., not dependent on being located near a waterway, beneficial gain required)
- Mitigation occurred off-site and within the RBZ

The impact calculation and required mitigation for this model project are presented in **Table 2.1**.

Table 2.1. Residential New Build Impact and Mitigation Calculation

Floodplain Function	Impact Determination	Mitigation Rationale	Required Mitigation
Flood Storage	**Home:** (1,500-square-foot footprint) × (1 foot between existing ground surface elevation and BFE) = 1,500 cubic feet **Driveway:** (800 square feet) × (0.25-foot-thick concrete between existing ground surface elevation and BFE) = 200 cubic feet **Total:** 1,700 cubic feet	Loss of flood storage capacity must be mitigated at a 2:1 ratio with a 200% multiplier (i.e., 4:1 ratio) when impact occurs in the RBZ and mitigation occurs off-site and within the RBZ. Impacts in the RBZ must be mitigated in the RBZ.	**Home:** 6,000 cubic feet **Driveway:** 800 cubic feet **Total:** 6,800 cubic feet of replacement flood storage must be created

[1] Base preparation refers to the process of excavating the area, grading the surface for proper drainage, and creating a stable foundation with layers of compacted aggregate.

Floodplain Function	Impact Determination	Mitigation Rationale	Required Mitigation
Water Quality	**Home:** 1,500 square feet, new, impervious **Driveway:** 800 square feet, new, impervious **Total:** 2,300 square feet	Loss of pervious surface must be mitigated at a 1:1 ratio with a 200% multiplier (i.e., 2:1 ratio) when mitigation occurs off-site and within the RBZ. Impacts in the RBZ must be mitigated in the RBZ.	**Home:** 3,000 square feet **Driveway:** 1,600 square feet **Total:** 4,600 square feet of impervious surface must be mitigated
Vegetation	5 trees ranging from 6 up to 20 inches dbh removed	Trees 6 to 20 inches dbh must be replaced at a 3:1 ratio with a 200% multiplier (i.e., 6:1 ratio) when impact occurs in the RBZ and mitigation occurs off-site and within the RBZ. Impacts in the RBZ must be mitigated in the RBZ.	30 trees must be planted
Beneficial Gain	Non-functionally dependent use in the RBZ, beneficial gain required	Five percent of the area impacted must be planted = 5 percent of 2,300 square feet (1,500 square feet of impact from home + 800 square feet of impact from driveway).	115 square feet of the RBZ must be planted with native riparian herbaceous, shrub, and tree vegetation

2.2. Residential New Build – Single-Family Home Designed to Avoid and Minimize Impacts

Figure 2-2. Residential New Build – Single-Family Home Designed to Avoid and Minimize Impacts

FEMA developed this model project to portray the construction of a new single-family home in which the design incorporated measures to avoid and minimize impacts on all three floodplain functions. Avoidance and minimization measures include:

1. Elevate the home on posts or piers to minimize new fill and structures within the SFHA.

2. Use pervious materials where feasible and incorporate low-impact development (LID) and green infrastructure to minimize and mitigate reductions of pervious surface, such as incorporating a green roof into the design.[2]

3. Design the project to avoid the removal of trees.

4. Situate the structure as far from the waterway as possible, thereby locating the structure outside of the floodway and RBZ.

While this model project is portrayed as a single-family home, it could also represent a nonresidential building of the same dimensions. The features and assumptions of this model project include:

- 1,500-square-foot footprint, elevated using 1-foot by 1-foot square posts or piers every 10 feet (24 total)
- 40-foot-long by 20-foot-wide (800 square feet total) driveway constructed of 4-inch-thick pervious concrete
    - Final height is at grade (i.e., 0 inches [0 feet] above the ground surface elevation) *after* base preparation. The material selected is thinner allowing base preparation to be adjusted to avoid effects above grade.
- No trees removed (avoided through project design)
- LID/green infrastructure (i.e., green roof) incorporated into the design to offset impacts on water quality from the roof of the home
- BFE is 1 foot above the ground surface level
- Constructed within the SFHA, outside of the RBZ; the floodway is not mapped
- Mitigation occurred on-site and within the SFHA

The impact calculation and required mitigation for this model project are presented in Table 2.2.

[2] Use of a green roof may require additional design considerations, such as an altered roofline.

Table 2.2. Residential New Build with Avoidance and Minimization Impact and Mitigation Calculation

Floodplain Function	Impact Determination	Mitigation Rationale	Required Mitigation
Flood Storage	**Home:** [(1-foot × 1-foot square piers) × 24] × (1 foot between existing ground surface elevation and BFE) = 24 cubic feet **Driveway:** (800 square feet) × (0 feet between existing ground surface elevation and BFE) = 0 cubic feet (no impact)	Loss of flood storage capacity must be mitigated at a 1.5:1 ratio when mitigation occurs on-site	**Home:** 36 cubic feet **Driveway:** No impact **Total:** 36 cubic feet of replacement flood storage must be created
Water Quality	**Home:** No impact; entire increase in impervious surface addressed through LID and green infrastructure (i.e., green roof) **Driveway:** No impact; pervious concrete used	Incorporation of green roof and pervious concrete addresses impacts from all new impervious surfaces.	No mitigation required
Vegetation	No impact; no trees removed	Tree removal is avoided through project design.	No mitigation required
Beneficial Gain	Not applicable; development located outside the RBZ	Because it is not located in the RBZ, beneficial gain is not required.	No mitigation required

2.3. Boat Launch – River

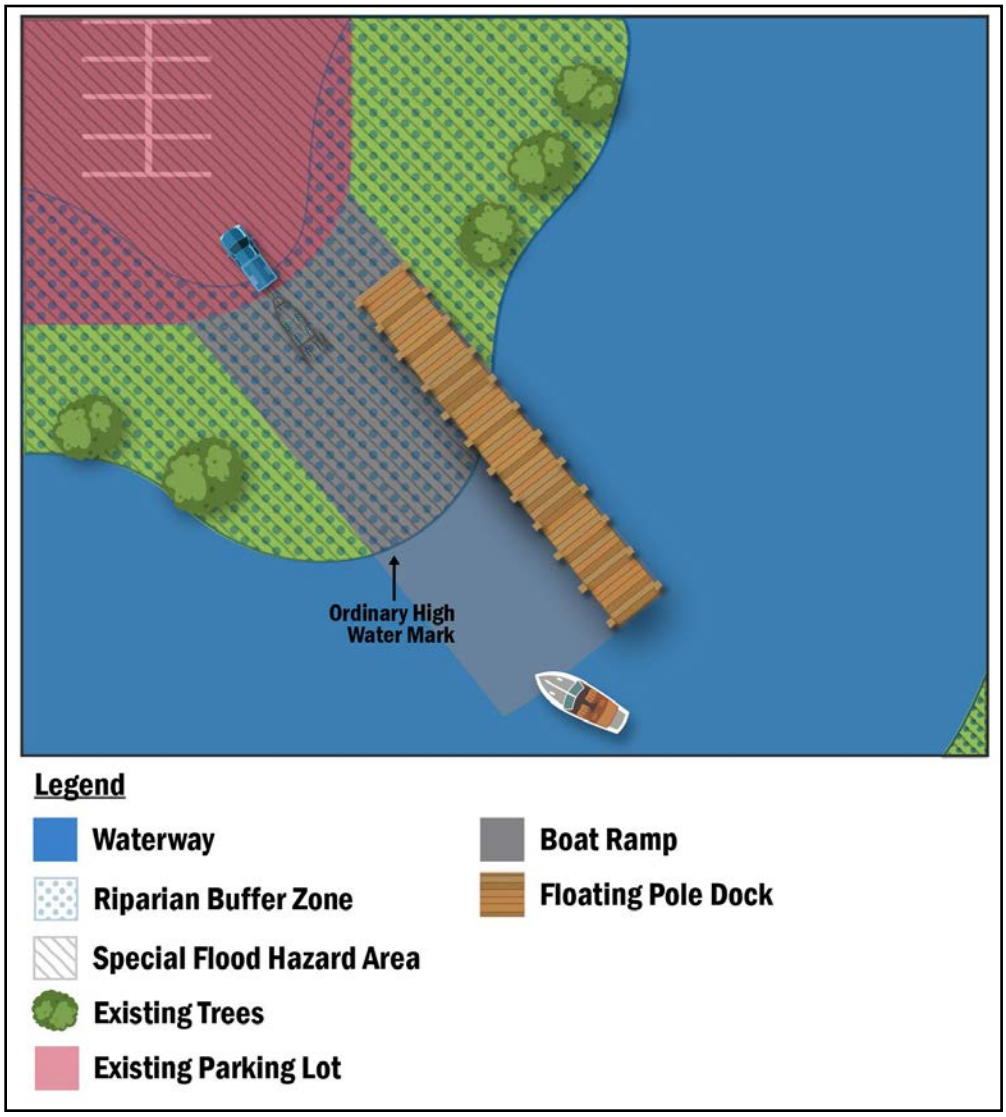

Figure 2-3. Boat Launch – River

FEMA developed this model project to portray the construction of a boat ramp and dock on a river. This model project portrays the quantification of impacts on flood storage capacity and water quality when a development is partially in water. Impacts on flood storage capacity and water quality do not apply below the OHWM. The features and assumptions of this model project include:

- 120-foot-long by 6-foot-wide (720 square feet total) floating pole dock, constructed of 6-inch-thick (0.5-feet) metal or composite;[3]
    - Assume that one quarter (25 percent) of the floating pole dock would remain above the OHWM but below the BFE during a flood because it is fixed to the land. Therefore, one quarter (25 *percent*) of the floating pole dock is assumed to be above the OHWM but below the BFE during a flood (i.e., impact on flood storage).
    - Constructed using 1-foot by 1-foot square piers every 10 feet on either side (24 total) that extend 6 feet between the OHWM and the BFE.
- 150-foot-long by 20-foot-wide (3,000 square feet total) boat ramp constructed that connects to an existing parking lot
    - Constructed of 6-inch-thick (0.5-feet) concrete
        - Final height is 3 inches (0.25 feet) above the ground surface elevation after base preparation
    - BFE is 1 foot above the ground surface elevation
    - Assume that 40 feet of the length is located below the OHWM (i.e., ordinarily under water); 110 feet of the length is located above the OHWM and below the BFE.
- No trees removed (avoided through project design)
- Ramp and dock constructed in the RBZ
    - Functionally dependent use (i.e., dependent on being located near a waterway, beneficial gain is not required)[4]
- Mitigation occurred on-site and within the RBZ; the floodway is not mapped

The impact calculation and required mitigation for this model project are presented in **Table 2.3**.

[3] A floating pole dock would rise as waters rise, except for the potion of the dock that is fixed to the land and remains above the OHWM but below the BFE when waters rise. The applicable portion of the floating pole dock that does not rise as waters rise is an impact on flood storage.

[4] The parking in this example figure is pre-existing and would not be altered by the model project; however, parking is not a functionally dependent use.

Table 2.3. Boat Launch on River Impact and Mitigation Calculation

Floodplain Function	Impact Determination	Mitigation Rationale	Required Mitigation
Flood Storage	**Dock:** [(120 feet long × 6 feet wide) × 0.5 feet between the OHWM and the BFE] × (0.25 above the OHWM but below the BFE) = 90 cubic feet **Piers:** [(1 foot × 1 foot) × 24 piers] × (6 feet between OHWM and BFE) = 144 cubic feet **Ramp:** (110 feet long between OHWM and BFE × 20 feet wide) × (0.25-foot-thick concrete between existing ground surface elevation and BFE) = 550 cubic feet **Total:** 784 cubic feet	Impact for flood storage capacity would occur only for ¼ of dock that is above the OHWM but below the BFE during a flood. Loss of flood storage capacity must be mitigated at a 2:1 ratio when mitigation occurs in the RBZ and on-site.	**Dock:** 180 cubic feet **Piers:** 288 cubic feet **Ramp:** 1,100 cubic feet **Total:** 1,568 cubic feet of replacement flood storage must be created
Water Quality	**Dock:** (120 feet long × 6 feet wide) = 720 square feet **Piers:** [(1 foot × 1 foot) × 24 piers] = 24 square feet **Ramp:** (110 feet long between OHWM and BFE × 20-feet-wide) = 2,200 square feet **Total:** 2,944 square feet	Impact on water quality is not applicable to 40 feet of ramp that extends waterward of the OHWM (ordinarily underwater). Loss of pervious surface must be mitigated at a 1:1 ratio when mitigation occurs in the RBZ and on-site.	**Dock:** 720 square feet **Piers:** 24 square feet **Ramp:** 2,200 square feet **Total:** 2,944 square feet of impervious surface must be mitigated
Vegetation	No impact; no trees removed	Tree removal is avoided through project design.	No mitigation required
Beneficial Gain	Not applicable; functionally dependent use in the RBZ	Because it is a functionally dependent use, beneficial gain is not required.	No mitigation required

2.4. Port Improvement Project

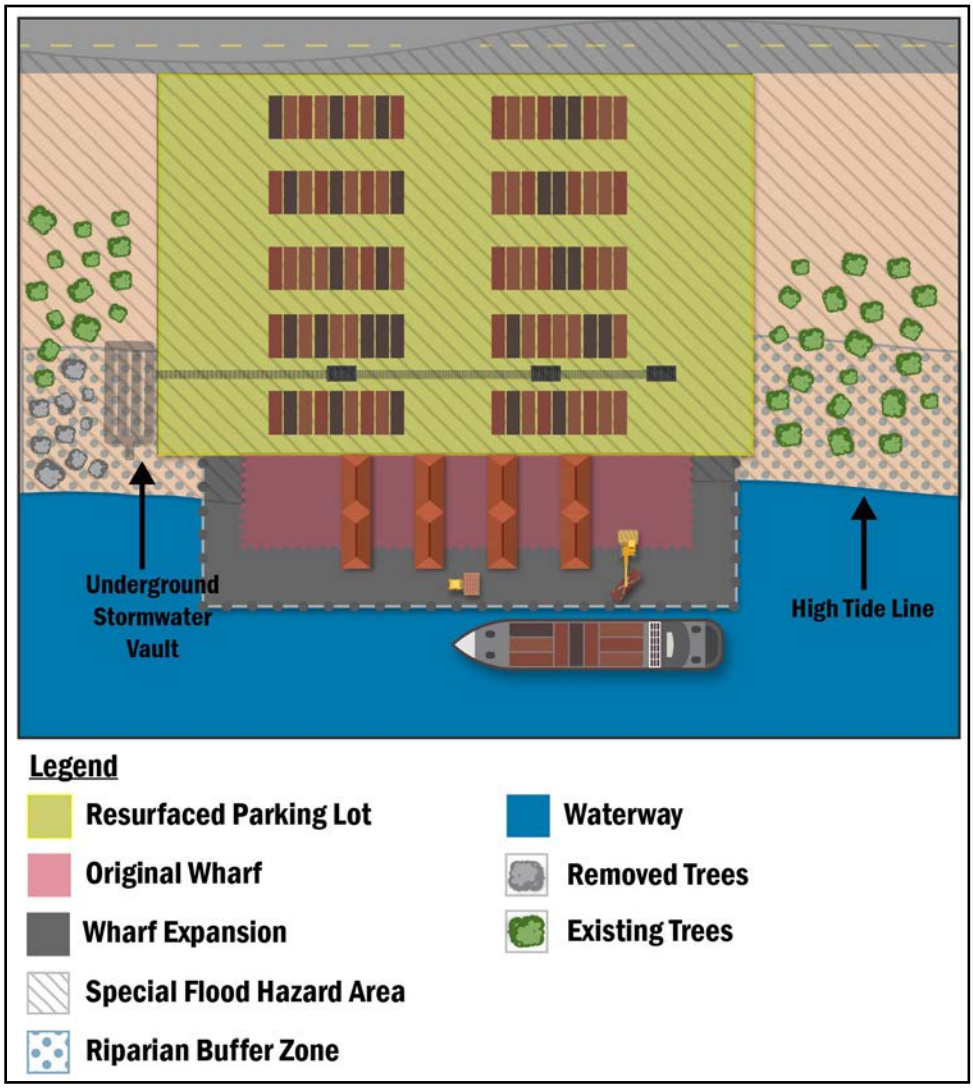

Figure 2-4. Port Improvement Project

FEMA developed this model project to portray the construction of a more complex project that makes improvements to an existing port, and which includes some project design elements that address impacts on pervious surfaces. In addition, this project portrays the determination of impacts on flood storage capacity over water, which is calculated as the new volume of fill or structures between the high tide line (or OHWM) to BFE.

This project includes improvements to an existing port wharf and 30-acre parking and storage area. Improvements include replacing an existing 5-acre wharf located parallel to the shoreline of a river and expanding the wharf by an additional 5 acres. This project includes improving existing pavement on a freight-handling area inland from the wharf to increase load capacity and incorporates an underground vault to collect and filter stormwater in alignment with the specifications in Chapter 3 of the 2024 Implementation Plan. The features and assumptions of this model project include:

- Replaced an existing 5-acre non-floating wharf and expanded it by 5 acres (to result in a 10-acre non-floating wharf in total).
    - *Constructed* using 1-foot by 1-foot square timbers with 1-foot-thick concrete pavement on top.
        - High tide line is 6 feet below the top of the wharf; the BFE is 2 feet above the top of the wharf (i.e., constructed between high tide line and BFE).[5]
    - *Constructed* using 2-foot by 2-foot square piers every 8 feet (3,403 total).
        - High tide line is 7 feet below the top of the piers and the BFE is 1-foot above the piers (i.e., piers extend 7 feet between the high tide line and the BFE).
- Dredged 6,806 cubic feet of material around the dock.
    - Dredging occurred below the high tide line and therefore there is no impact or benefit to *flood* storage.
- Removed the existing 30 acres of 6-inch-thick concrete pavement with a height at ground surface level and replaced it with 8-inch-thick concrete pavement to increase load capacity.
    - Final height is 3 inches (0.25 feet) above the pre-existing pavement elevation (and the ground surface elevation) after base preparation
    - BFE is 1 foot above the ground surface elevation[6]
    - 5 acres (217,800 square feet) of improvement within the RBZ
        - Parking lots are not a functionally dependent use (i.e., not dependent on being located near a waterway, therefore beneficial gain is required).
    - 25 acres (1,089,000 square feet) of improvement outside the RBZ, within the remainder of *the* SFHA

[5] For features located over water, impacts on flood storage capacity are calculated as the new fill/structures between the high tide line (or ordinary high water mark) and the BFE.

[6] The high tide line, as it relates to the parking lot improvements, is not needed to determine impacts on flood storage capacity because the parking lot is not overwater. Therefore, impacts on flood storage capacity are calculating as new fill/structures between the existing ground surface elevation and the BFE.

- Located the new stormwater vault completely underground (i.e., below existing grade) to collect and treat stormwater from the entire project area
    - Assume *final* grading to install the stormwater vault matches pre-existing ground surface elevation and excess soil and material is removed from the SFHA.
- 10 trees within the RBZ were removed to construct the underground vault
    - 5 trees *ranging* from 6 to 20 inches dbh
    - 5 trees *ranging* from 20 to 39 inches dbh
- Constructed partially within the RBZ and entirely within the SFHA; the floodway is not mapped
    - A wharf is a functionally dependent use; however, the pavement improvement (and underground vault beneath) is not. Therefore, beneficial gain is only required for the impacts *associated* with the pavement improvement within the RBZ and not for the wharf improvements.
- Mitigation occurred on-site
    - Impacts in the RBZ are mitigated within the RBZ

The impact calculation and required mitigation for this model project are presented in **Table 2.4**.

Table 2.4. Port Improvement Project Impact and Mitigation Calculation

Floodplain Function	Impact Determination	Mitigation Rationale	Required Mitigation
Flood Storage	**Replacement of existing 5 acres of wharf**: No impact because the replacement is in kind **Expanding wharf by 5 acres:** [(2-foot × 2-foot square piers) × 3,403 piers] × (7 feet between high tide line and BFE) = 47,624 cubic feet **Dredging**: No impact because below the high tide line **Pavement improvement:** (217,800 square feet inside the RBZ) × (0.25-foot increase in height of pavement between ground surface elevation and BFE) = 54,450 cubic feet (1,089,000 square feet outside RBZ) × (0.25-foot increase in height of pavement between ground surface elevation and BFE) = 272,250 cubic feet **Underground vault:** No impact because located underground, below existing grade **Total:** 102,074-cubic-foot reduction in flood storage capacity within the RBZ and 272,250 cubic-foot reduction outside of the RBZ	Loss of flood storage capacity must be mitigated at a 2:1 ratio for impacts within the RBZ and a 1.5:1 ratio for impacts outside of the RBZ when mitigation occurs on-site. Impacts occurring in the RBZ must be mitigated in the RBZ.	**Within the RBZ:** (102,074-cubic-foot reduction in flood storage capacity within the RBZ) × (2:1 ratio) = 204,148 cubic feet replacement flood storage required within the RBZ **Outside the RBZ:** (272,250-cubic-foot reduction in flood storage capacity outside of the RBZ) × (1.5:1 ratio) = 408,375 cubic feet replacement flood storage required outside of the RBZ
Water Quality	**Replacement of existing 5 acres of wharf:** No impact because the replacement is in kind **Dredging:** No impact because no loss of pervious surface[7] **Expanding wharf by 5 acres:** No impact because new impervious area is offset through underground vault **Pavement improvement:** No impact because footprint did not increase **Underground vault:** No impact because located underground **Total:** No impact because reduction of pervious surface is addressed through the underground vault	The only increase in impervious surface is associated with expanding the existing wharf, which is mitigated through project design from the incorporation of an underground vault that serves the entire project.	Increases in impervious surface mitigated through incorporation of underground stormwater vault

[7] Federal, state, and local regulations would still apply. The term "no impact" in this case is specific to no net loss.

Floodplain Function	Impact Determination	Mitigation Rationale	Required Mitigation
Vegetation	**Replacement of existing 5 acres of wharf:** No impact **Expanding wharf by 5 acres:** No impact **Pavement improvement:** No impact **Underground vault:** 5 trees from 6 to 20 inches dbh removed; 5 trees from 20 to 39 inches dbh removed **Total:** 10 trees removed	Five trees from 6 to 20 inches dbh were removed; which must be mitigated by planting trees at a 3:1 ratio when mitigation occurs in the RBZ and on-site. Five trees from 20 to 39 inches dbh were removed; which must be mitigated by planting trees at a 5:1 ratio when mitigation occurs in the RBZ and on-site.	40 trees must be planted
Beneficial Gain	Pavement improvement is a non-functionally dependent use in the RBZ, beneficial gain required	Five percent of the area impacted in the RBZ = 5 percent of 5 acres (217,800 square feet).	0.25 acre (10,890 square feet) of the RBZ must be planted with native riparian herbaceous, shrub, and tree vegetation

2.5. Parking Lot Redevelopment

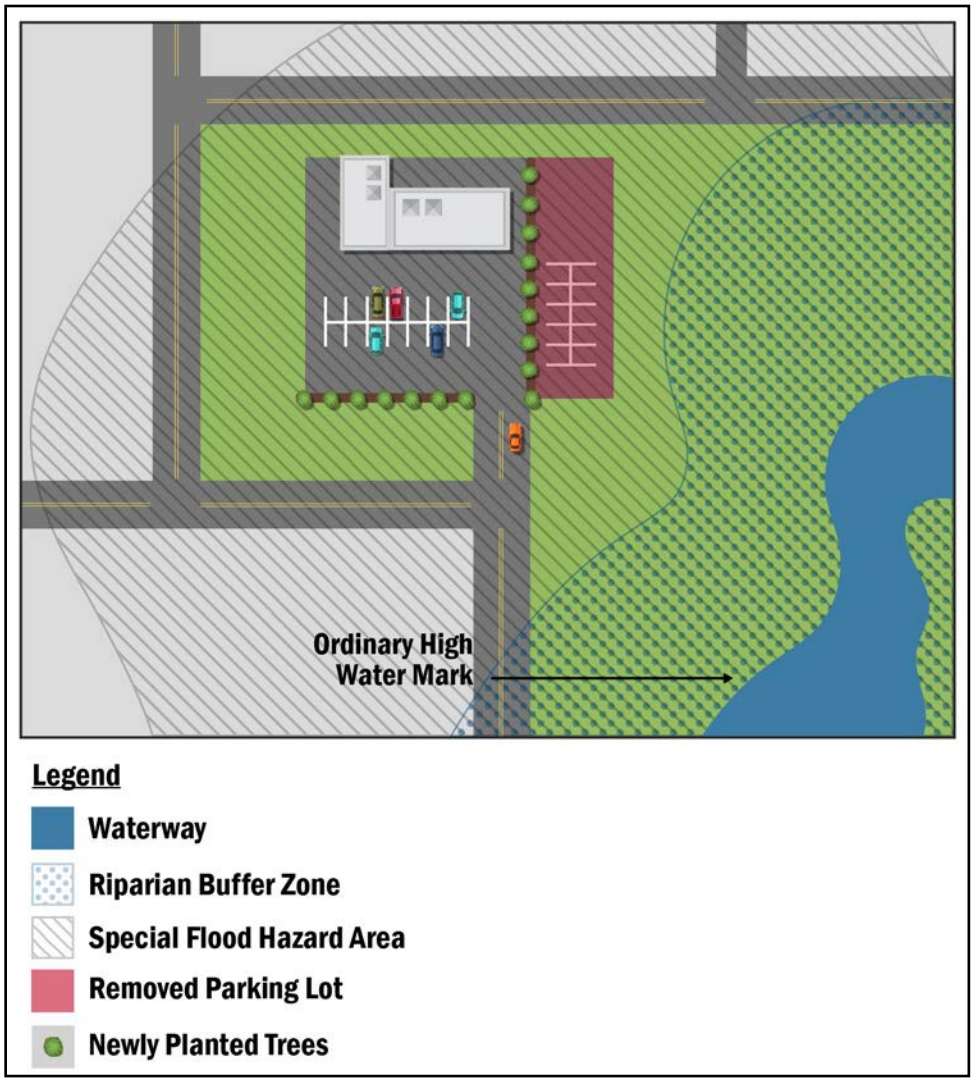

Figure 2-5. Parking Lot Redevelopment

FEMA developed this model project to portray redevelopment. This project highlights how the existing conditions of a site (i.e., already developed) can reduce the impacts associated with a project and may be designed in a manner that does more than achieve no net loss.[8] The features and assumptions of this model project include:

- Project site was a pre-existing 60,000-square-foot parking lot constructed of 8-inch-thick concrete pavement raised 6 inches (0.5 feet) above the ground surface elevation with no trees.

[8] There may be cases where a project (Project A) is designed and implemented in a manner that achieves more than no net loss (e.g., net increase of pervious surface), which can then be used as mitigation for another project (Project B) under Path C.

- Site was redeveloped into a 35,000-square-foot building and 5,100-square-foot parking lot and the remaining pavement on-site is removed (19,900 square feet of pavement removed).
    - The pre-existing above-grade 6-inch-thick concrete pavement in the footprint of the new 35,000-square-foot building was removed to accommodate the foundation of the new building.
    - The final pavement height of the redeveloped parking lot area is 3 inches (0.25 feet) above the ground surface elevation.
        - BFE is 1 foot above the existing ground surface level
- 16 new trees planted along the parking lot
- Constructed outside of the RBZ, within the remainder of the SFHA; the floodway is not mapped
- Mitigation occurred on-site and within the SFHA

The impact calculation and required mitigation for this model project are presented in **Table 2.5**.

Table 2.5. Parking Lot Redevelopment Impact and Mitigation Calculation

Floodplain Function	Impact Determination	Mitigation Rationale	Required Mitigation
Flood Storage	**Building:** (35,000 square feet × 1 foot between existing ground surface elevation and BFE) = 35,000 cubic feet of flood storage removed **Removal of existing pavement to create foundation for new building:** Removal of existing fill (35,000 square feet × 0.5-foot-thick concrete between existing ground surface elevation and BFE) = 17,500 cubic feet of flood storage added **Parking lot re-pavement:** Removal of (5,100 square feet × 0.5-foot-thick pavement) + addition of (5,100 square feet × 0.25-foot-thick pavement) = 1,275 cubic feet of flood storage added **Removal of excess pavement:** Removal of (19,900 square feet × 0.5-foot-thick pavement) = 9,950 cubic feet of flood storage added **Total**: (35,000 cubic feet) – (17,500 cubic feet) – (1,275 cubic feet) – (9,950 cubic feet) = 6,275-cubic-foot reduction in flood storage capacity	Loss of flood storage capacity must be mitigated at a 1.5:1 ratio when mitigation occurs on-site	(6,275-cubic-foot reduction in flood storage capacity) × (1.5:1 ratio) = 9,412.5 cubic feet of replacement flood storage must be created

Floodplain Function	Impact Determination	Mitigation Rationale	Required Mitigation
Water Quality	**Building:** No impact because footprint was previously the parking lot (already impervious). **Parking lot**: No impact because it previously existed. **Removal of excess pavement:** Removal of 19,900 square feet of existing impervious surface **Total**: Net reduction of 19,900 square feet of impervious surface	In total, the area of impervious surface was reduced by 19,000 square feet.	No mitigation required *Reduction of 19,900 square feet of impervious surface could be used to mitigate impacts from another development using applicable off-site ratio under Path C.*
Vegetation	**Building:** No impact **Parking lot:** No impact **Removal of excess pavement:** No impact **Total:** Net increase of 16 trees	In total, the number of trees increased.	No mitigation required *Increase of 16 trees could be used to mitigate impacts from another development using applicable off-site ratio.*
Beneficial Gain	Not applicable; development located outside the RBZ	Because it is not located in the RBZ, beneficial gain is not required.	No mitigation required

2.6. Housing Development with Underground Stormwater Vault

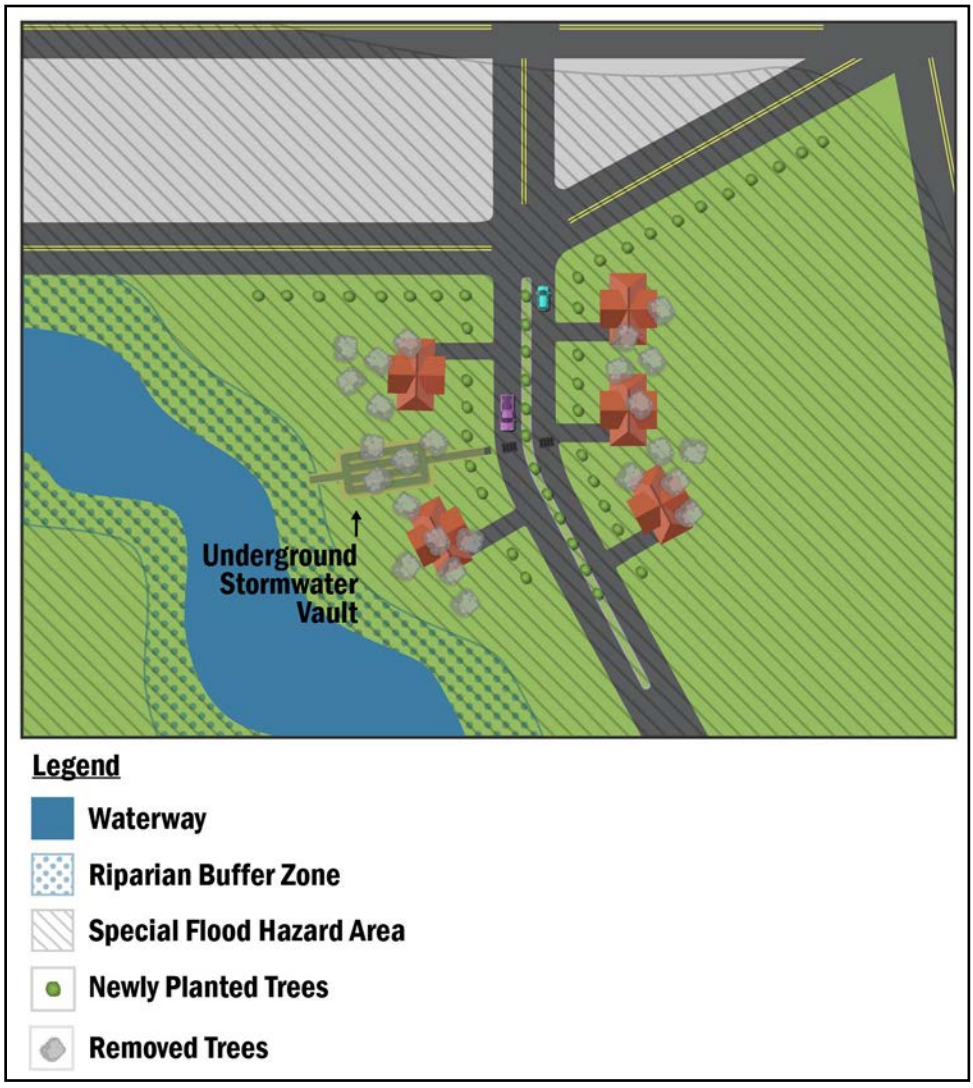

Figure 2-6. Housing Development with Underground Stormwater Vault

FEMA developed this model project to portray a development with multiple structures that incorporates stormwater retention facilities. This project highlights how grading for a multi-structure development influences impacts on flood storage capacity, and how incorporation of an underground stormwater retention and treatment vault addresses impacts on water quality. The features and assumptions of this model project include:

- Site was graded to construct the driveways and road and to smooth out the ground surface elevation of the remainder of the site. The post-graded ground surface elevation of the site is 1.5 feet below BFE.
    - Approximately 15,000 cubic feet of excess dirt was removed from the SFHA as a result of grading

  - 5 new 20-foot by 40-foot (800 square feet each) driveways constructed using 6-inch-thick concrete
    - Final height is 3 inches (0.25 feet) above the ground surface elevation of 1.5-foot BFE after base preparation and construction
  - 40-foot-wide by 600-foot-long road (24,000 square feet total), constructed using 6-inch-thick concrete to provide access to homes
    - Final height is 3 inches (0.25 feet) above the ground surface elevation of 1.5-feet BFE after base preparation and construction.
- 5 new homes constructed
  - Each home is elevated on an enclosed crawl space
  - Each home has a 1,500-square-foot footprint
- A new underground stormwater retention and treatment vault constructed to address the project's reduction of pervious surface. Dirt removed from the construction of the facility is disposed of outside the SFHA.
- 25 trees removed for construction
  - 10 trees ranging from 6 to 20 inches dbh
  - 15 trees ranging from 20 to 39 inches dbh
- 48 new trees planted along the road and road median as part of the project design
- Constructed outside the RBZ, within the remainder of the SFHA; the floodway is not mapped
- Mitigation occurred on-site within the SFHA

The impact calculation and required mitigation for this model project are presented in **Table 2.6**.

Table 2.6. Housing Development Impact and Mitigation Calculation

Floodplain Function	Impact Determination	Mitigation Rationale	Required Mitigation
Flood Storage	**Grading:** 15,000 cubic feet removed **Homes:** (1,500 square feet × 5 new homes) × (1.5 feet between ground surface elevation and BFE) = 11,250 cubic feet of new fill/structures **Driveways:** (800 square feet × 5 new driveways) × (0.25-foot-thick pavement between ground surface elevation and BFE) = 1,000 cubic feet of new fill/structures **Road:** (24,000 square feet) × (0.25-foot-thick pavement between ground surface elevation and BFE) = 6,000 cubic feet of new fill/structures **Retention facility:** No impact because it is below ground and fill is removed from SFHA **Total:** (−15,000 cubic feet from grading) + (11,250 cubic feet from new homes) + (1,000 cubic feet from driveways) + (6,000 cubic feet from road) = Net increase of 3,250 cubic feet of fill/structures	Loss of flood storage capacity must be mitigated at a 1.5:1 ratio when mitigation occurs on-site.	4,875 cubic feet of replacement flood storage must be created
Water Quality	**Grading:** No impact **Homes:** (1,500 square feet × 5 new homes) = 7,500 square feet of new impervious surface **Driveways:** (800 square feet × 5 new driveways) = 4,000 square feet of new impervious surface **Road:** 24,000 square feet of new impervious surface **Retention facility:** No impact because it is below ground **Total**: 35,500 square feet new impervious mitigated through underground retention facility	Underground stormwater retention facility addresses water quality protection caused by the increase in impervious surface.	Mitigation not required because increase in impervious surface is addressed through the incorporation of an underground stormwater vault into the design

Floodplain Function	Impact Determination	Mitigation Rationale	Required Mitigation
Vegetation	**Trees Removed:** 10 trees from 6 to 20 inches dbh removed 15 trees from 20 to 39 inches dbh removed **Trees planted:** 48 trees planted	Removal of 10 trees from 6 to 20 inches dbh must be mitigated at a ratio of 2:1 when mitigation occurs on-site. Removal of 15 trees from 20 to 39 inches dbh must be mitigated at a ratio of 4:1 when mitigation occurs on-site. 48 trees planted as part of design; therefore 32 additional trees must be planted to complete mitigation requirements.	(80 trees must be planted) – (48 trees planted as part of design) = 32 trees must be planted to complete mitigation requirement
Beneficial Gain	Not applicable; development located outside the RBZ	Because it is not located in the RBZ, beneficial gain is not required.	No mitigation required

2.7. New Barn for Storage

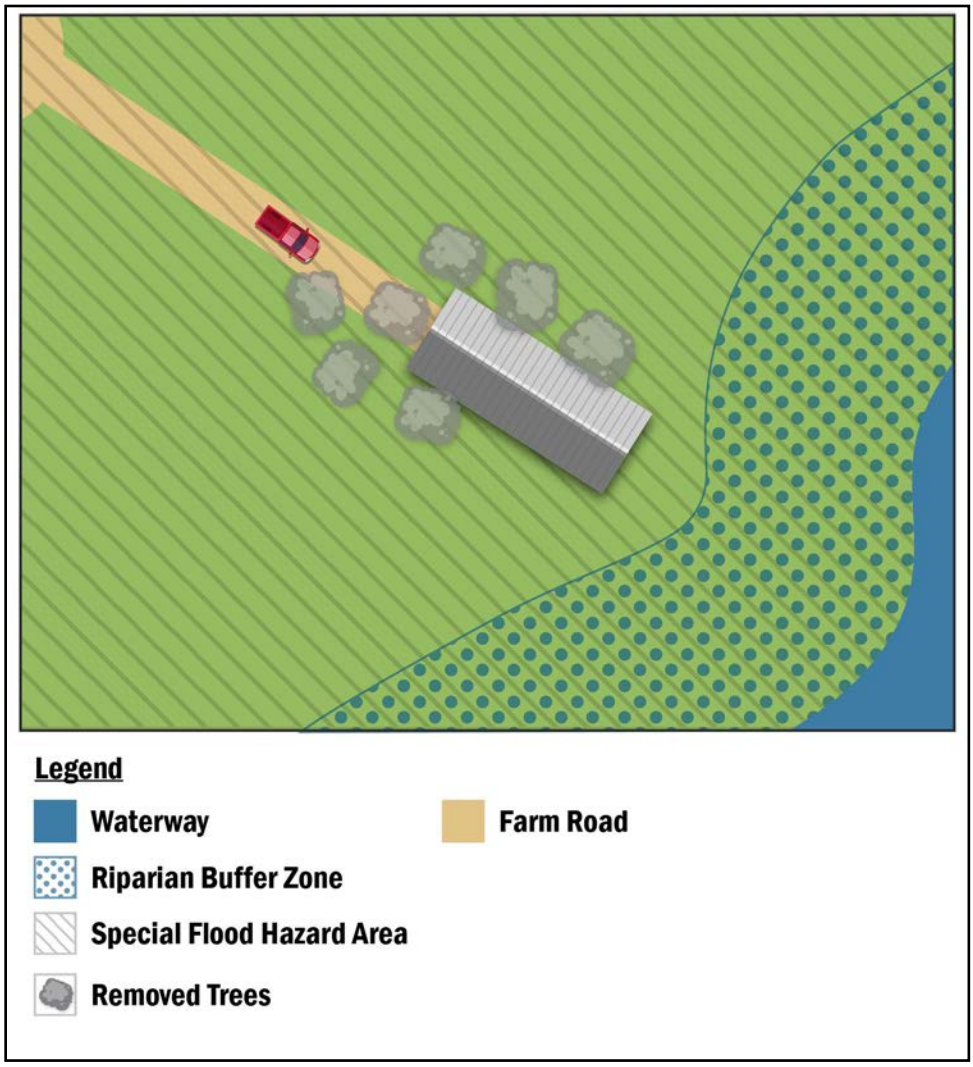

Figure 2-7. New Barn for Storage

FEMA developed this model project to portray an agricultural development. This project is an enclosed barn. While the materials stored in the barn are assumed to be above the BFE, NMFS identified in their 2016 BiOp that actions in the floodplain can reduce flood storage, resulting in fish entrapment. Based on their assessment, the entire footprint of the barn is considered an impact on flood storage. The features and assumptions of this model project include:

- 1,500-square-foot footprint, enclosed to store materials year-round
- 20-foot by 400-foot (800 square feet total) farm road to access the barn
    - Constructed by light grading to clear and smooth the access route, minor soil compaction, followed by a 3-inch (0.25-foot) pavement that does not rise above the previous ground level; existing grade is matched.

- 7 trees ranging from 6 to 20 inches dbh removed for construction
- BFE is 1 foot above the existing ground surface level
- Constructed outside of the RBZ, within the remainder of the SFHA; the floodway is not mapped
- Mitigation occurred on-site and within the SFHA

The impact calculation and required mitigation for this model project are presented in **Table 2.7**.

Table 2.7. New Barn for Storage Impact and Mitigation Calculation

Floodplain Function	Impact Determination	Mitigation Rationale	Required Mitigation
Flood Storage	**Barn:** (1,500 square feet) × (1 foot between existing ground surface elevation and BFE) = 1,500 cubic feet **Farm Road:** (800 square feet) × (0 feet between existing ground surface elevation and BFE) = 0 cubic feet (No impact) **Total:** 1,500 cubic feet	Loss of flood storage capacity must be mitigated at a 1.5:1 ratio when mitigation occurs on-site	2,250 cubic feet of replacement flood storage must be created
Water Quality	**Barn:** 1,500 square feet new impervious surface **Farm Road:** 8,000 square feet new impervious surface **Total:** 9,500 square feet	Reduction of pervious surface must be mitigated at a 1:1 ratio when mitigation occurs on-site	9,500 square feet of impervious surface must be mitigated
Vegetation	7 trees from 6 to 20 inches dbh removed	7 trees removed from 6 to 20 inches dbh must be mitigated at a 2:1 ratio when mitigation occurs on-site	14 trees must be planted
Beneficial Gain	Not applicable; development located outside the RBZ	Located outside of the RBZ	No mitigation required