



# **Shoreline No Net Loss and Mitigation**

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## **Guidance for local governments**

### **Shorelands and Environmental Assistance Program**

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# Purpose and Key Terms

## Purpose

As someone implementing a Shoreline Master Program (SMP), you play a critical role in reviewing projects for consistency with environmental regulations meant to protect shoreline ecological functions. The purpose of this chapter is to provide implementation guidance to local shoreline administrators about compliance with the mitigation sequencing requirements of your SMP during the review of individual shoreline development proposals.

Local governments and individual SMPs use a variety of terms to communicate common regulatory mechanisms. There are three terms used throughout this chapter that need explanation:

## Key Terms

**Buffer** - The term we use throughout this chapter to describe the area landward of the ordinary high water mark where vegetation is conserved and development is limited to maintain shoreline ecological processes and functions ([WAC 173-26-221\(5\)](https://apps.leg.wa.gov/WAC/default.aspx?cite=173-26-221)<sup>2</sup>). However, SMPs around the state use equivalent terms such as setback, vegetation conservation area, vegetation conservation strip, riparian habitat area, native growth protection area, and others (see Figure 1). If your SMP does not use the term buffer, you will need to determine what equivalent term is used to correctly apply the guidance of this chapter.

During SMP planning, buffer widths were established by considering existing human development, existing shoreline conditions, the science around the protection of shoreline ecological functions, and protecting the built environment from flooding and erosion.

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<sup>2</sup> <https://apps.leg.wa.gov/WAC/default.aspx?cite=173-26-221>

**Mitigation sequence** - An approach to planning and project design that, when properly applied, achieves NNL. The steps of the mitigation sequence are:

1. Avoiding the impact altogether by not taking a certain action or parts of an action;
2. Minimizing impacts by limiting the degree or magnitude of the action and its implementation by using appropriate technology or by taking affirmative steps to avoid or reduce impacts;
3. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
4. Reducing or eliminating the impact over time by preservation and maintenance operations;
5. Compensating for the impact by replacing, enhancing, or providing substitute resources or environments; and
6. Monitoring the impact and the compensation projects and taking appropriate corrective measures.

Application of the mitigation sequence achieves no net loss of ecological functions for each new development and does not result in required mitigation in excess of that necessary to assure that development will result in no net loss of shoreline ecological functions. (WAC 173-26-201(2)(e))

**No-net-loss analysis (NNL analysis)** - A generic term we use to describe a higher level of site-specific documentation (i.e., a level of document not standardly required of all shoreline applicants), prepared by a qualified professional, which will be either helpful or necessary to evaluate whether a proposal is compliant with the mitigation sequencing requirements of all comprehensively updated SMPs. The term NNL analysis is used to describe any document, or combination of documents, that assesses a site's ecological functions and demonstrates how mitigation sequencing will be applied to achieve NNL. An NNL analysis may require the consideration of a site's ecological functions within a larger context, such as the watershed scale. An NNL analysis is not necessarily required for all shoreline applications. Instead, an SMP may prescribe when an NNL analysis is needed, or an SMP may grant the shoreline administrator discretion in deciding when an NNL analysis must be submitted.



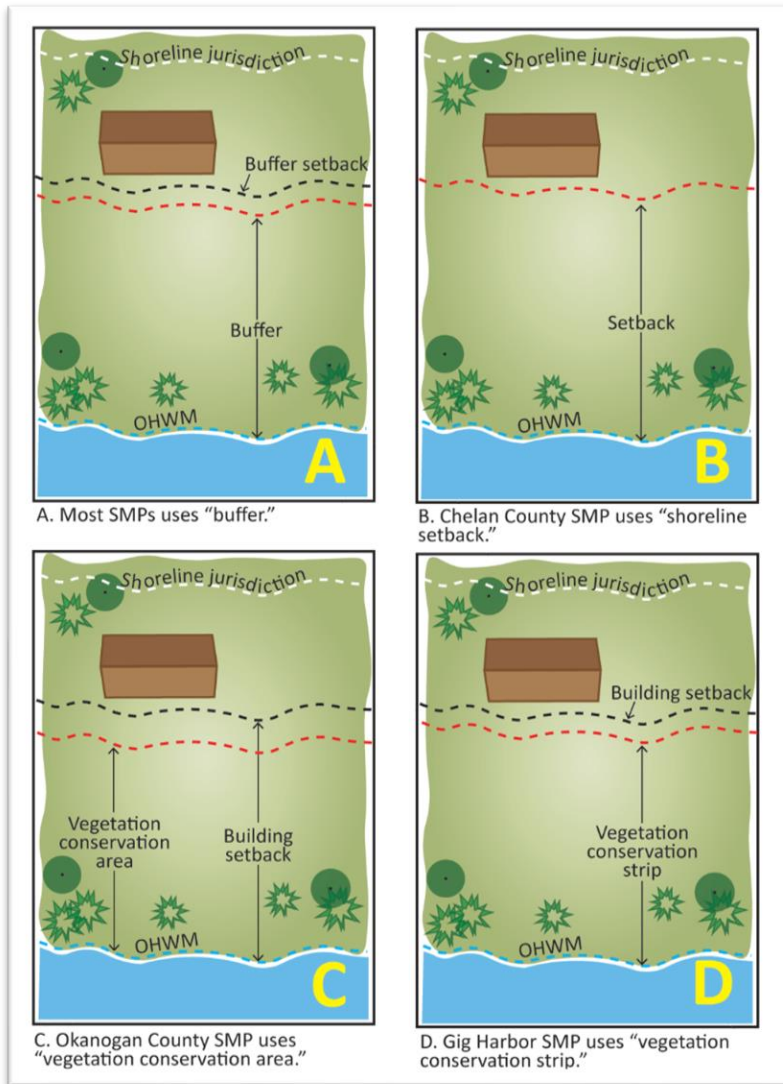


Figure 1. Shoreline buffers and examples of equivalent terms.

## Overview

Ecology’s Shoreline Master Program (SMP) guidelines require that SMPs include policies and regulations designed to assure, at a minimum, “no net loss of ecological functions necessary to sustain shoreline natural resources” ([WAC 173-26-201\(2\)\(c\)](#)).<sup>3</sup> This principle is referred to in shorthand as NNL and is intended to ensure that the overall level of shoreline ecological functions remains the same or improves over time as communities implement their SMPs.

The “net” in no net loss recognizes that any development has potential or actual, short-term or long-term impacts and that through application of appropriate development standards and employment of mitigation measures in accordance with the mitigation sequence, those impacts will be addressed in a manner necessary to assure that the end result will not diminish the shoreline resources and values as they currently exist (WAC 173-26-201(2)(c)). In this way, impacts from new, authorized development will “hold the line” on shoreline ecological functions. This principle is conceptually represented in Figure 2.

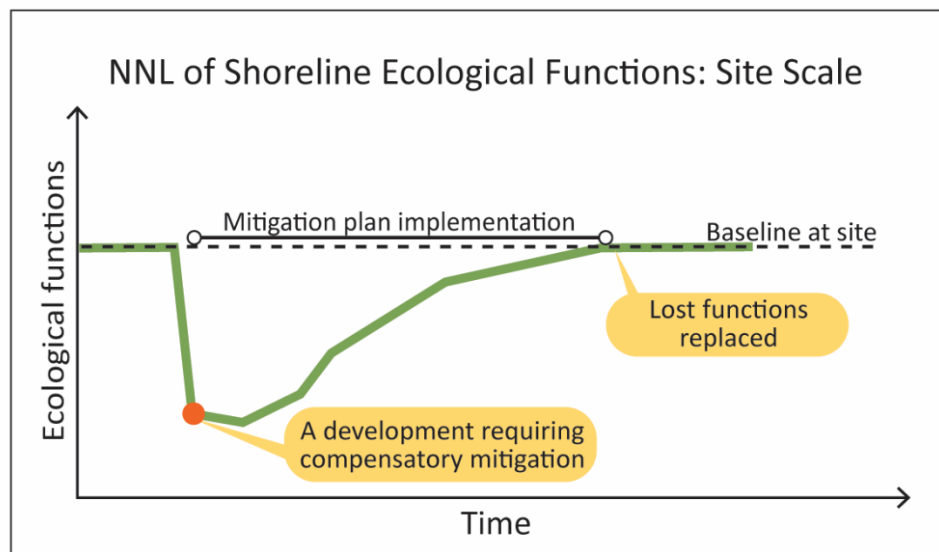


Figure 2. Conceptual representation of NNL.

The green line in Figure 2 charts ecological functions over time. When a project is authorized that cannot avoid all impacts (represented by the orange dot), the applicant must still achieve NNL by rectifying temporary impacts and compensating for lost impacts to shoreline functions. Rectifying and replacing lost functions can take time, and there will often be lag time between when a mitigation plan is implemented and when all lost shoreline ecological functions return.

The NNL requirement is for development authorized under your SMP.<sup>4</sup> Your statutory obligation is to ensure that each new authorized development achieves NNL. For this reason,

<sup>3</sup> <https://app.leg.wa.gov/WAC/default.aspx?cite=173-26-201>

<sup>4</sup> WAC 173-26-186(8)(b)(i) and (ii), <https://app.leg.wa.gov/WAC/default.aspx?cite=173-26-186>

this chapter does not address voluntary restoration or SMP violations even though it is understood that voluntary restoration can increase shoreline ecological functions above baseline conditions and that SMP violations can lower functions below baseline conditions. For the same reason, this chapter will not address the natural or climate-driven weather events that also impact shoreline ecological functions such as flooding, drought, high temperatures, and wildfire.

## Shoreline ecological functions

NNL relates to the review of new uses and development under the SMP to ensure they do not result in unmitigated impacts to the shoreline ecological functions necessary to sustain shoreline natural resources.

The SMP guidelines define **ecological functions**:

"Ecological functions" or "shoreline functions" means the work performed or role played by the physical, chemical, and biological processes that contribute to the maintenance of the aquatic and terrestrial environments that constitute the shoreline's natural ecosystem (WAC 173-26-020(13)).

Think of shoreline ecological functions as the processes that create and support a shoreline ecosystem. The concept of ecological functions recognizes that any ecological system is composed of a wide variety of interacting physical, chemical, and biological components, that are interdependent to varying degrees, and that produce the landscape and habitats as they exist at any one time.<sup>5</sup>

We explore the ecological functions provided by different shorelines in more detail on the following pages. The degree to which an ecological function is expressed at a shoreline site will vary, and not all functions will be expressed at all sites. A site-specific assessment is needed to document what functions exist at a particular location and how a proposed use or modification will impact those functions.

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<sup>5</sup> WAC 173-26-201(2)(c)

## Rivers, streams, and associated floodplains

While not intended to be an exhaustive list, the SMP guidelines highlights important shoreline ecological functions associated with rivers, streams, and their associated flood plains (below from WAC 173-26-201(3)(d)(i)(C)).

**Hydrologic:** Transport of water and sediment across the natural range of flow variability; attenuating flow energy; developing pools, riffles, and gravel bars; and the recruitment and transport of large woody debris and other organic material.

**Shoreline vegetation:** Maintaining temperature, removing excessive nutrients and toxic compounds, sediment removal and stabilization, attenuation of flow energy, and provision of large woody debris and other organic matter.

**Hyporheic functions:** Removing excessive nutrients and toxic compounds, water storage, support of vegetation, sediment storage, and maintenance of base flows.

**Habitat:** Habitat for native aquatic and shoreline-dependent birds, invertebrates, mammals, amphibians, and anadromous and resident native fish: Habitat functions may include, but are not limited to, space or conditions for reproduction, resting, hiding, migration, and food production and delivery.

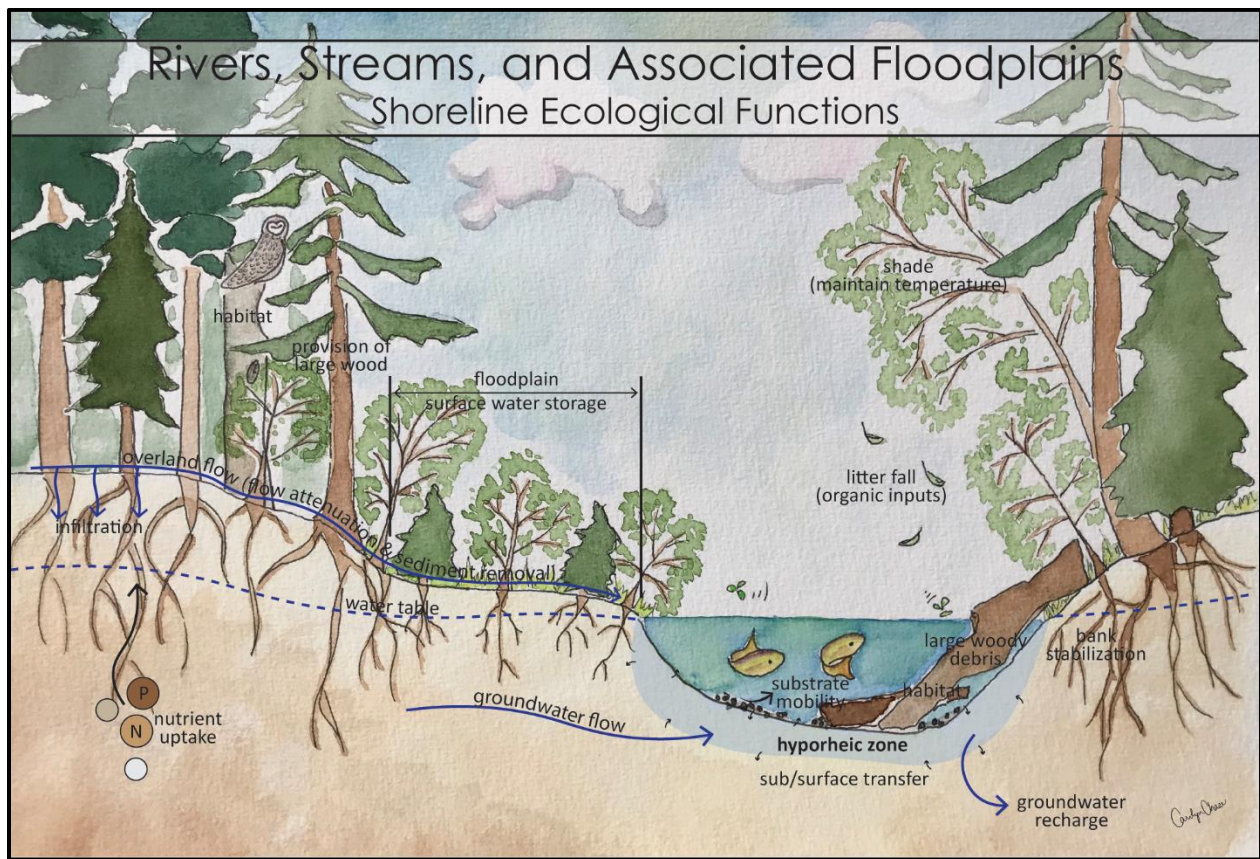


Figure 3. Rivers, streams, and floodplains shoreline ecological functions.



# Streams, rivers, and associated floodplains

## Key questions: Site-specific assessment of shoreline ecosystem functions



A site-specific analysis is necessary to understand what shoreline ecological functions exist at a particular site and what impacts a proposed use or development will have. A site-specific analysis should address critical questions like:

1. How does the site contribute to spatial continuity and connectivity along the length of the shoreline and within the watershed for species that depend on naturally functioning rivers, streams, and riparian areas? What impacts to spatial connectivity are likely to occur if the proposed development occurs?
2. What are the physical features of the stream, river, or associated floodplain near the site (e.g., cut bank, riffles, pools, braids, oxbow, side channel, marsh, wet meadow, etc.)? Is the proposal likely to impact the physical framework of the aquatic system?
3. How does the site contribute to the timing, volume, and distribution of woody debris recruitment in rivers and streams? What impacts to woody debris recruitment are likely to occur if the proposed development occurs?
4. What aspects of the site contribute to the maintenance of water quality? What impacts will the proposal likely have on water quality?
5. How does the site contribute to sediment and nutrient input, storage, and transport in the stream or river? What impacts will the proposal have on this function?
6. Will the proposal alter the range of natural water flow variability or limit channel migration?
7. What is plant species composition and structural diversity at the site? What impacts will the proposal have on nutrient filtering; bank stabilization; shade; litter fall; habitat; sediment removal and stabilization; and the supply, amount, and distribution of woody debris?

## Lakes

While not intended to be an exhaustive list, the SMP guidelines highlight important shoreline ecological functions associated with lakes (below from WAC 173-26-201(3)(d)(i)(C)).

**Hydrologic:** Storing water and sediment, attenuating wave energy, removing excessive nutrients and toxic compounds, and recruitment of large woody debris and other organic material.

**Shoreline vegetation:** Maintaining temperature, removing excessive nutrients and toxic compounds, attenuating wave energy, sediment removal and stabilization, and providing woody debris and other organic matter.

**Habitat:** Habitat for aquatic and shoreline-dependent birds, invertebrates, mammals, amphibians, and anadromous and resident native fish: Habitat functions may include, but are not limited to, space or conditions for reproduction, resting, hiding, migration, and food production and delivery.

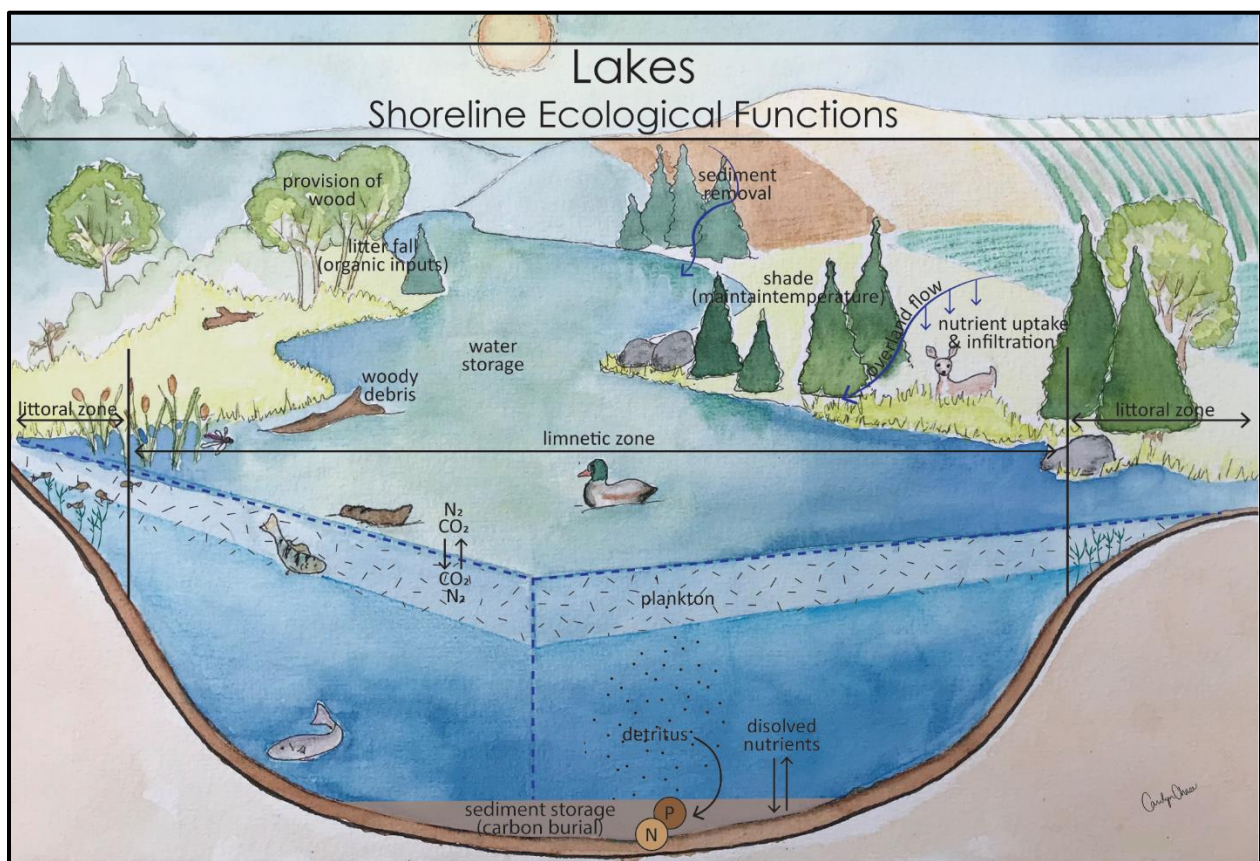


Figure 4. Lake shoreline ecological functions.



# Lakes

## Key questions: Site-specific assessment of shoreline ecosystem functions



A site-specific analysis is necessary to understand what shoreline ecological functions exist at a particular site and what impacts a proposed use or development will have. A site-specific analysis should address critical questions like:

1. How does the site contribute to spatial continuity and connectivity along the length of the shoreline and within the watershed for species that depend on naturally functioning lakes and their riparian areas for fulfilling life history requirements? What impacts to spatial connectivity are likely to occur if the proposed development occurs?
2. What bank and underwater terrain provide the physical framework of the lacustrine system? How will the proposal impact the habitat associated with these features?
3. How does the site contribute to the timing, volume, and distribution of woody debris recruitment? What impacts to woody debris recruitment are likely to occur if the proposed development occurs?
4. What aspects of the site contribute to the maintenance of water quality? What impacts will the proposal likely have on water quality?
5. Will the proposal alter the natural range of water flow variability?
6. What is the plant species composition and structural diversity at the site? What impacts will the proposal have on nutrient filtering; shade; bank stabilization; habitat; litter fall; sediment removal and stabilization; and the supply, amount, and distribution of woody debris?



## Marine waters

While not intended to be an exhaustive list, the SMP guidelines highlight important shoreline ecological functions associated with marine areas (below from WAC 173-26-201(3)(d)(i)(C)).

**Hydrologic:** Transporting and stabilizing sediment; attenuating wave and tidal energy; removing excessive nutrients and toxic compounds; and recruitment, redistribution, and reduction of woody debris and other organic material.

**Vegetation:** Maintaining temperature, removing excessive nutrients and toxic compounds, attenuating wave energy, sediment removal and stabilization, and providing woody debris and other organic matter.

**Habitat:** Habitat for aquatic and shoreline-dependent birds, invertebrates, mammals, amphibians, and anadromous and resident native fish: Habitat functions may include, but are not limited to, space or conditions for reproduction, resting, hiding, migration, and food production and delivery.

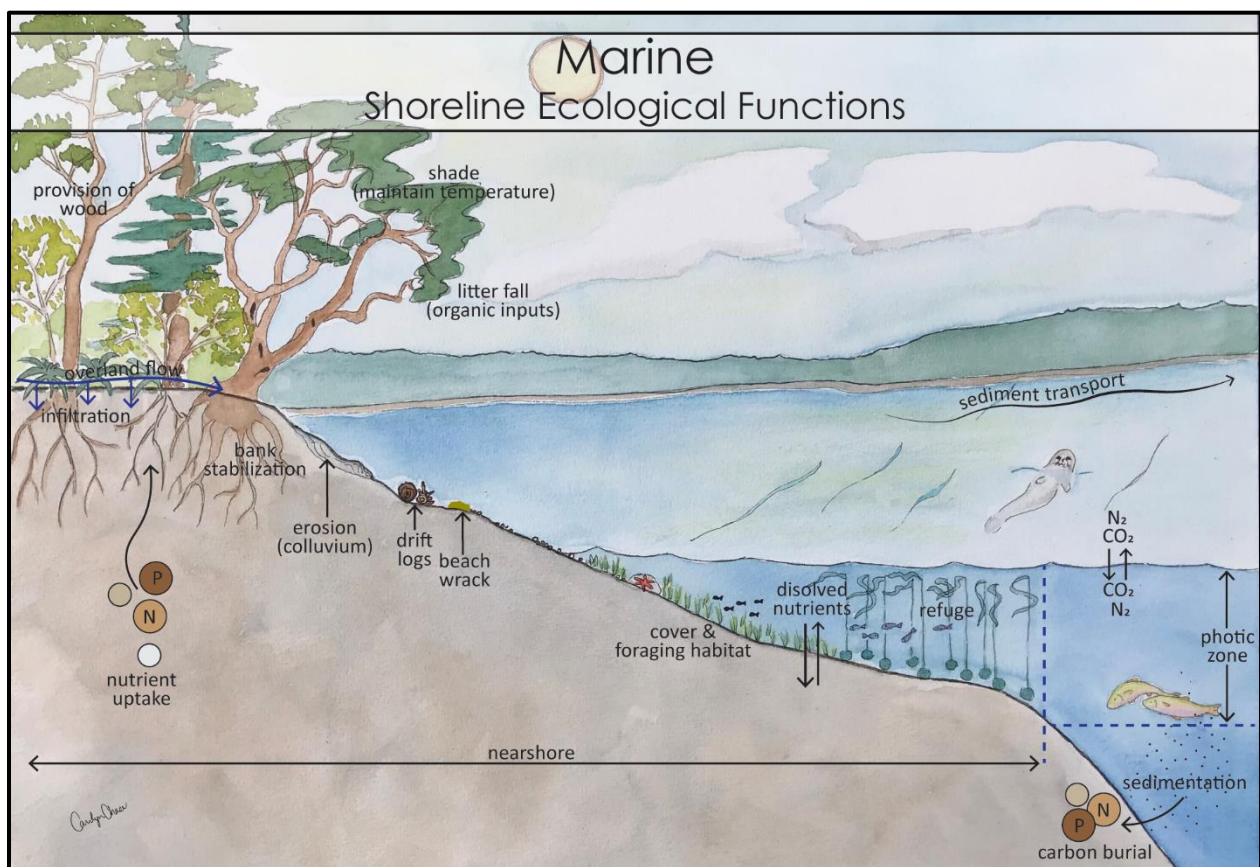


Figure 5. Marine areas shoreline ecological functions.

# Marine waters

## Key questions: Site-specific assessment of shoreline ecosystem functions



A site-specific analysis is necessary to understand what shoreline ecological functions exist at a particular site and what impacts a proposed use or development will have. A site-specific analysis should address critical questions like:

1. How does the site contribute to spatial connectivity within the watershed and along marine shores for species that depend on aquatic systems for fulfilling life history requirements? What impacts to spatial connectivity are likely to occur if the proposed development occurs?
2. What beach, near-shore habitats, and underwater terrain provide the physical framework of the marine system? How will the proposal impact the habitat and hydrologic functions associated with these features? Will there be impacts to sediment transport, wave attenuation, or refuge and forage habitat?
3. How does the site contribute to the timing, volume, and distribution of woody debris recruitment? What impacts to woody debris recruitment are likely to occur if the proposed development occurs?
4. What aspects of the site contribute to the maintenance of water quality necessary to support aquatic species? What impacts will the proposal likely have on water quality?
5. How will the proposal impact the sediment regime under which the marine ecosystem developed? Will there be impacts to sediment timing, volume, or rate? Does the proposal have the potential to impact the character of sediment input, storage, or transport?
6. What is the plant species composition and structural diversity at the site? What impacts will the proposal have on nutrient filtering; shade; bank stabilization; habitat; litter fall; sediment removal and stabilization; and the supply, amount, and distribution of woody debris?

## Critical areas within shoreline jurisdiction

Under the Growth Management Act (GMA), local governments are required to designate critical areas and protect their functions and values. Critical areas include wetlands, critical aquifer recharge areas, fish and wildlife habitat conservation areas (FWHCA), geologically hazardous areas, and frequently flooded areas.

It is common for critical areas and shoreline jurisdiction to overlap. **Where overlap exists, the ecological functions performed by the critical area will often contribute to overall shoreline ecological functions at the site.** As an example, Figure 6 shows the landward edge of shoreline jurisdiction as being the edge of the associated wetland, an area that also incorporates a stream (i.e., a FWHCA) and most of that stream's regulated buffer.

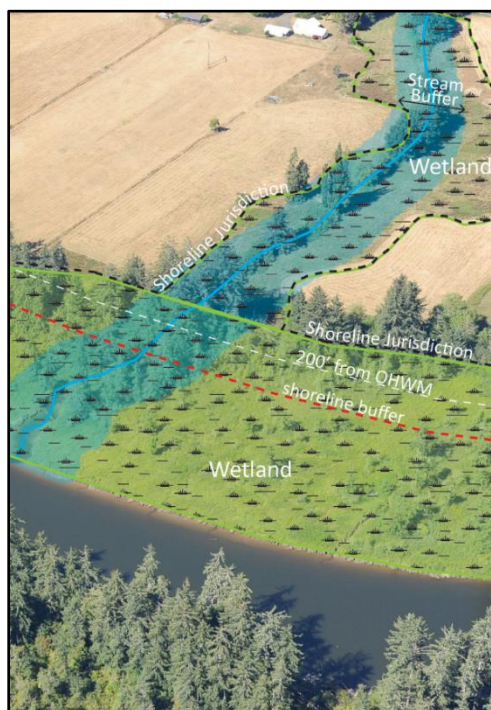


Figure 6. Critical areas within shoreline jurisdiction.

Where critical areas occur within shoreline jurisdiction, they are regulated by your SMP alone (RCW 36.70A.480(3)(d)). Your SMP either embeds protective critical areas regulations or incorporates by reference portions of your locally adopted critical areas ordinance.

The level of protection extended to critical areas within the shoreline area assures NNL of shoreline ecological functions necessary to sustain shoreline natural resources (WAC 173-26-221(2)(a)(ii)). To this end, the critical areas regulatory provisions of your SMP “protect existing ecological functions and ecosystem-wide processes.”<sup>6</sup> Here ecosystem-wide processes means “the suite of naturally occurring physical and geologic processes of erosion, transport, and deposition; and specific chemical processes that shape landforms within a specific shoreline

<sup>6</sup> RCW 90.58.020, WAC 173-26-221(2)(b)(iv)



ecosystem and determine both the types of habitat and the associated ecological functions” (WAC 173-26-020(14)).

Let’s explore the shoreline ecological functions provided by the five critical areas.

## Wetlands

The NNL standard for wetlands regulated by your SMP is NNL “of wetland area and functions, including lost time when the wetland does not perform the function” (WAC 173-26-221(2)(c)(i)(A)).

Generally, shoreline jurisdiction extends 200 feet from the OHWM of waterbodies that are shorelines of the state. However, shoreline jurisdiction also includes *associated wetlands* which are “those wetlands which are in proximity to and either influence or are influenced by tidal waters or a lake or stream subject to the SMA” (WAC 173-22-030). Wetlands are “associated” and will be regulated by your SMP if:

- The wetland is either fully or partially within 200 feet of the OHWM,
- The wetland is within a floodplain of a waterbody regulated by the SMP, or
- The wetland is associated through hydraulic continuity.

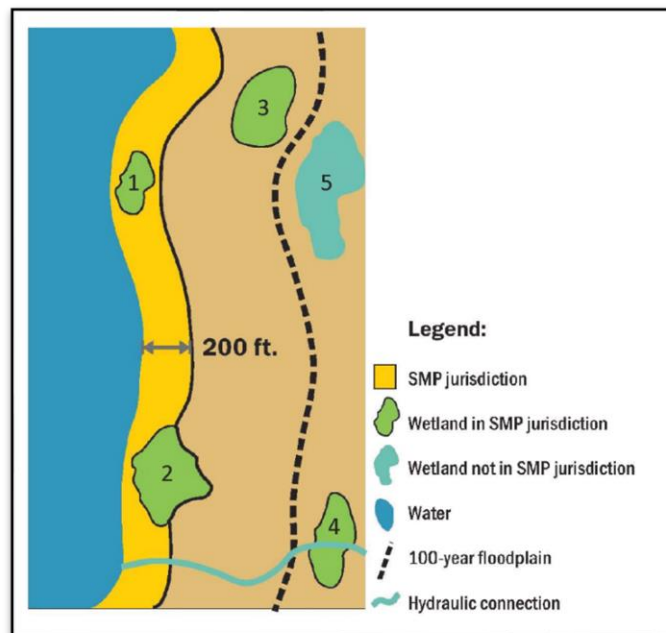


Figure 7. Associated wetlands.

Figure 7 shows four wetlands that would be regulated under your SMP because they are within 200 feet of the OHWM (#1), partially within 200 feet of the OHWM (#2), within the 100-year floodplain (#3), or hydraulically connected to the shoreline (#4). Wetland number 5 is not associated and would not be regulated by the SMP.

While not intended to be an exhaustive list, the SMP guidelines highlight important ecological functions associated with wetlands (below from WAC 173-26-201(3)(d)(i)(C)).

**Hydrological:** Storing water and sediment, attenuating wave energy, removing excessive nutrients and toxic compounds, and recruiting woody debris and other organic material.

**Vegetation:** Maintaining temperature, removing excessive nutrients and toxic compounds, attenuating wave energy, removing and stabilizing sediment, and providing woody debris and other organic matter.

**Hyporheic functions:** Removing excessive nutrients and toxic compounds, storing water and maintaining base flows, and storing sediment and support of vegetation.

**Habitat:** Habitat for aquatic and shoreline-dependent birds, invertebrates, mammals, amphibians, and anadromous and resident native fish: Habitat functions may include, but are not limited to, space or conditions for reproduction, resting, hiding, migration, and food production and delivery.

Where development within the shoreline will encroach on a wetland or wetland buffer, the project will trigger a requirement for a qualified professional to assess the wetland's quality and function for rating or categorization.

Ecology's [Functions and values of wetlands webpage](https://ecology.wa.gov/Water-Shorelines/Wetlands/Education-training/Functions-values-of-wetlands)<sup>7</sup> provides a summary of how wetlands perform functions including water purification, shoreline stabilization, groundwater recharge, stream flow maintenance, flood protection, and fish and wildlife habitat. The [Washington State Wetland Rating System](https://ecology.wa.gov/Water-Shorelines/Wetlands/Tools-resources/Rating-systems)<sup>8</sup> was designed to differentiate between wetlands based on their sensitivity to disturbance, their rarity, our ability to replace them, and the functions they provide.

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<sup>7</sup> <https://ecology.wa.gov/Water-Shorelines/Wetlands/Education-training/Functions-values-of-wetlands>

<sup>8</sup> <https://ecology.wa.gov/Water-Shorelines/Wetlands/Tools-resources/Rating-systems>

## Critical aquifer recharge areas

Critical Aquifer Recharge Areas (CARAs) are defined in the Growth Management Act as “areas with a critical recharging effect on aquifers used for potable water, including areas where an aquifer that is a source drinking water is vulnerable to contamination that would affect the potability of the water, or is susceptible to reduced recharge” ([WAC 365-190-030](https://apps.leg.wa.gov/WAC/default.aspx?cite=365-190-030)).<sup>9</sup>

The ecological functions provided by CARAs are **water quality and hydrologic**. CARAs provide the public with clean, safe, and available drinking water and recharge the streams, lakes, and wetlands that provide critical fish and wildlife habitat.

The quality and quantity of groundwater in an aquifer is inextricably linked to its recharge area, and protecting CARAs depends on:

- Ensuring that new development does not result in too much impervious surface such that storm water cannot infiltrate and recharge groundwater, and
- Preventing pollution from occurring by controlling land use activities that may result in contamination from spills and leaks.

Groundwater is a source of water to streams, lakes, estuaries, wetlands, and springs and for this reason serves a critical function for wildlife and fish habitat. Because ground water is important component of streamflow, the maintenance of groundwater supply is important to the protection of salmon and other anadromous species. Protecting these aquifers from stormwater pollution is also important. (Morgan 2005, Commerce 2018)

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<sup>9</sup> <https://apps.leg.wa.gov/WAC/default.aspx?cite=365-190-030>

## Fish and wildlife habitat conservation areas

FWHCAs contribute to the state's biodiversity and occur on both publicly and privately owned lands. Fish and wildlife habitat conservation means "land management for maintaining populations of species in suitable habitats within their natural geographic distribution so that the habitat available is sufficient to support viable populations over the long term and isolated subpopulations are not created" ([WAC 365-190-130\(1\)](#)).<sup>10</sup>

The intent in regulating FWHCAs is not to maintain all individuals of all species at all times. Instead, it means not degrading or reducing populations or habitats so that they are no longer viable over the long term (WAC 365-190-130(1)).

The FWHCAs that must be considered for classification and designation include (from WAC 365-190-130(2)):

- Areas where endangered, threatened, and sensitive species have a primary association;
- Habitats and species of local importance, as determined locally;
- Commercial and recreational shellfish areas;
- Kelp and eelgrass beds; herring, surfsmelt, and other forage fish spawning areas;
- Naturally occurring ponds under 20 acres and their submerged aquatic beds that provide fish or wildlife habitat;
- Waters of the state;
- Lakes, ponds, streams, and rivers planted with game fish by a governmental or tribal entity; or
- State natural area preserves, natural resource conservation areas, and state wildlife areas.

Where development within the shoreline will encroach on a FWHCA, the project can trigger the need for a site-specific study prepared by a qualified professional that evaluates the proposals likely impacts. For FWHCAs, the NNL analysis will be this study paired with a discussion of how mitigation sequencing has been applied to achieve NNL of shoreline ecological functions.

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<sup>10</sup> <https://apps.leg.wa.gov/wac/default.aspx?cite=365-190-130>

## Geologically hazardous areas

Geologically hazardous areas include areas susceptible to erosion, sliding, earthquake, or other geological events. While geologically hazardous areas can pose a threat to the health and safety of people when incompatible commercial, residential, or industrial development is sited in areas of significant hazard, they also play an important function in maintaining habitat integrity (Commerce 2018).



Figure 8. Feeder bluff.

**The key ecological function provided by geologically hazardous areas is habitat.** Mass wasting events, such as landslides and debris flows, contribute sediment and wood for building complex instream habitats, estuarine marshes, and beaches important for fisheries, wildlife, and recreation. Human alterations that limit channel migration and bank erosion can degrade instream and riparian habitats (Rentz 2020). In the Puget Sound, steep slopes along shorelines can include feeder bluffs that deliver a significant volume of sediment to the beach and support a wide range of ecological functions including the recruitment of organic detritus and large wood, the provision of spawning substrate for sand lance and surf smelt, and the formation of beaches, spits, and tidal wetland systems (Shipman 2014).

Your SMP includes shoreline stabilization policies and regulations that are consistent with the mitigation sequence. These provisions include requirements for a site-specific geotechnical analysis that evaluates the risk of erosion-related damage to a structure to determine if stabilization is necessary before evaluating stabilization options through a framework that requires that least impactful stabilization techniques be considered first.



## Frequently flooded areas

Frequently flooded areas are “flood plains and other areas subject to flooding [that] perform important hydrologic functions and may present a risk to persons and property” ([WAC 365-190-110](https://apps.leg.wa.gov/wac/default.aspx?cite=365-190-110)).<sup>11</sup> At a minimum the frequently flooded areas designated in your jurisdiction will be lands within the 100-year floodplain designation of the Federal Emergency Management Agency and the National Flood Insurance Program. The location of frequently flooded areas was an important consideration during SMP planning, especially as it pertains to the designation of shoreline environment designations and the establishment of buffers and setbacks.<sup>12</sup>

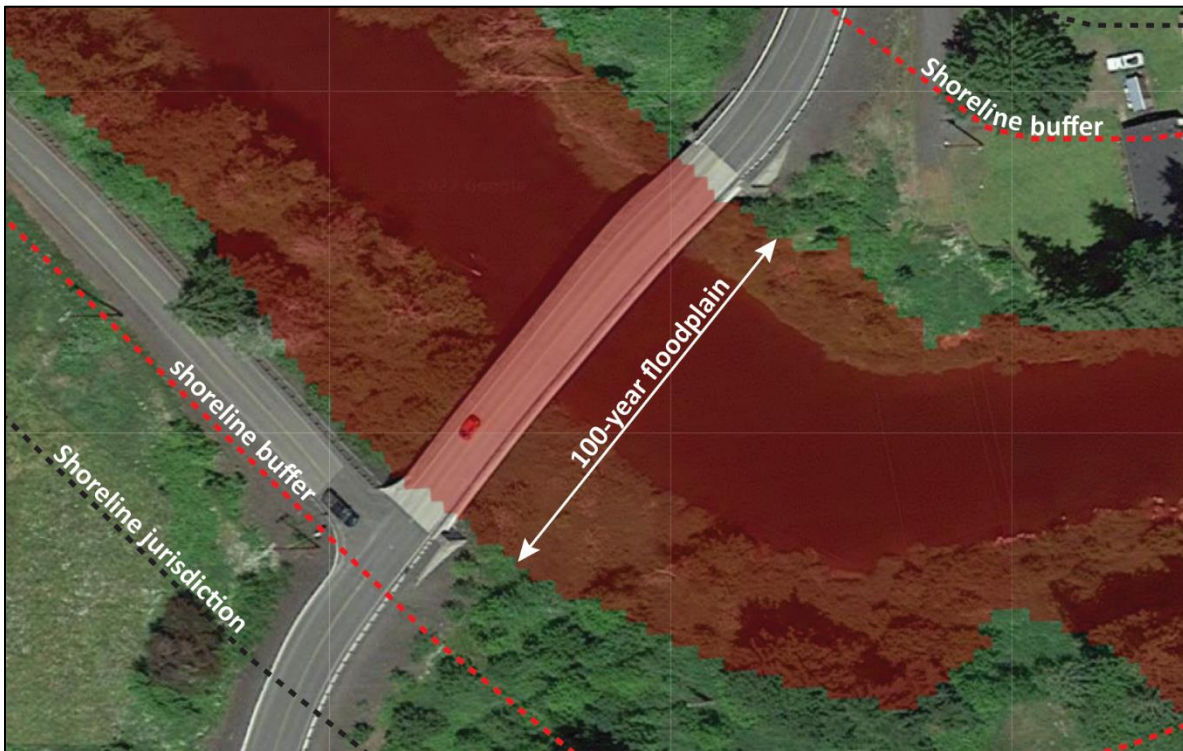


Figure 9. Frequently flooded area within shoreline jurisdiction.

While floodplains are potentially hazardous areas for development due to flooding and erosion, fish and wildlife depend on the habitat created when a river overflows its banks. Historic losses to salmon habitat have occurred because of development encroaching into floodplains. Increasingly, there is recognition of the importance of floodplains as vital habitat to support salmon and other species (Commerce 2018).

<sup>11</sup> <https://apps.leg.wa.gov/wac/default.aspx?cite=365-190-110>

<sup>12</sup> WAC 365-190-110, WAC 173-26-020, and WAC 173-26-221(2)

While not intended to be an exhaustive list, the SMP guidelines highlight important shoreline ecological functions associated with the floodplains of rivers and streams (below from WAC 173-26-201(3)(d)(i)(C)).

**Hydrologic:** Transport of water and sediment across the natural range of flow variability; attenuating flow energy; developing pools, riffles, and gravel bars; and recruitment and transport of large woody debris and other organic material.

**Shoreline vegetation:** Maintaining temperature, removing excessive nutrients and toxic compounds, sediment removal and stabilization, attenuation of flow energy, and provision of large woody debris and other organic matter.

**Hyporheic functions:** Removing excessive nutrients and toxic compounds, water storage, support of vegetation, sediment storage, and maintenance of base flows.

**Habitat:** Habitat for native aquatic and shoreline-dependent birds, invertebrates, mammals, amphibians, and anadromous and resident native fish: Habitat functions may include, but are not limited to, space or conditions for reproduction, resting, hiding, migration, and food production and delivery.

# NNL through Mitigation Sequencing

NNL is a governing principle that guided local SMP development and Ecology’s review and approval of local master programs.<sup>13</sup> NNL is achieved through the application of mitigation sequencing. Mitigation sequencing is an approach to planning and project design that, when properly applied, achieves NNL ([WAC 173-26-201\(2\)\(e\)](#)). The steps of the mitigation sequence are:

1. **Avoiding the impact** altogether by not taking a certain action or parts of an action;
2. **Minimizing impacts** by limiting the degree or magnitude of the action and its implementation by using appropriate technology or by taking affirmative steps to avoid or reduce impacts;
3. **Rectifying the impact** by repairing, rehabilitating, or restoring the affected environment;
4. **Reducing or eliminating the impact over time** by preservation and maintenance operations;
5. **Compensating for the impact** by replacing, enhancing, or providing substitute resources or environments; and
6. **Monitoring the impact** and the compensation projects and taking appropriate corrective measures.

The listed order of these steps is important, and lower-priority measures are appropriate only when higher-priority measures are infeasible or not applicable ([WAC 173-26-201\(2\)\(e\)](#)).

NNL is achieved through the application of the mitigation sequence at two critical times. The first is during the SMP planning process. The second is during the design and construction of individual shoreline projects.

## Mitigation sequencing requirements in your SMP

All comprehensively updated SMPs<sup>14</sup> are consistent with the NNL requirement ([WAC 173-26-186 \(8\)\(b\)](#)). This is because during SMP planning, each local government must inventory shoreline conditions, characterize ecosystem functions and processes, and analyze future demand for shoreline space, and potential conflicts. Counties and cities use the information gathered through this process to develop SMP policies and regulations that achieve NNL and

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<sup>13</sup> [WAC 173-26-186](#), <https://apps.leg.wa.gov/WAC/default.aspx?cite=173-26-186>

<sup>14</sup> Comprehensively updated SMPs are those locally adopted and approved by Ecology to be consistent with the 2003 SMP guidelines (WAC 173-26, Part III) and SMP procedural rules (WAC 173-26, Parts I and II).

address the cumulative impacts from reasonably foreseeable future shoreline development and uses.<sup>15</sup>

NNL is embedded in SMP policies and regulations that establish:

- Shoreline environment designations,
- Shoreline use and modification regulations,
- Critical areas protections, and
- Mitigation measures and methods for addressing unanticipated impacts

[\(WAC 173-26-201\(2\)\(c\)\)](#).

Once a local government comprehensively updates its SMP, local administrators ensure that the NNL requirement is met through the careful and complete implementation of SMPs during the day-to-day review of individual development proposals ([WAC 173-26-186\(8\)\(b\)\(i\)](#)). During your review of individual shoreline permits, you will be considering what change in shoreline functions is likely to occur because of the project. Your project-level review for NNL will consider change from the legal existing conditions at the project site at the time of application.

## Avoiding the impact

Avoiding the impact is the first step in the mitigation sequence. Let's look at three familiar SMP avoidance regulations.

The establishment of a protected area such as a buffer (see call-out box on next page) or an area identified for vegetation conservation, is a common example of a regulation meant to avoid development impacts. It's not uncommon for jurisdictions extend some level of vegetation conservation beyond a standard, protective buffer. Some jurisdictions have tree preservation or retention ordinances that apply citywide including within shoreline jurisdiction. There are also SMPs that have established tree retention provisions specific to the shoreline jurisdiction but that extend beyond the standard, protective buffer. These regulations are often paired with a prescriptive tree replacement ratio.

Uses identified as being prohibited within the shoreline or within certain shoreline environment designations are avoidance regulations that shift the location of certain non-water-oriented and incompatible uses to other areas. This means your decisions about how to classify a use have important implications for shoreline management. Third, your SMP includes provisions for the siting of new development meant to avoid the need for new shoreline stabilization in the future. Consider the following example.

Critical areas within the shoreline are protected by regulations that first seek to avoid impacts by shifting new development outside of wetlands and wetland buffers, outside of FWHCAs, outside of floodways and channel migration zones, and away from geologically hazardous

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<sup>15</sup> WAC 173-26-201(3)(c) and (d)(i), (ii), and (iii)

areas. To avoid impacts to CARA functions, a local government must first map CARAs and adopt the zoning regulations and performance standards to protect them. Protection is achieved when individual development proposals comply with the regulatory provisions that protect CARAs.

The term **buffer** is used throughout this chapter to describe the area landward of the ordinary high water mark or critical area edge where vegetation is conserved and development is limited to maintain shoreline ecological processes and functions ([WAC 173-26-221\(5\)](#)). However, SMPs around the state use other terms such as setback, vegetation conservation area, riparian habitat area, and native growth protection area.

## Example 1: Single-family residence outside of the shoreline buffer

You review a proposed single-family residence application by checking the site plan, building elevations, and local critical areas maps to ensure all development is outside of buffers and setbacks and that the proposal is meeting bulk, dimensional, and all other performance standards<sup>16</sup> of the SMP.

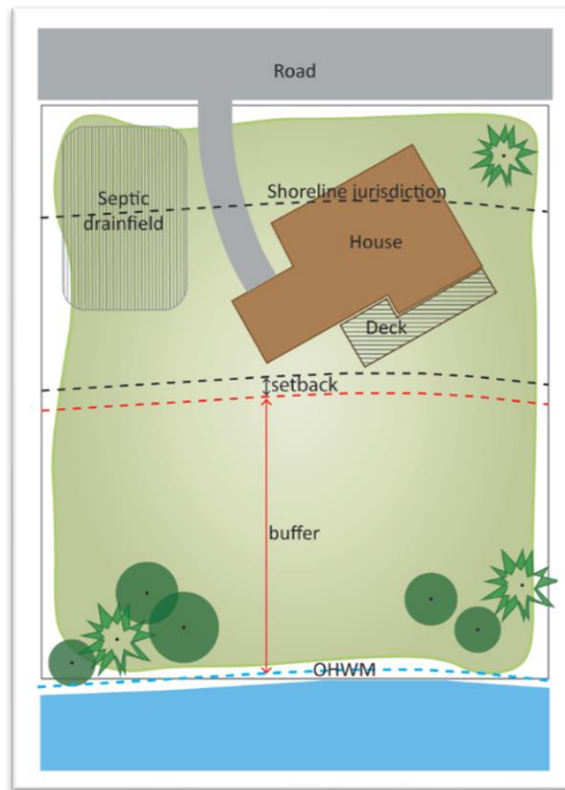


Figure 10. A single-family residence that meets all SMP requirements.

Besides being consistent with the SMP, the proposal meets other provisions of your municipal code that were considered during the SMP planning process, like stormwater management requirements and lot coverage standards that are critical to achieving NNL.

You are confident that the location of the ordinary high water mark (OHWM) shown on plans is accurate because you determined it in the field months earlier using Ecology's guidance.<sup>17</sup> Because you visited the site, you're confident that existing site conditions are accurately represented on plans.

<sup>16</sup> Some SMPs include performance standards such as impervious surface limits, vegetation management requirements, and tree protection standards that extend beyond buffers and setbacks.

<sup>17</sup> <https://apps.ecology.wa.gov/publications/summarypages/1606029.html>

In this case, the SMP establishes a buffer and a structural setback. The structure is proposed to be located landward of the setback line (Figure 10Error! Reference source not found.). The proposal is consistent with the SMP and, as a result, meets the NNL requirement.

In this example, the mitigation sequence stopped at avoidance, and no additional documentation of mitigation sequencing was necessary. However, the local government may need to place conditions on the SDP exemption to ensure impacts are avoided during construction. This idea is explored in the first project scenario starting on page 58.

**Interrupted buffers.** Some SMPs include provisions that allow an applicant to demonstrate that a shoreline buffer is so physically and permanently cut off from the shoreline by a substantial barrier that the site does not contribute to shoreline ecological functions and therefore should not be regulated as a shoreline buffer. Because the regulation of buffers is an important impact avoidance mechanism, the onus is on the applicant to demonstrate that a site is disconnected from the shoreline. This demonstration must consider the wide variety of interacting physical, chemical, and biological components that contribute to the shoreline's ecology (see section on Shoreline Ecological Functions).

## Minimizing impacts

Avoiding all impacts may be infeasible when a use or development will encroach on a shoreline buffer, critical area, critical area buffer, or occur waterward of the OHWM. Once an applicant has demonstrated that a proposal cannot avoid all impacts, they will then document attempts to minimize impacts (mitigation sequence step 2) through project design.

As was the case with avoidance, your SMP includes regulations that minimize impacts. SMP dock standards that regulate light penetration, construction materials, and dimensions are examples of minimization requirements. While standards like these are specific, your SMP will also include nonspecific regulations meant to achieve NNL through the application of mitigation sequencing. For example, your SMP likely includes use regulations like the following:

- All unavoidable adverse impacts must be mitigated.
- The project will not result in a net loss of shoreline ecological functions.
- The project must meet mitigation sequencing provisions.
- The development shall achieve no net loss of ecological function.
- Adverse impacts shall be adequately mitigated.

Depending on the project, different levels of site-specific information will be needed to verify that individual projects have correctly applied mitigation sequencing to achieve no net loss. Consider the following example.

## **Example 2: Inn with trail in the shoreline buffer**

Consider a proposed inn on waterfront property to see how mitigation sequencing will often require additional site-specific information that documents how mitigation sequencing will be applied.

The subject parcel includes shoreline with a Rural Conservancy designation. The SMP prohibits non-water-oriented commercial uses like the inn within 200 feet of the OHWM (avoidance regulation). The proposal also includes walking trails that provide access to the water. This use is allowed within the shoreline when consistent with use regulations, including one that establishes a maximum trail width standard and another that specifies what materials can be used (minimization regulations).

The SMP also includes a use regulation that states “trail construction and maintenance shall minimize removal of vegetation, avoid important wildlife habitat, and shall not result in a net loss of ecological functions.” Here the SMP is asking for site-specific information about ecological functions and how trail design will apply mitigation sequencing to achieve NNL. During review, you’ll look for documentation that the design avoids and minimizes impacts to vegetation and habitat, that temporary impacts will be rectified, and that all unavoidable impacts will be compensated for.



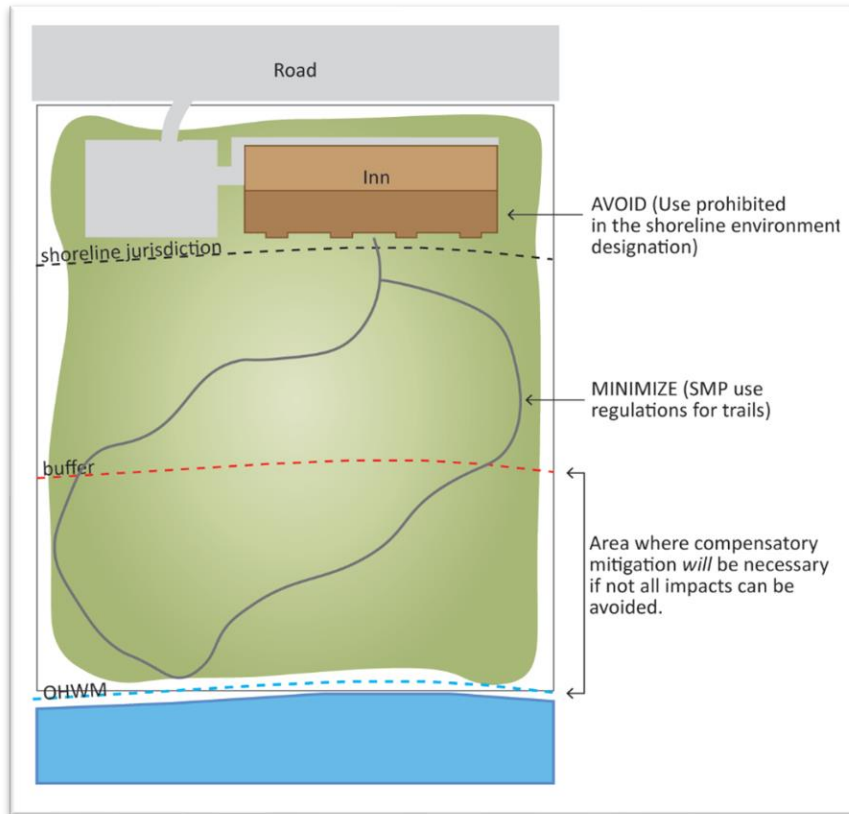


Figure 11. An inn proposed on a waterfront property.

## Rectifying impacts

Attempts to minimize impacts might include efforts to rectify temporary impacts. Rectifying the impact is the third step in the mitigation sequence and it requires applicants to repair, rehabilitate, or restore the affected environment. Rectifying is most often associated with temporary, construction-related impacts. However, it also includes most stormwater facilities, which are generally constructed to rectify impacts to water quality and quantity from additional impervious surfaces.

## Reducing or eliminating the impact over time

Attempts to minimize impacts may include efforts to reduce or eliminate the impact over time through preservation and maintenance operations during the life of the action (mitigation sequence step 4). When a project cannot avoid all impacts, a proposal may require ongoing preservation and maintenance efforts to reduce environmental impacts. Examples might include:

- Maintenance cleaning for pervious pavement.
- Seasonal trail maintenance to address erosion.
- Maintaining pet waste stations at recreation areas.
- Regularly servicing septic systems.
- Maintaining mitigation plantings through regular watering and invasive species removal.
- Preserving mitigation sites in perpetuity.

## Compensating for the impact

It is understood that some projects will result in unavoidable impacts to shoreline ecological functions. For these projects, compensatory mitigation (mitigation sequence step 5) is needed to achieve NNL at the project level. This section provides guidance for compensatory mitigation of shoreline ecological functions. Readers should see *Wetland Mitigation in Washington State*, Ecology's two-part wetland mitigation guidance document, for compensatory mitigation guidance specific to wetland impacts.<sup>18</sup>

Compensatory mitigation is one of the last steps in the mitigation sequence, where unavoidable impacts are offset by “replacing, enhancing, or providing substitute resources or environments” ([WAC 173-26-201\(2\)\(e\)\(i\)\(E\)](#)). Figure 12 and Figure 13 communicate a preference for the location of shoreline mitigation sites. Pages 38 through 45 list common shoreline activities, their ecological impacts, and commonly associated mitigation strategies.

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<sup>18</sup> [Wetland mitigation resources https://ecology.wa.gov/Water-Shorelines/Wetlands/Mitigation](https://ecology.wa.gov/Water-Shorelines/Wetlands/Mitigation)

When compensatory mitigation is appropriate, “preferential consideration shall be given to measures that replace the impacted functions directly and in the immediate vicinity of the impact” ([WAC 173-26-201\(2\)\(e\)\(ii\)\(B\)](#)). However, in practice, mitigation cannot always be fully accomplished with onsite and in-kind compensation. Out-of-kind and/or offsite<sup>19</sup> mitigation opportunities should be sought only when in-kind and onsite opportunities are either unavailable or insufficient in achieving NNL. It is important for local governments to understand how their codes may restrict or encourage the use of offsite mitigation, mitigation banks, and/or advance mitigation.

For instance, small lots that are constrained by shoreline buffers may require a shoreline variance to be developed for single-family residential uses. In some situations, site conditions may make onsite and in-kind mitigation challenging. Perhaps the shoreline buffer is already well vegetated, or perhaps the space needed to accommodate mitigation is unavailable. In these situations, applicants should consider in-water mitigation opportunities like the placement of large woody material or the removal of a derelict over-water structure. An applicant could also propose offsite mitigation. SMP Restoration Plans may be a good resource to identify offsite opportunities.

Applicants should consider climate change in mitigation location and design. Some parts of the state will experience more drought, wildfire, higher temperatures, sea level rise, saltwater intrusion, and flooding. These realities pose a challenge to locating and designing a mitigation site that will be sustainable long term. It also means applicants may need to expect higher plant mortality and to plan and budget for replanting repeatedly and irrigation.

An applicant should clearly identify functional impacts associated with a proposal and what opportunities exist to compensate for those impacts onsite and/or offsite. If an applicant cannot develop a plan to compensate for impacts, a proposal may not be viable. There is no mechanism for properly approving a shoreline permit that will cause adverse impacts to the shoreline environment ([WAC 173-27-170\(2\)\(c\)](#)). While an applicant can seek relief from specific bulk, dimensional, or performance standards of the SMP (many of which help achieve NNL) through a shoreline variance permit, the requirement that each new development proposal achieve NNL cannot be varied. **NNL is the principle from which many SMP regulatory standards derive and is not a performance standard that can be varied.**

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<sup>19</sup> Offsite mitigation opportunities must be within the same watershed as the project site ([WAC 173-26-201\(2\)\(e\)\(ii\) B](#)).



Figure 12. Buffer impacts and the preferred location of mitigation sites.



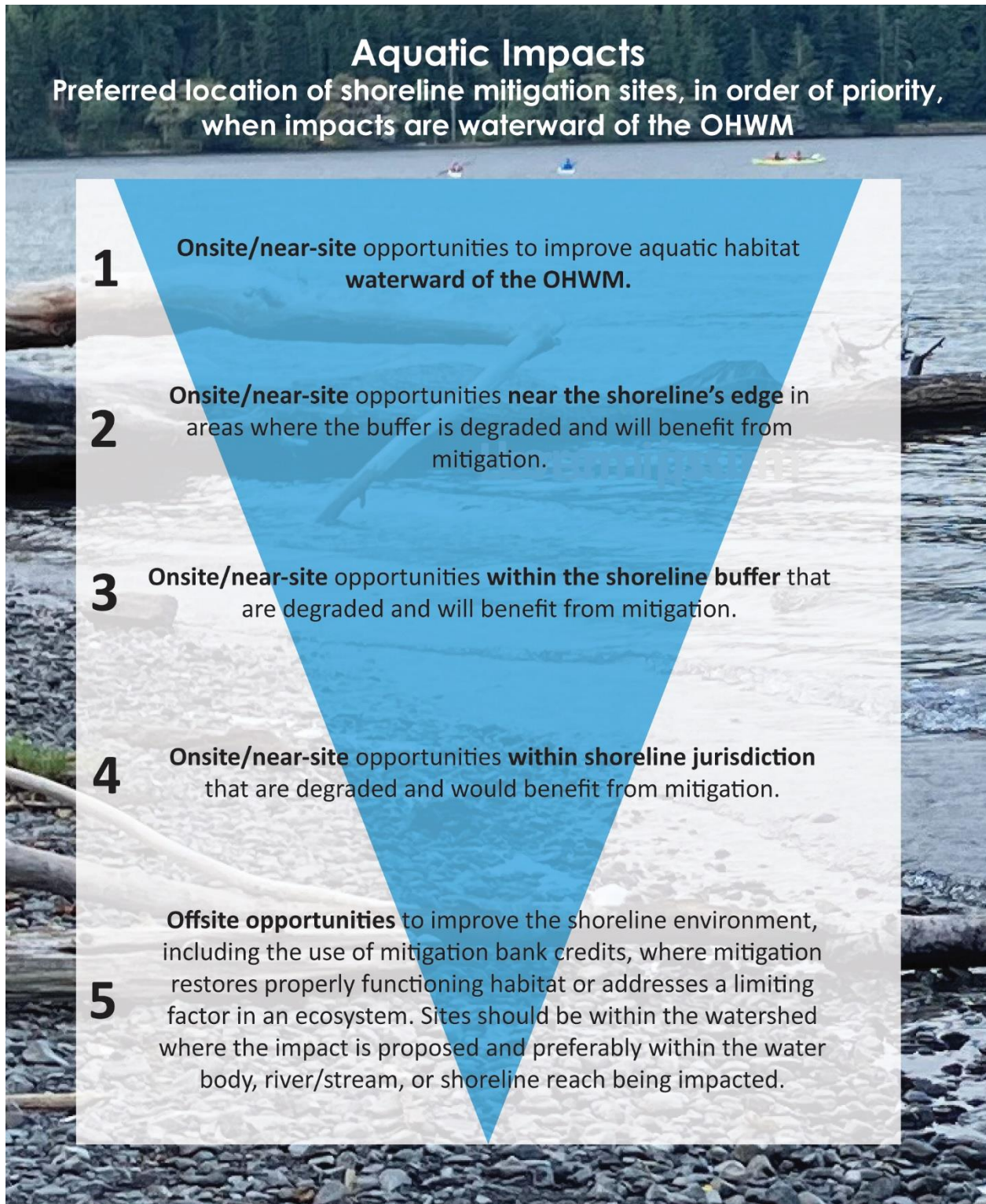


Figure 13. Aquatic impacts and the preferred location of mitigation sites.

## Shoreline stabilization: functional losses and mitigation

### Shoreline stabilization - Potential losses of shoreline ecological functions

- Interruption of natural, habitat-forming processes that require the erosion, transport, and deposition of sediment. The interruption of these processes can result in sediment impoundment landward of the structure and subsequent beach starvation.
- Interference with the recruitment of organic detritus and the movement of organisms that contribute to shoreline ecosystems.
- Loss or degradation of shallow-water habitat for fish forage, refuge, and spawning.
- Restriction of channel migration and side channel habitat formation. Both are important for large woody debris and gravel recruitment, the creation of salmon rearing habitat, and flood storage.
- Interruption of natural hydraulic regimes. This prevents the natural erosion of vegetated shorelines and large woody debris recruitment. Large woody debris is important for increased biological diversity.
- Loss of shoreline vegetation to provide shade, erosion control, and a prey base (i.e., the macroinvertebrates fish eat). Shoreline vegetation is important for creating the habitat conditions needed for salmon spawning, rearing, refuge, and foraging areas.

### New or enlarged shoreline stabilization - Common mitigation strategies<sup>20</sup>

When all impacts cannot be avoided, the following mitigation strategies minimize and compensate for the ecological impacts of new or enlarged shoreline stabilization.

1. Construct the smallest/shortest and softest stabilization feasible that will address the erosion concern. (Minimize)
2. Construct a soft structure (e.g., bioengineering, beach nourishment, protective berms, reslope and revegetate, or vegetative stabilization). (Minimize)
3. Construct a hybrid structure (i.e., mix rock, logs, and vegetation). (Minimize)
4. Construct upland retaining walls. (Minimize)
5. Construct new hard structure as far landward of the OHWM as possible. For replacement stabilization, ensure new armoring is landward of the existing structure and located as far landward as is feasible. (Minimize)
6. Onsite - Remove all or sections of existing bank protection structures that are no longer needed. (Compensate)

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<sup>20</sup> Some options listed minimize ecological losses, while others compensate for losses. Not all options will be available or appropriate for all sites, and a combination of strategies may be needed to attain NNL.

7. Onsite – Install a habitat feature such as large woody material at or above the OHWM. Use the Marine Shoreline Design Guidelines<sup>21</sup> for structures in marine environments and the Stream Habitat Restoration Design Guidelines<sup>22</sup> for structures in freshwater environments. (Compensate)
8. Onsite - Remove existing over-water or in-water structures that are no longer needed. (Compensate)
9. Onsite - Plant native trees and shrubs near the shoreline edge so that vegetation will overhang the bulkhead. (Compensate)
10. Onsite - Remove human-made debris waterward of the OHWM on the site (e.g., creosote piles, tires, car bodies, oil drums, concrete or asphalt, remnant pilings, and other materials detrimental to ecological functions). (Compensate)
11. Offsite – Remove existing bank protection structures that are no longer needed on similar shoreform type. (Compensate)
12. Use offsite mitigation or in-lieu fee programs where available within shoreline jurisdiction and where no feasible onsite options exist. (Compensate)



Photo courtesy of Hugh Shipman

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<sup>21</sup> <https://wdfw.wa.gov/publications/01583>

<sup>22</sup> <https://wdfw.wa.gov/publications/01374>

## Loss of riparian vegetation: functional losses and mitigation

### Loss of riparian vegetation - Potential losses of shoreline ecological functions

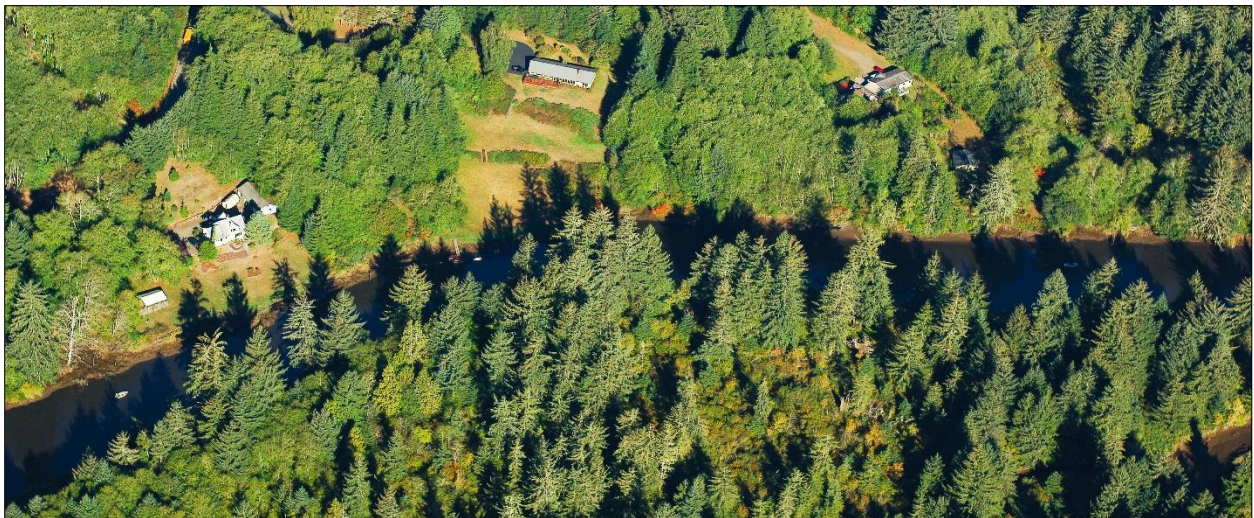
- Diminished capacity for filtering and vegetative uptake of nutrients and pollutants from ground water and surface runoff.
- Reduced capacity for stormwater detention and infiltration. This can increase the quantity of water and pollutants delivered to aquatic habitats during storm events. Increased flows can affect in-water habitat structure.
- Loss of shade necessary to maintain the cool temperatures required by salmonids, spawning forage fish, and other aquatic biota.
- Loss of prey base (i.e., the macroinvertebrates fish eat).
- Loss of large woody material that provides in-water structure.
- Loss of terrestrial wildlife habitat in the form of migration corridors and feeding, watering, rearing, and refuge.
- Loss of bank stabilization and erosion control provided by riparian vegetation.



## Loss of riparian vegetation - Common mitigation strategies<sup>23</sup>

When all impacts cannot be avoided, the following mitigation strategies minimize and compensate for the loss of riparian vegetation within the shoreline buffer.

1. Position structures to avoid mature trees. (Minimize)
2. Revegetate buffer with native trees, shrubs, and groundcover. (Compensate)
3. Replace invasive, non-native plants with native species. (Compensate)
4. Use large trees and root wads removed for the project for onsite mitigation consistent with WAC 220-660-220<sup>24</sup> for large woody material placement, repositioning, and removal. (Compensate)
5. Install habitat features such as large woody material, bird nest boxes, squirrel boxes, and bat boxes. (Compensate)
6. Restrict livestock access to buffer area. (Compensate)
7. Permanently protect mitigation area through a conservation easement, transfer of development rights, or other mechanism to ensure long-term protection. (Compensate)
8. Use offsite mitigation or in-lieu fee programs where available within shoreline jurisdiction and where no feasible onsite options exist. (Compensate)



Source: Ecology's Coastal Atlas

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<sup>23</sup> Some options listed minimize ecological losses, while others compensate for losses. Not all options will be available or appropriate for all sites, and a combination of strategies may be needed to attain NNL.

<sup>24</sup> <https://app.leg.wa.gov/wac/default.aspx?cite=220-660-220>

## Over-water and in-water structures: functional losses and mitigation

### Over-water and in-water structures - Potential losses of shoreline ecological functions

- Shading reduces survival of aquatic plants. Aquatic plants provide food, breeding areas, and protective nurseries for juvenile fish and other aquatic life.
- Shading increases predation of juvenile salmon, steelhead, and other small fish in two ways. Shading caused by over-water and in-water structures can affect migration behavior of juvenile fish that respond by moving into deeper water where there is increased risk of predation. Additionally, these structures can create habitat for predator fish.
- Building materials may leach harmful chemicals.
- Pile driving causes temporary increases in water turbidity.

### Over-water and in-water structures - Common mitigation strategies<sup>25</sup>

When all impacts cannot be avoided, the following mitigation strategies minimize and compensate for new or enlarged over-water and in-water structures.

1. Locate the structure as high above the water as practicable to reduce shade. (Minimize)
2. Reduce the dimensions of an existing dock to meet current requirements and decrease the shade footprint. (Minimize)
3. Replace existing solid decking with grating or gridded surface materials that allow light penetration. (Minimize)
4. Align the new structure in a north-south orientation to maximize transmission of light under the structure. (Minimize)
5. Put float stops on any floats to prevent grounding on the substrate. (Minimize)
6. Any wood used in the structure must be an approved treated wood for use in aquatic environments and any floatation must be fully enclosed to prevent loss of material into the water. (Minimize)
7. Minimize piling diameter size and the number of pilings needed in a design. Use only approved piling materials (approved treated wood, steel, etc.). (Minimize)
8. If anchors are used to hold a float in place, the lines must not rest on the substrate at any time. (Minimize)
9. Onsite - Remove existing over-water or in-water structures that are no longer needed. (Compensate)
10. Remove floats during off season and store at an upland location. (Compensate)

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<sup>25</sup> Some options listed minimize ecological losses, while others compensate for losses. Not all options will be available or appropriate for all sites, and a combination of strategies may be needed to attain>NNL.

11. Remove shoreline armor and restore the shoreline or replace hard shoreline stabilization through use of soft shore stabilization techniques. (Compensate)
12. Provide a backshore or in-water habitat feature such as large woody debris. (Compensate)
13. Plant native trees and shrubs near the shoreline edge. (Compensate)
14. Remove human-made debris waterward of the OHWM onsite. (Compensate)
15. Offsite - Remove existing over-water or in-water structures that are no longer needed. (Compensate)
16. Use offsite mitigation or in-lieu fee programs where available within shoreline jurisdiction and where no feasible onsite options exist. (Compensate)



Source: Ecology's Coastal Atlas



## New impervious surfaces: functional losses and mitigation

### New impervious surfaces - Potential losses of shoreline ecological functions

- Reduced capacity for stormwater detention and infiltration. This can increase the quantity of water and pollutants delivered to aquatic habitats during storm events. Increased flows can affect in-water habitat structure.
- Diminished capacity for filtering and vegetative uptake of nutrients and pollutants from ground water and surface runoff.
- Loss of shade necessary to maintain the cool temperatures required by salmonids, spawning forage fish, and other aquatic biota.
- Loss of prey base (i.e., the macroinvertebrates fish eat) with associated loss of riparian vegetation.

### New impervious surfaces - Common mitigation strategies<sup>26</sup>

When all impacts cannot be avoided, the following mitigation strategies minimize and compensate for new impervious surfaces within the shoreline buffer.

1. Use low-impact development techniques. (Minimize)
2. Install a rain garden. (Minimize/Rectify)
3. Onsite - Remove existing impervious surface and replant with native vegetation. (Compensate)
4. Offsite - Remove existing impervious surface and replant with native vegetation. (Compensate)
5. Use offsite mitigation or in-lieu fee programs where available within shoreline jurisdiction and where no feasible onsite options exist. (Compensate)



Source: Ecology's Coastal Atlas

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<sup>26</sup> Some options listed minimize ecological losses, while others compensate for losses. Not all options will be available or appropriate for all sites, and a combination of strategies may be needed to attain NNL.

## Fill waterward of the OHWM: functional losses and mitigation

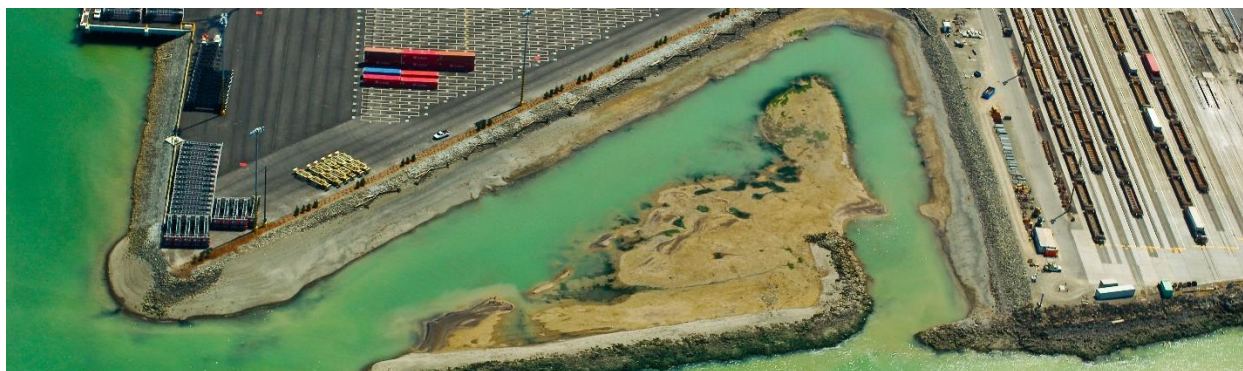
### Fill waterward of the OHWM - Potential losses of shoreline ecological functions

- Interruption of natural habitat-forming processes that require the erosion, transport, and deposition of sediment.
- Permanently eliminates aquatic habitat.
- Increased habitat fragmentation.
- Smothering of aquatic plants and sessile animals.
- Temporary increase in turbidity.

### Fill waterward of the OHWM - Common mitigation strategies<sup>27</sup>

When all impacts cannot be avoided, the following mitigation strategies minimize and compensate for new fill waterward of the OHWM.

1. Design any facilities to be landward of the OHWM. (Avoid)
2. Onsite - Remove fill waterward of the OHWM. (Compensate)
3. Remove failing shoreline stabilization structures waterward of the OHWM. (Compensate)
4. Remove human-made debris waterward of the OHWM on the site (e.g., creosote logs, car bodies, oil drums, concrete or asphalt, remnant pilings, and other materials detrimental to ecological functions). (Compensate)
5. Offsite - Remove fill waterward of the OHWM. (Compensate)
6. Use offsite mitigation or in-lieu fee programs where available within shoreline jurisdiction and where no feasible onsite options exist. (Compensate)



Source: Ecology's Coastal Atlas

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<sup>27</sup> Some options listed minimize ecological losses, while others compensate for losses. Not all options will be available or appropriate for all sites, and a combination of strategies may be needed to attain NNL.

## Use-related impacts

Many of the impacts discussed so far have been tied to development, yet the ongoing use of a structure or property will likely also result in impacts. Use-related impacts could include light, noise, the trampling of vegetation, soil erosion, litter, and pollution and may come from people, livestock, pets, industrial operations, vehicles, etc.

As an example, let's consider the recreational use impacts of a trail segment proposed to be constructed within shoreline jurisdiction. The trail will cut through an intact forested area that includes a wetland buffer. Use-related impacts may include vegetation trampling, soil erosion, wildlife disturbance (from noise and pets), pollution from pet waste, and the introduction of non-native invasive plant species. The degree of impact will depend on the intensity of trail use, trail maintenance plans, and trail design.

The review of any shoreline proposal should start with a consistency review of your SMP's use matrix. Where a use is allowed, your review will then turn to its consistency with the use provisions of your SMP and ensuring that any unavoidable impacts are mitigated.

Use is fundamental to shoreline management. Consider that use is so important to the policy of the SMA that development is not contemplated where it is not in support of an established or proposed use. Regardless of whether development will occur, any proposal to change the use of a shoreline property must be consistent with your SMP.

Determine whether your jurisdiction has a mechanism for ensuring SMP consistency when a proposal will change the use of shoreline property but where no development is proposed. For example, an applicant could propose to remodel a single-family residence to use it as a bed and breakfast, which is a commercial use. This mechanism may be tied to a change-of-use/occupancy permit and/or to your business licensing program. It will likely be similar to or the same as the mechanism used to ensure consistency with the underlying zoning.

Remember that shoreline conditional use permits can be required for proposals that have no development component.



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## Outdoor lighting

Artificial light has negative effects on many creatures that depend on the daily cycle of light and dark for behaviors like reproduction, nourishment, sleep, and protection from predators.

The International Dark-sky Association lists the following ways to minimize the harmful effects of light pollution, lighting should: **only be on when needed, only light the area that needs it, be no brighter than necessary, minimize blue light emissions, and be fully shielded (pointing downward).**

Ask applicants for a lighting “cut sheet” or “spec sheet” that provides details on the fixtures to be installed. The International Dark-sky Association has a visual guide to understanding the difference between unshielded and fully shielded light fixtures. Lighting fixtures can also be Dark Sky Friendly certified.

For more information: [darksky.org](https://darksky.org)

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## Monitoring the impact

Compensatory mitigation should be monitored (mitigation sequence step 6) whenever mitigation success cannot be assessed at the time of final building inspection. The degree of monitoring (i.e., frequency and duration) may vary depending on the potential ecological risk of a mitigation project’s failing to meet mitigation plan goals.

Some mitigation will not require post-permit monitoring. For example, a permit requirement to remove cement pieces and tires from the shoreline can be assessed for completeness on or before final inspection. However, whenever mitigation success cannot be assessed at the time of final inspection, sites must be monitored and evaluated over time. In these cases, the mitigation plan will guide ongoing monitoring and the steps that will be taken if mitigation fails to meet identified goals and objectives. Examples of mitigation that requires ongoing monitoring include planting native vegetation; creating, restoring, or enhancing wetland functions; and removing invasive species.

Local governments should consider including a permit condition allowing staff access to mitigation sites. Suggested language for this condition is:

The applicant shall provide access to the project site and all mitigation sites upon request by city/county personnel for site inspection, monitoring, and/or necessary data collection, to ensure that the conditions of this permit are being met.

Ecological mitigation requires maintenance; however, even with diligent upkeep, efforts can fail to meet mitigation plan objectives. It is important to ensure that mitigation plans include a contingency plan that describes how the applicant will address deficiencies through corrective

measures. The need to take corrective measures, such as replanting, may require the local government to extend the monitoring period until all performance standards are met.

## As-built mitigation report

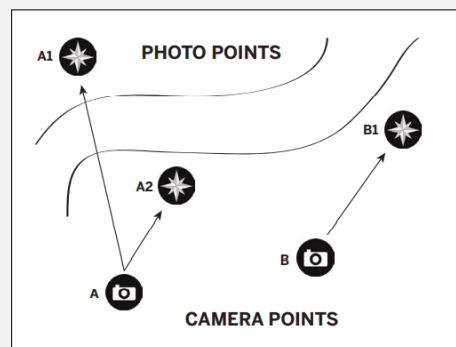
In most cases, requiring applicants to submit an as-built report will be necessary to establish baseline conditions and evaluate the success of the mitigation site throughout the monitoring timeframe.

An as-built report for mitigation work is submitted after mitigation planting is complete. At a minimum, the as-built report should include:

1. A site plan showing changes that occurred to the mitigation area during installation. The site plan should also establish permanent camera points and photo points (see sidebar above). The site plan should clearly be labeled “as-built.”
2. Photographs of the installed mitigation using established camera points and photo points.
3. A report detailing basic information like the date of mitigation installation, the species planted, and the quantity of each species planted.

Consider requiring the submittal of an as-built report as a condition of permit approval.

**Photo point monitoring** is a way of documenting changes to mitigation plantings over time. Photographs of mitigation plantings are taken from established locations called camera points. Camera points must be permanent landmarks like trees, building corners, and fences, or they can be marked by steel stakes or fence posts that remain in the ground for the duration of the monitoring timeframe. Photo points are where the camera lens is pointing. One camera point can have several photo points. Photo points must also be permanently marked.



Source: Stream Webs Student Stewardship Network, Oregon State University, [www.streamwebs.org](http://www.streamwebs.org).

## How to Document Mitigation Sequencing

Depending on the SMP and local practice, mitigation sequencing can be documented in a variety of ways. In most cases, an understanding of how a project will apply mitigation sequencing to meet NNL is achieved through a combination of application materials that, when considered together, give the reviewing planner confidence that a project will achieve NNL. Documentation can be within an applicant's site plan, narrative, SEPA Checklist, and other submittal documents.

Depending on site conditions and potential ecological impacts, a proposal may benefit from a more robust assessment of the site's ecological functions and a demonstration of how mitigation sequencing was applied to achieve NNL.<sup>28</sup> Across the state this information is presented to local governments in a variety of technical documents that go by different names (e.g., site-specific impact analysis, critical areas report, shoreline mitigation plan, habitat management plan, wetland mitigation plan, mitigation sequencing analysis, etc.). Throughout this chapter we will use the term NNL analysis (see callout box) to refer to any site-specific document, or combination of documents, that is prepared by a qualified professional and assesses a site's ecological functions and demonstrates how mitigation sequencing will be applied to achieve NNL.

[Appendix A](#) includes a list of recommended components for an NNL analysis and, if not all impacts can be avoided, a mitigation plan.

**No-net-loss analysis (NNL analysis)** is a generic term we use to describe a higher level of site-specific documentation (i.e., a level of document not standardly required of all shoreline applicants), prepared by a qualified professional, which will be either helpful or necessary to evaluate whether a proposal is compliant with the mitigation sequencing requirements of all comprehensively updated SMPs. The term NNL analysis is used to describe any document, or combination of documents, that assesses a site's ecological functions and demonstrates how mitigation sequencing will be applied to achieve NNL. An NNL analysis may require the consideration of a site's ecological functions within a larger context, such as the watershed scale. An NNL analysis is not necessarily required for all shoreline applications. Instead, an SMP may prescribe when an NNL analysis is needed, or an SMP may grant the shoreline administrator discretion in deciding when an NNL analysis must be submitted.

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<sup>28</sup> As required by WAC 173-26-201(2)(e), SMPs "shall include provisions that require proposed individual uses and developments to analyze environmental impacts of the proposal and include measures to mitigate environmental impacts not otherwise avoided or mitigated by compliance with the master program and other applicable regulations."

## When is an NNL analysis necessary?

Applicants will always need to demonstrate how mitigation sequencing will be applied to achieve NNL. **The challenge is understanding when a project requires a higher level of documentation than what is typically required for a complete shoreline permit application.**

While some SMPs include prescriptive requirements for when and how an applicant must document mitigation sequencing, others give more discretion to the shoreline administrator. It is also common for SMPs to include with all use-specific and modification-specific regulations, a general statement requiring NNL without clarifying how the applicant or the reviewing planner will determine that the requirement has been met and without clarifying which projects will need an NNL analysis.

To address this difference in SMPs and provide guidance to those local governments without prescriptive requirements, Ecology has identified six categories of projects that should typically be required to submit an NNL analysis. **The categories represent projects that may not avoid all impacts. A project may benefit from an NNL analysis when a use or development:**

- **Occurs waterward of the OHWM.** Your SMP allows certain water-oriented uses and shoreline modifications to occur waterward of the OHWM with an approved SDP, CUP, or exemption from an SDP.<sup>29</sup> Uses and modifications within the aquatic environment will often benefit from an NNL analysis because avoiding all impacts will often be infeasible.
- **Occurs within a shoreline buffer.** Your SMP allows certain water-oriented uses and shoreline modifications to occur within a shoreline buffer with an approved SDP, CUP, or exemption from an SDP. Uses and modifications within shoreline buffers will often benefit from an NNL analysis. (See call out box on next page)
- **Occurs on a site with a critical area or critical area buffer.** Your SMP regulates development within critical areas and critical area buffers that occur within shoreline jurisdiction. Your SMP either embeds protective critical areas regulations or incorporates by reference portions of your locally adopted critical areas ordinance meant to achieve NNL.
- **Requires a shoreline conditional use permit.** The CUP process is used for unclassified uses or developments that may have unanticipated or uncommon impacts that could not be reasonably identified during SMP development.<sup>30</sup> Importantly uses and developments that require a CUP were not considered during the programmatic cumulative impacts analysis that was completed when your SMP was comprehensively updated. The purpose of the programmatic cumulative impacts analysis is to demonstrate that the implementation of your SMP's policies and regulations will achieve NNL over time. For

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<sup>29</sup> Shoreline modifications are those actions that modify the physical configuration or qualities of the shoreline area, usually through the construction of a physical element such as a dike, break-water, pier, weir, dredged basin, fill, bulkhead, or other shoreline structure. They can include other actions, such as clearing, grading, or application of chemicals. See WAC 173-26-020(36).

<sup>30</sup> WAC 173-26-241(2)(b) and WAC 173-27-160

this reason, CUPs will often benefit from an NNL analysis. A NNL analysis also helps address a CUP approval criterion that requires applicants to demonstrate consistency with the “policies of RCW 90.58.020 and the master program” (WAC 173-27-160(1)(a))<sup>31</sup> Amongst others, your SMP includes policies that assure NNL. This documentation also helps address a CUP approval criterion that requires applicants to demonstrate that the “proposed use will cause no significant adverse effects to the shoreline environment in which it is to be located” (WAC 173-27-160(1)(d)). Approving a CUP also requires the analysis of cumulative environmental impacts of potential additional requests for like actions in the area.

- **Requires a variance from an SMP standard established to protect ecological functions.**<sup>32</sup> Variance permits are a means to grant relief from the specific bulk, dimensional, or performance standards set forth in the SMP (WAC 173-27-030(17)). When an applicant seeks relief from an SMP standard, they may be seeking relief from a regulation put in place to avoid or minimize the loss of shoreline ecological functions (e.g., tree retention standard, buffer width, dock length, number of mooring structures, etc.). For this reason, variance permits will often benefit from an NNL analysis. This documentation helps address a variance approval criterion that requires applicants to demonstrate that the design of the project will not cause adverse impacts to the shoreline environment (WAC 173-27-170(2)(c)). Like CUPs, variance requests require the analysis of cumulative environmental impacts of potential additional requests for like actions in the area.
- **Is required by the SMP to document mitigation sequencing.** In addition to the five categories listed above, some SMPs will require certain proposed uses and developments to document or demonstrate how mitigation sequencing will be applied. For example, the Clark County SMP requires applicants proposing a new commercial use or development to submit a site-specific mitigation sequencing analysis. The Mason County SMP requires proposed mining activities to document “through a Habitat Management Plan that the project will ensure that ecological functions are protected, and unavoidable impacts are mitigated during the course of mining and after reclamation.” Similarly, the Cowlitz County SMP requires applicants for new road projects to demonstrate the facility has been designed to “follow the mitigation sequence of this Program to achieve no net loss of ecological functions.”

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<sup>31</sup> CUP approval criteria are listed in WAC 173-27-160, <https://apps.leg.wa.gov/WAC/default.aspx?cite=173-27-160>.

<sup>32</sup> Shoreline variance requests can be from provisions unrelated to the NNL requirement. For example, a variance from a building height standard identified of the SMP would not necessarily require documentation of NNL.



## Multiple buffer widths

Some SMPs apply different buffer widths to the same shoreline area based on a use’s water orientation. Establishing different buffers was one method used during SMP planning to ensure appropriate water-dependent, water-enjoyment, and water-related uses could occur in and near the water.

Standard Shoreline Buffer from the OHWM (1)	High Intensity	Shoreline Residential	Rural/Urban Conservancy	Natural
<b>Recreational Development (6)</b>				
Water-dependent structures and uses	0 feet	0 feet	0 feet	0 feet
Water-related and water-enjoyment structures and uses	75 feet	75 feet	75 feet	100 feet
Non-water-oriented structures and uses	150 feet	150 feet	150 feet	N/A

Figure 14. Example of an SMP that establishes different buffers based on a use’s water orientation.

For these SMPs, Ecology recommends that shoreline administrators identify the widest buffer established for the shoreline environment designation and consider this to be the “protective buffer.” **The protective buffer will be the one associated with non-water-oriented uses and is the area necessary to protect shoreline ecological functions.** Ecology recommends local administrators require a NNL analysis for most new proposals that will occur within the protective buffer or waterward of the OHWM (exceptions to this recommendation explained in the next section). Otherwise, water-oriented developments and uses could result in unmitigated losses to shoreline ecological functions.

The SMP example shown in Figure 14 establishes three buffer widths for recreational development. It shows a protective buffer of 150 feet (the buffer established for non-water-oriented recreation uses). Water-dependent, water-related, and water-enjoyment development are allowed within the protective buffer when they can meet NNL.

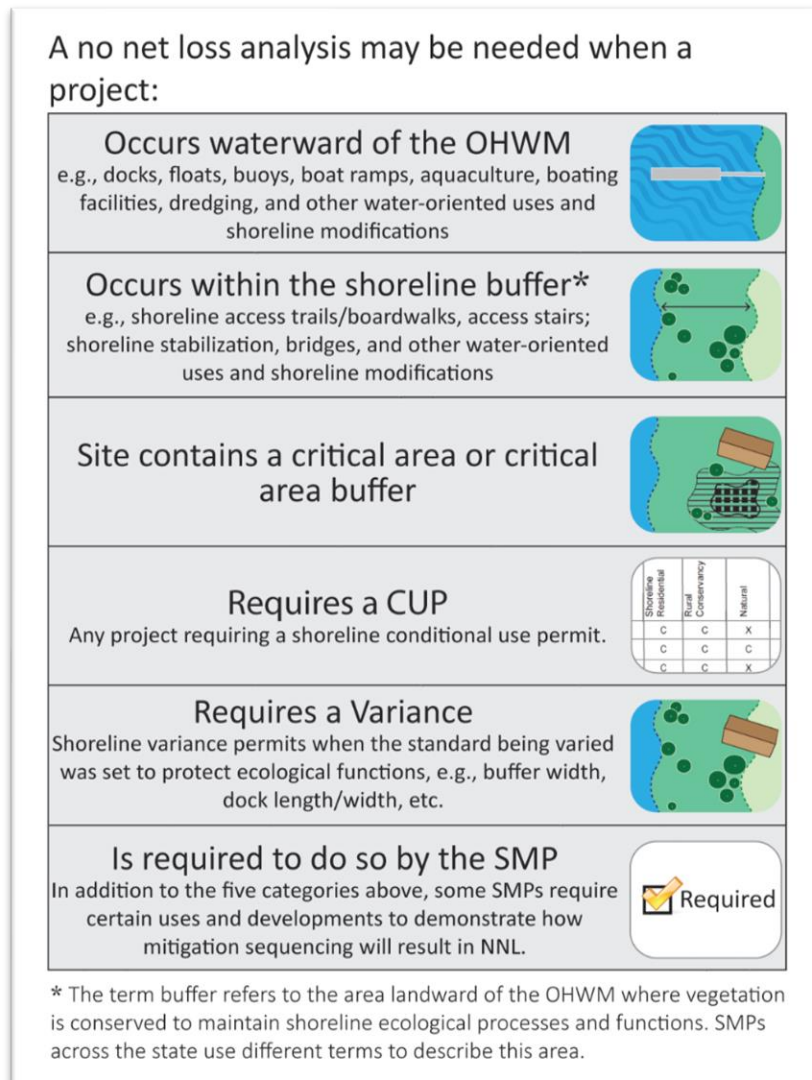


Figure 15. Projects in these six categories will often benefit from an NNL analysis.

**What if my SMP already includes prescriptive requirements for an NNL analysis?**

Some SMPs establish clear requirements for when an applicant will prepare an NNL analysis. For example, the Jefferson County SMP requires a habitat management plan if a field evaluation determines that any portion of the proposed project will occur within a regulated FWHCA or buffer and when an applicant is proposing buffer reduction or averaging. When a local SMP includes prescriptive requirements for an NNL analysis, those requirements will guide the permit application and review process.

## When is an NNL analysis unnecessary?

Not all projects within one of the six categories (Figure 15) will result in ecological impacts, either because the project has been designed to avoid impacts altogether, because SMP regulations have sufficiently mitigated all ecological impacts, or because shoreline functions at the site are limited due to existing development or disturbance. Let's look at some examples of projects that are unlikely to benefit from an NNL analysis.

- A proposed dock on a lake that has no state or federally listed aquatic species and no Washington Department of Fish and Wildlife priority aquatic species if the proposal is consistent with all SMP dock standards. In this case, in-water habitat functions will not be impaired by the proposed overwater structure.
- A proposal to add electric vehicle charging stations to an existing parking lot in a shoreline buffer. The proposal will not result in new impervious surfaces, and all temporary, construction-related impacts can be avoided and minimized by the construction best management practices (BMPs) the applicant has incorporated.
- A utility project that will use horizontal boring, also known as directional boring/drilling, to avoid trenching through a wetland buffer. In this case, the horizontal boring technique may avoid all permanent impacts.

Figure 16 shows three shorelines that span a range of development intensities: an undeveloped, natural shoreline (A); a medium-density shoreline (B); and a high-density, urban shoreline (C).

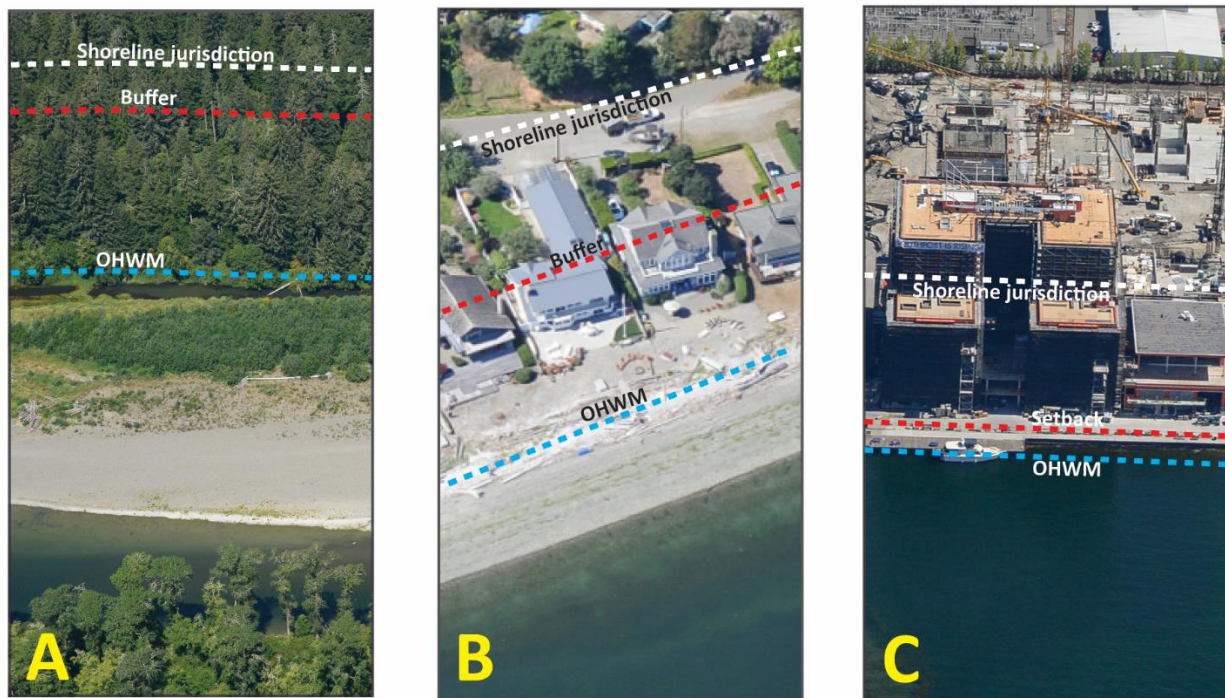


Figure 16. Shoreline A, B, and C.

For **shoreline A**, it's unlikely that a reviewing planner would have confidence that a proposed in-water or in-buffer development could achieve NNL without an NNL analysis documenting existing ecological functions and demonstrating how mitigation sequencing will be applied to achieve NNL.

For **shoreline B**, we can imagine in-buffer development proposals, but likely not in-water proposals, where a reviewing planner would have confidence in a project's ability to achieve NNL without an NNL analysis (e.g., residential remodels, a utility project within the paved right-of-way, installation of a bus shelter).<sup>33</sup> However, an NNL analysis would be necessary if, for example, new shoreline stabilization were proposed or if a new single-family residence were proposed within the shoreline buffer.

For **shoreline C**, there are likely many in-setback development proposals, but likely not in-water proposals, where a reviewing planner could have confidence in a project's ability to achieve NNL without an NNL analysis. This is because the shoreline is filled, hardened, lacks vegetation, and has been developed at high density.

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<sup>33</sup> Or similar projects that would not result in new impervious surfaces, would not remove native vegetation, and would not generate pollution.

## Mitigation Sequencing Tools and Resources

Ecology has developed tools for local governments to use during the permit review process and after a project has been approved to ensure that applicants correctly apply mitigation sequencing and fulfill obligations for compensatory mitigation.

### Recommended components for an NNL analysis and mitigation plan

[Appendix A](#) is a list of the components typically included in an NNL analysis and, if not all impacts can be avoided, a mitigation plan. While some SMPs set minimum requirements for what components a mitigation plan must include, others do not. Appendix A lists recommended components for an NNL analysis and mitigation plan and can be used during the permitting process by local governments that haven't adopted specific requirements.

### Checklists for avoiding and minimizing impacts

[Appendix B](#) is a checklist that identifies design techniques that avoid and minimize shoreline buffer impacts. It is a resource that allows local governments to share examples of avoidance and minimization strategies with applicants and a tool for applicants to communicate which strategies their proposal incorporates. Ecology also provides guidance for avoiding and minimizing impacts to wetlands<sup>34</sup> as well as avoidance and minimization checklists that can be used during site analysis, project design, and construction.<sup>35</sup> Additionally, pages 38 through 45 show potential shoreline ecological losses and common mitigation strategies (both minimization and compensation strategies) for shoreline stabilization, the loss of riparian vegetation, over-water and in-water structures, new impervious surfaces, and fill below the OHWM.

### As-built report template for homeowners and other small-site mitigation areas

[Appendix C](#) is an as-built report template created by Ecology. It is an optional tool for local governments and should be used for shoreline mitigation planting areas associated with single-family residential projects or other small-scale developments.

### Monitoring report template for homeowners and other small-site mitigation areas

Some mitigation projects will be professionally installed, maintained, and monitored. In other cases, property owners will be performing these tasks. [Appendix D](#) is a monitoring report template created by Ecology that local governments have the option of using. Appendix D is

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<sup>34</sup> [Interagency wetland mitigation guidance https://ecology.wa.gov/Water-Shorelines/Wetlands/Mitigation/Interagency-guidance](https://ecology.wa.gov/Water-Shorelines/Wetlands/Mitigation/Interagency-guidance)

<sup>35</sup> [AvoidanceMinimizationchecklist.pdf \(wa.gov\)](#)



appropriate for mitigation planting areas associated with single-family residential projects or other small-scale developments.

## Key resources list

[Appendix E](#) is a list of publicly available documents, websites, maps, and other resources commonly used by shoreline administrators to review permits, as reference materials, and for training staff. Published information is updated overtime. Please ensure you are using the most recent agency guidance.

## Project Scenarios

This section includes scenarios of shoreline development proposals to help illustrate how mitigation sequencing is correctly applied and documented.

### A new single-family residence

You review a substantial development permit (SDP) exemption for a proposed single-family residence (Figure 17). As part of your review, you check the site plan, building elevations, and local critical areas maps to ensure all development is outside of buffers and setbacks and that the proposal is meeting bulk, dimensional, and all other performance standards<sup>36</sup> of the SMP.

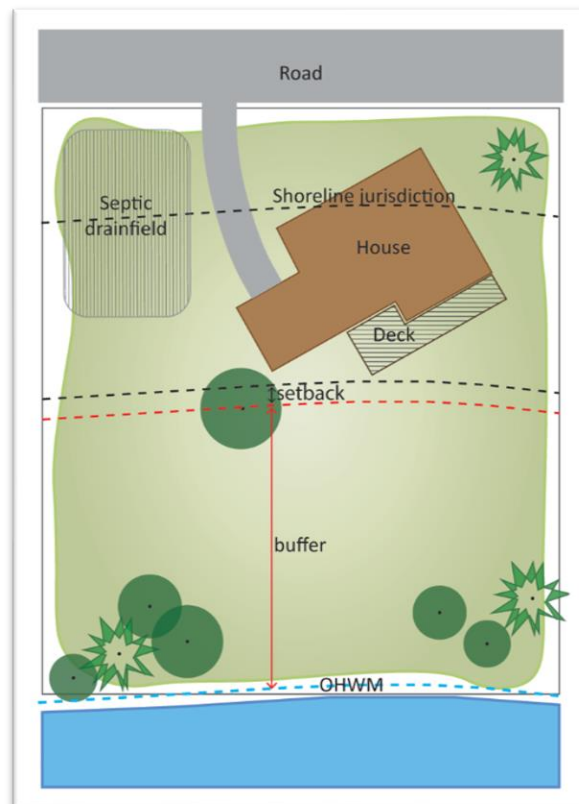


Figure 17. A single-family residence that meets all SMP requirements.

In addition, you check for compliance with other local codes that play a role in environmental protection. For your community, this includes the stormwater code, yard setback standards, tree retention standards, and lot coverage limits.

<sup>36</sup> Some SMPs include performance standards such as impervious surface limits, vegetation management requirements, and tree protection standards that extend beyond buffers and setbacks.

You get approval from the applicants to visit the site and ask that they join you as you confirm the OHWM using Ecology's methods.<sup>37</sup> While on site, you communicate that an SDP exemption can be conditioned and that you will be requiring:

- Temporary construction fencing at the setback line to prevent impacts to the buffer,
- Tree protection fencing for the large tree in the buffer and nearest the development area,<sup>38</sup> and
- The submittal of as-built plans.

Based on your review and site visit, you find the proposal consistent with the SMP and other local codes. The project has avoided impacts, meeting the NNL requirement of the SMP. The SDP exemption can be authorized, and no additional documentation of mitigation sequencing is necessary.

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<sup>37</sup> [Determining the Ordinary High Water Mark for Shoreline Management Act Compliance in Washington State](#)

<sup>38</sup> See Tree Protection on Construction and Development Sites, A Best Management Practices Guidebook for the Pacific Northwest, [https://file.dnr.wa.gov/publications/rp\\_urban\\_treeprtctnguidbk.pdf](https://file.dnr.wa.gov/publications/rp_urban_treeprtctnguidbk.pdf).

## A new single-family residence seeking a buffer reduction

You are reviewing an application for a new single-family residence within shoreline jurisdiction. The lot is 180 feet deep and 80 feet wide. A portion of the lot is constrained by a 100-foot shoreline buffer and 10-foot buffer setback. The applicants are proposing to use an SMP provision that allows a single-family residence to reduce the buffer width by up to 25 percent without a variance (Figure 18). The SMP allows the reduction when applicants can demonstrate that mitigation sequencing has been applied and that buffer functions will not be adversely affected. In this case, the applicants are requesting the full 25 percent buffer reduction, reducing the buffer to 75 feet. The application is being processed as an exemption from an SDP.<sup>39</sup>

During review, you are unable to find documentation of mitigation sequencing, and you contact the applicants to ask what design strategies were used to first avoid and then minimize buffer impacts. You ask why a 25 percent reduction is necessary and whether a no-encroachment alternative was considered. To help the conversation, you send the applicants a checklist of design strategies for minimizing buffer impacts (see [Appendix B](#)).

The applicants are familiar with development on the lake, and they tell you that they know of property owners that have received a buffer reduction without jumping through hoops. They also question the validity of an ecological buffer when many properties, including theirs, have maintained lawns up to the shoreline edge.

There have been concerns about water quality in the lake for decades and you communicate that shoreline buffers play an important role in water quality. You tell the applicants about efforts by lakeshore property owners and the city to plant native trees and shrubs within the buffer to help reduce lake temperatures and provide wildlife habitat. You communicate that you cannot authorize the SDP exemption until it is clear how the proposal meets the specific requirements of the SMP's buffer reduction provision.

Sometime later, the applicants submit a revised site plan that shifts development landward and reorients the position of the structure to ensure development is outside of the shoreline buffer. Revisions result in a project that avoids impacts, meeting the NNL requirement of the SMP. With these changes, the applicants have sufficiently documented how mitigation sequencing will be applied to achieve NNL.

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<sup>39</sup> The SMA exempts single-family residences from the requirement for an SDP (RCW 90.58.030).

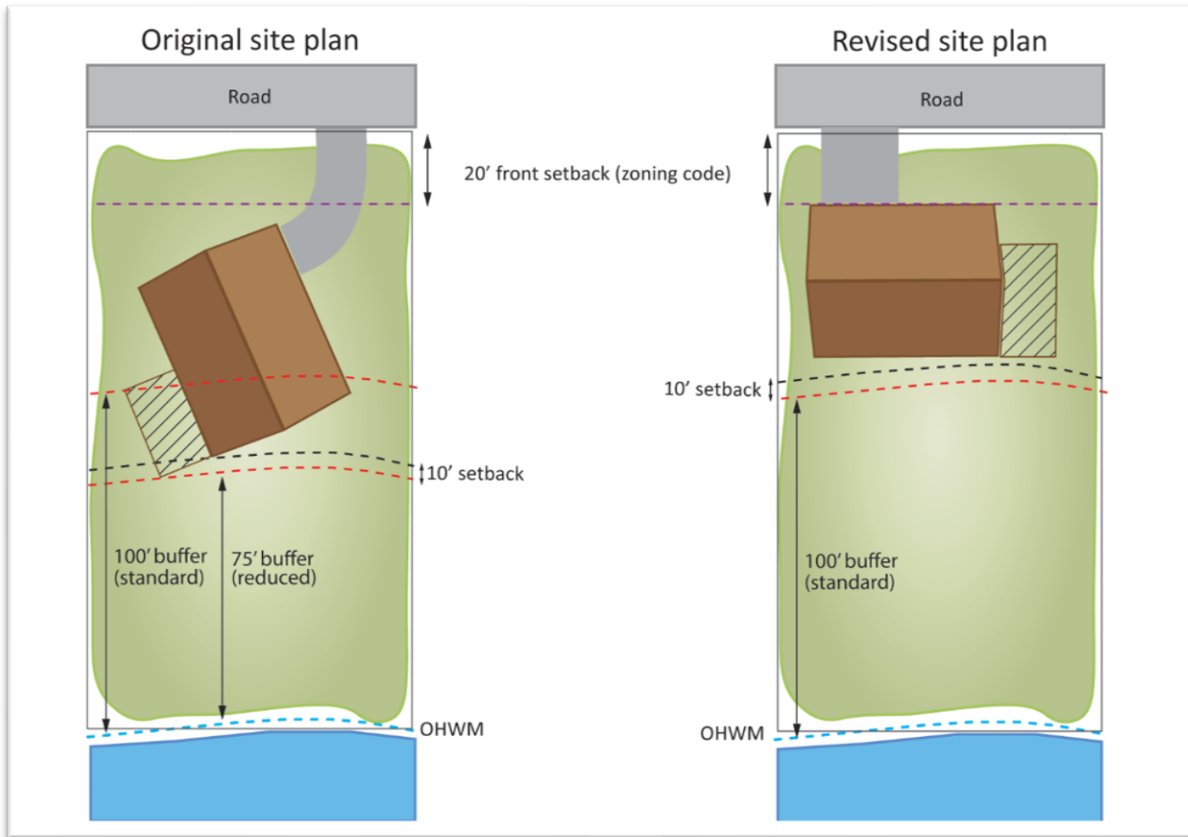


Figure 18. Changes to a site plan to avoid buffer encroachment.



## A variance request for a single-family residence

You are reviewing pre-application materials for a single-family residence in a rural residential shoreline environment. The applicants are seeking a shoreline variance (see sidebar) for an undeveloped legal lot. The small lot is constrained by a shoreline buffer. To build even a modest home would require a shoreline variance.

However, you have concerns. The proposal puts the home 25 feet from the OHWM, and you see no effort to minimize impacts through design (Figure 19). It appears the applicants skipped steps in the mitigation sequence and are proposing compensatory mitigation before first taking measures to avoid and minimize impacts.<sup>40</sup>

At the pre-application meeting you tell the applicants that you agree a variance is needed to develop the site but that you'll need documentation of how mitigation sequencing was applied to achieve no net loss. You tell the applicants this documentation should detail what avoidance and minimization design techniques will be used. During the meeting you provide a checklist of design techniques for minimizing development impacts within the buffer (see [Appendix B](#)) along with guidance for the location of shoreline mitigation sites (see Figure 12).

Sometime later, the property owners apply for a shoreline variance with substantial design changes (Figure 19).

Both the original and revised proposals require a shoreline variance. However, the revised proposal shows the complete application of the mitigation sequence, while the original does not. Included in the applicants' submittal is a list of the steps that have been taken to first avoid, then minimize, and finally compensate for impacts. The list includes the following:

- Pulling the home site farther landward.
- Retaining mature trees.
- Minimizing impervious surfaces by opting for two-story construction and an attached garage.
- Using a road pull-out for extra parking.
- Constructing a rain garden.
- Selecting a mitigation planting area nearer the shoreline edge.

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<sup>40</sup> This is also necessary for other variance criteria, such as the requirement to minimize the variance request.

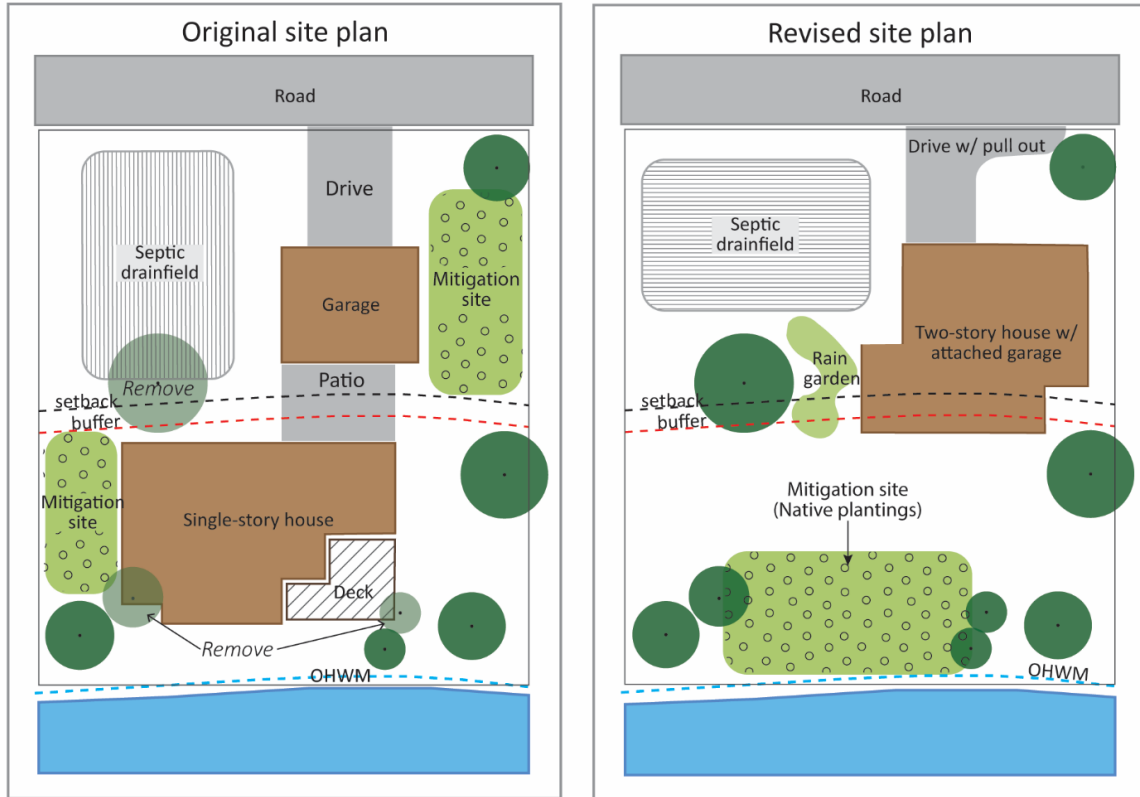


Figure 19. Design changes to a single-family residential development to minimize impacts.

Impacts are significantly less; however, the project does not avoid all development impacts to the buffer. Compensatory mitigation plantings are necessary to mitigate buffer impacts. With these changes, the applicants have sufficiently documented how mitigation sequencing will be applied to achieve NNL.

**Note:** This scenario is intended to highlight the application and documentation of mitigation sequencing. It doesn't address shoreline variance permit approval criteria related to reasonable use, hardship, design compatibility, special privilege, minimum necessary, and the public interest ([WAC 173-27-170\(2\)\(c\)](#)). When an applicant seeks relief from an SMP standard, they may be seeking relief from a regulation put in place to avoid or minimize the loss of shoreline ecological functions (e.g., buffer width, dock length, number of mooring structures, etc.). For this reason, variance permits will often benefit from an NNL analysis.

## A variance proposal to develop a small lot

You are reviewing pre-application materials for a new single-family residence on a small riverfront lot that is almost completely constrained by a shoreline buffer (Figure 20). A shoreline variance permit (see sidebar) will be needed to develop the site for residential use.

Prior to the pre-application conference, you visit the property and observe that the lot is well vegetated with mature trees, shrubs, and groundcover. You see that English ivy is prevalent and risks shading out understory plants and engulfing tree trunks and that not all trees are shown on preliminary plans, and it appears that several mature trees will be impacted by the proposal.

At the pre-application conference, you tell the applicants that it is unclear what design strategies have been employed to minimize impacts and that steps must be taken to minimize impacts before proposing compensatory mitigation. You request that the property owners submit an NNL analysis and mitigation plan and that they complete the Techniques for Avoiding and Minimizing Buffer Impacts checklist ([Appendix B](#)). You also request that a survey of existing trees be included with the variance permit submittal.

You also express concern for the applicants' plan for compensatory mitigation. They propose to plant native shrubs and trees between the home site and the river. This plan is unlikely to succeed because the site is already well vegetated and because English ivy would likely outcompete new plantings.

Sometime later the property owners apply for a shoreline variance permit with significant changes to site design and the mitigation plan (Figure 20). You note the following changes:

- The amount of new hard surface has been reduced by shrinking the footprint of structures and paved surfaces.
- Development has been shifted farther from the OHWM.
- A vegetation survey has been prepared, and revisions to site design will preserve all mature trees.
- A plan for protecting site trees during construction is included.
- Invasive species removal is proposed as compensatory mitigation and cleared areas will be replanted with native riparian vegetation.<sup>41</sup>
- The mitigation plan includes a monitoring plan with performance standards. The monitoring plan also includes a method for quantifying the percent cover of invasive weeds to determine whether performance standards are being met.
- Any construction-related impacts to the native herbaceous plants and shrubs will be rectified through replanting.

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<sup>41</sup> When developing mitigation plans, applicants should consult the state and county noxious weed lists and the [Washington Invasive Species Council web page](#) to determine which plants are of special concern in the region.

- Impacts from the septic system will be rectified by planting shallow-rooted native plants appropriate for septic drainfield landscaping.<sup>42</sup>

While impacts are less, the project will result in new impervious surfaces within the shoreline buffer. The compensatory mitigation proposed is necessary to mitigate buffer impacts. With these changes, you are confident that the applicant has sufficiently documented how mitigation sequencing will be applied to achieve NNL.

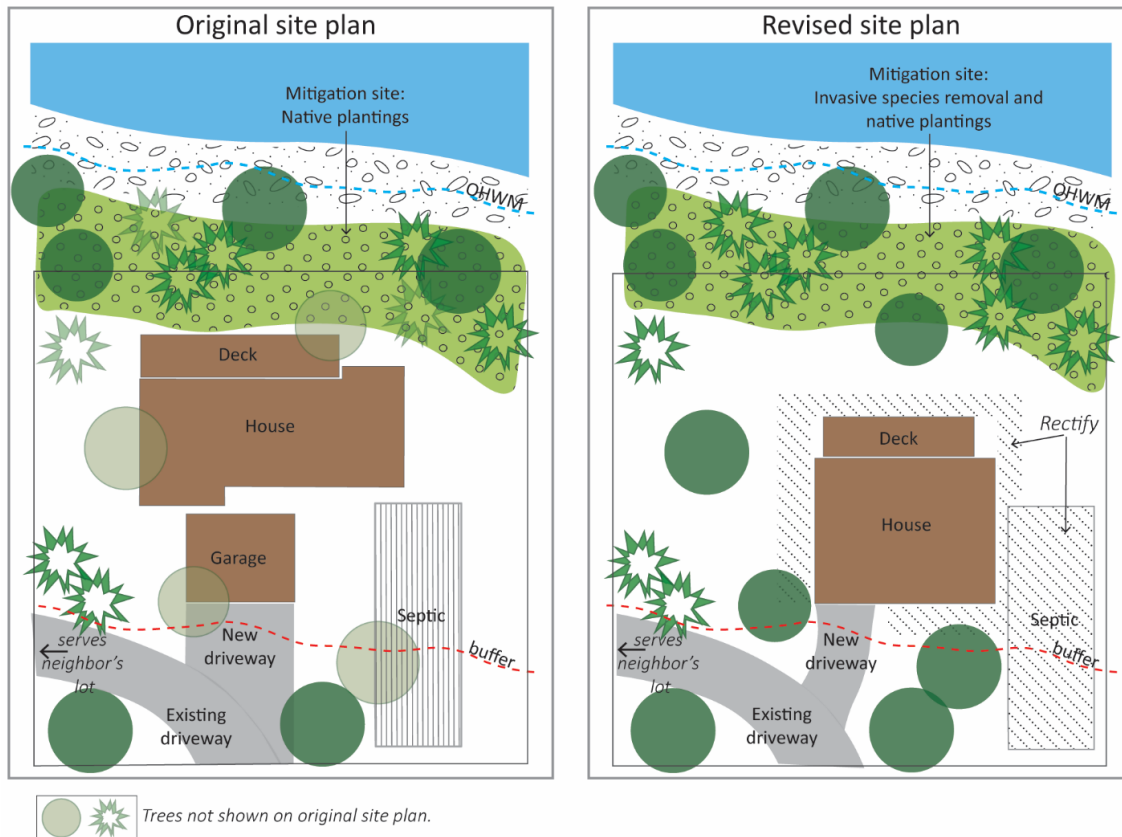


Figure 20. A small, constrained lot with limited opportunities for compensatory mitigation.

**Note:** One of the shoreline variance approval criteria requires that applicants demonstrate “that the design of the project ... will not cause adverse impacts to the shoreline environment” (WAC 173-27-170(2)(c)). This scenario focuses on compliance with this *one* requirement by highlighting the application and documentation of mitigation sequencing to achieve NNL.

This scenario doesn’t address shoreline variance permit approval criteria related to reasonable use, hardship, design compatibility, special privilege, minimum necessary, and the public interest (WAC 173-27-170).

<sup>42</sup> Recommendations for landscaping septic areas with native plants are available in some areas. These resources are provided by Washington State University County Extensions and county governments.

## A proposed water-oriented recreation business

You receive pre-application materials for a new kayak and canoe rental business that includes in-water development as well as development within and outside the 150-foot buffer. The use is allowed in the environment designation with an SDP, but only water-dependent uses are allowed within the buffer.

The applicants share an initial site plan at the pre-application meeting (Figure 21). A single structure is proposed 25 feet from the OHWM that will be used as office space, guest lounge, and boat storage. Stairs to the water and a short pier with float are proposed. The stairs incorporate a rail system for sliding watercraft up and down the steep bank. Walking paths, a driveway, and a parking area are also proposed. Mitigation areas will include invasive plant removal, revegetation of the areas with native trees and shrubs, and the installation of nesting boxes.

You tell the applicants that you're concerned the design is inconsistent with the SMP. You communicate that uses like the driveway, parking area, office, and guest lounge appear to be non-water dependent and should be located outside of the 150-foot buffer. You communicate that walking paths are allowed within the buffer if they meet SMP standards for water access trails.

The applicants ask about boat storage. They tell you that 150 feet is too far for some clients to carry a watercraft and that boat storage should be considered a water-dependent portion of the project. You agree with this assessment.

During the pre-application meeting, you request that the property owners submit an NNL analysis and mitigation plan and that they complete the Techniques for Avoiding and Minimizing Buffer Impacts checklist ([Appendix B](#)). Because outdoor lighting will be installed, you request that the NNL analysis and mitigation plan address efforts to minimize impacts to wildlife from artificial light. You also provide them with Figure 12 that provides guidance on the location of mitigation sites for buffer impacts.

The applicants ask for resources on which plants are appropriate for mitigation sites. You recommend a regionally appropriate resource from the list in this document (see section on [Mitigation planting resources](#)).

When the SDP application arrives, you see the site plan has been revised significantly (Figure 21).



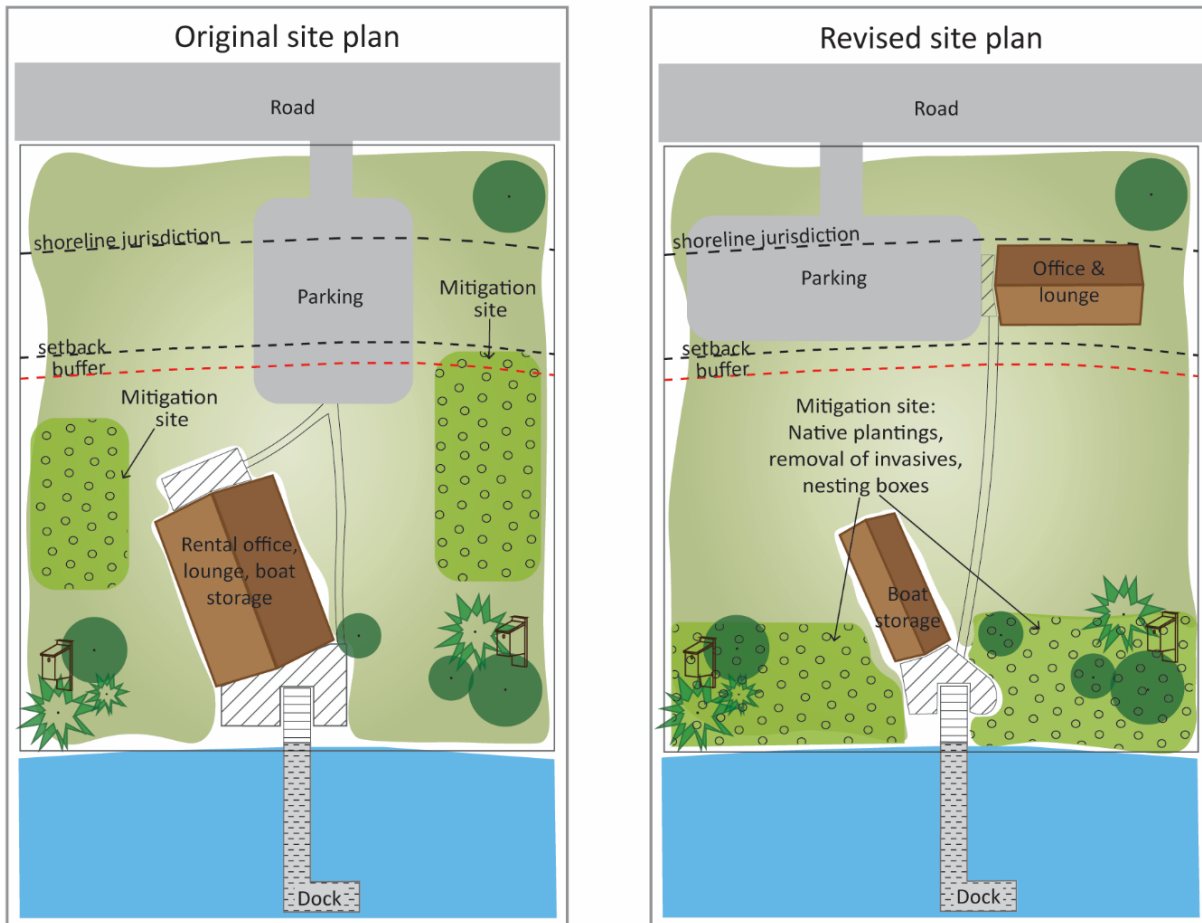


Figure 21. Proposed canoe and kayak rental business.

While the original proposal would have been difficult to approve, you're confident that the revisions show the correct application of the mitigation sequence. Plan revisions reduce, but do not avoid all impacts to the buffer and aquatic environment and compensatory mitigation is necessary. Proposed changes include:

- The applicants have separated business uses into two structures, a boat storage shed and a retail structure to be used as an office and customer lounge area.
- The revised plan shows only water-oriented uses, including the boat storage shed, dock, access stairs, and walking path, within the buffer. Parking and the office/customer lounge are outside the buffer.
- The degree of buffer encroachment has been reduced, and the mitigation area is nearer to the shoreline edge.
- Applicants have submitted a proposed lighting plan and manufacturer's cut sheets with details on the outdoor lighting to be installed. The number of total fixtures within the buffer has been minimized and all fixtures will be shielded.

## A proposed bulkhead

You receive a proposal for a new bulkhead that would be placed just landward of the OHWM to protect an existing single-family residence. The proposed bulkhead would span the entire length of the property and tie into an existing stabilization structure on the adjoining property to the south (Figure 22). No stabilization exists on the property to the north. The applicant has submitted a geotechnical report and met the burden of proof that the home is at imminent risk from erosion. Under your SMP, the project is exempt from an SDP, and although some local governments require a CUP for this modification, your jurisdiction does not.

You see that while the applicants have identified an area for mitigation plantings, they haven't submitted a site-specific analysis of what shoreline functions will be impacted by the proposed stabilization structure or documentation of how mitigation sequencing was applied. You also note that the geotechnical report does not fully assess the feasibility of passive techniques, in this case relocating the house landward or planting native vegetation for erosion control. Nor did the geotechnical report assess what level of protection soft shore or hybrid stabilization techniques would provide.

As part of your review, you visit the site. While onsite you determine the OHWM using Ecology's methods<sup>43</sup> and find it to be farther landward than what is depicted on the applicant's original site plan. You communicate the inconsistency to the property owners, showing them the indicators you used to make the OHWM determination, in this case the landward extent of persistent vegetation and the landward edge of log drift piles.

You request additional information from the applicants, including a site-specific NNL analysis that evaluates the site's shoreline functions and demonstrates NNL through the application of mitigation sequencing. You recommend that the applicant consult their local Ecology Shoreline Specialist or Conservation District office for site-specific resources on soft-shore alternatives.<sup>44</sup> You also communicate that plans must be revised and resubmitted to show the correct location of the OHWM.

Sometime later, the applicants submit additional documents, including revisions to the geotechnical report that assesses passive and soft shore options for the site, an NNL analysis and mitigation plan, and revised site plans (Figure 22). Substantial changes have been made, including:

- The OHWM has been correctly demarcated.
- The applicants have documented that relocating the home farther landward is not feasible because the lot is narrow, and a septic drain field is located landward of the existing home site.

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<sup>43</sup> Determining the Ordinary High Water Mark for Shoreline Management Act Compliance in Washington State, <https://apps.ecology.wa.gov/publications/documents/1606029.pdf>

<sup>44</sup> On Puget Sound, applicants may consult a local [Shore Friendly contact](#).

- The proposed bulkhead has been pulled farther landward, and total length has been reduced.
- A pocket beach has been added into the design that incorporates both hard and soft materials, including native vegetation.

Special reports for the project give you a clear sense that the proposal is consistent with the mitigation sequence. With fewer impacts overall, compensatory mitigation can be accomplished onsite. The addition of a pocket beach will provide ecological benefits by converting an area that was maintained lawn to native plantings.

With these changes, you are confident the applicants have documented how mitigation sequencing will be applied to achieve NNL. Your site visit was crucial to effectively implementing the SMP. Without it, you may have incorrectly approved the placement of a bulkhead many feet waterward of the OHWM, resulting in much higher losses to shoreline functions.

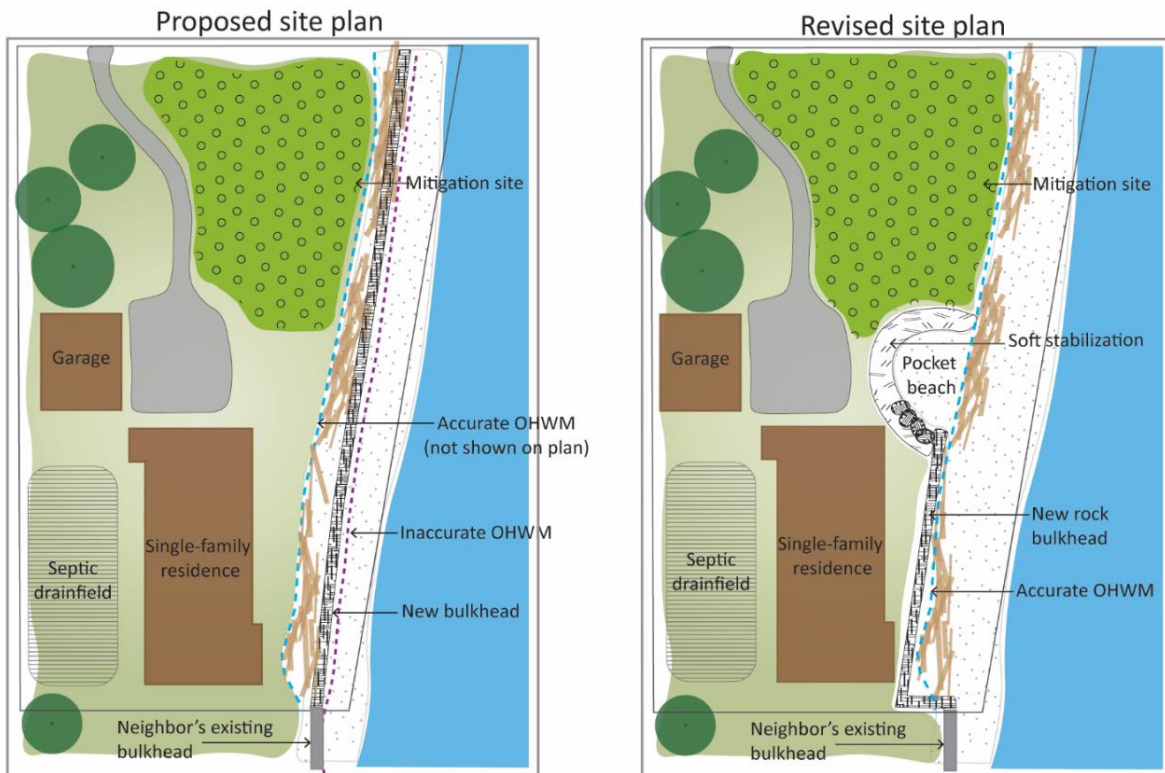


Figure 22. Site design changes to a shoreline stabilization project.

**Note:** For shoreline stabilization proposed on **marine shorelines**, advise applicants to use WDFW's [Marine Shoreline Design Guidelines](https://wdfw.wa.gov/publications/01583)<sup>45</sup>. For stabilization proposed on streams, advise applicants to use [WDFW's Integrated Streambank Protection Guidelines](https://wdfw.wa.gov/publications/00046)<sup>46</sup>.

<sup>45</sup> <https://wdfw.wa.gov/publications/01583>

<sup>46</sup> <https://wdfw.wa.gov/publications/00046>

## A new residential dock with no proposed compensatory mitigation

A property owner has applied for an SDP to construct a single-use dock (Figure 23). The site is on a lake where docks are an allowed use and somewhat common. The lake is also home to rainbow trout, a species identified on the Washington Department of Fish and Wildlife's (WDFW) online Priority Habitat and Species Maps, [PHS on the web](#). You see that the site includes a single-family residence, appurtenant structures, and a maintained yard of mowed grass and ornamental plantings.

The applicant is not proposing development landward of the OHWM and states that dock access will be through the maintained lawn. The applicant's environmental consultant has submitted a memo stating that NNL will be achieved without compensatory mitigation because:

1. No trees or vegetation will be removed from the buffer, and
2. The proposal meets SMP standards for dock dimensions, materials, lighting, and skirting.

The consultant asserts that dock performance standards are self-mitigating and that because they can be met, additional documentation is unnecessary.

You disagree and request a site assessment report (your community's term for an NNL analysis) that addresses whether impacts to fish habitat will occur and, if so, how mitigation sequencing will be applied to achieve NNL. You show the applicant the SMP provisions that trigger a site assessment report, including:

1. A dock use standard that states that any adverse impacts of the proposed dock shall be adequately mitigated.
2. A provision that specifies that FWHCAs include those areas identified as Priority Habitat and Species Areas by the WDFW.
3. A provision that requires a site assessment report for developments proposed within or near a FWHCA.

In addition, you share with the applicant Figure 13 and information on the impacts of overwater structures and common mitigation strategies (starting on page 41).

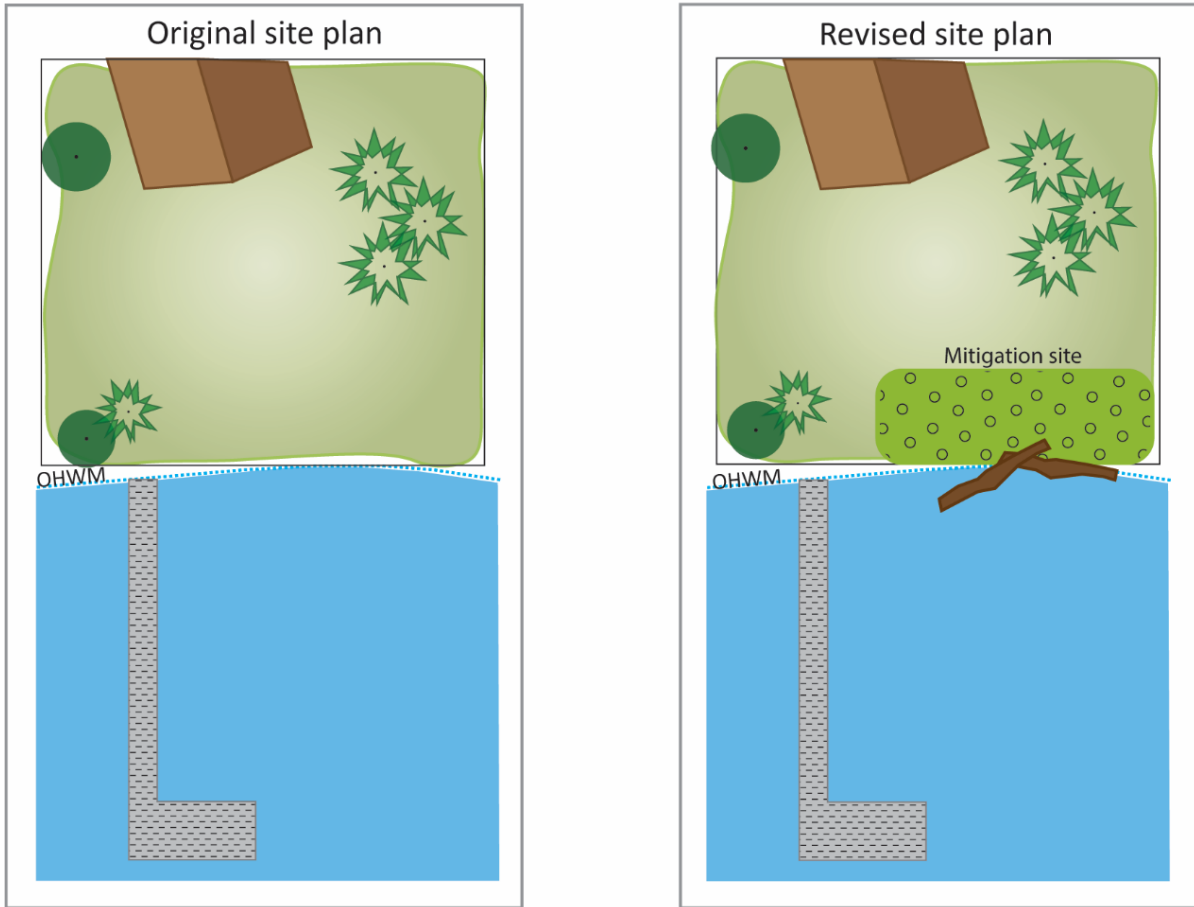


Figure 23. Plans for a new dock are revised to include compensatory mitigation.

Shortly thereafter, the applicant submits a site assessment report that includes a mitigation plan. Revisions include:

- The installation of a large woody material habitat feature.
- A mitigation planting area near the shoreline edge that will include native shrubs and trees.

With these changes, you're confident the applicants have fully applied the mitigation sequence to achieve NNL.



## A dock proposal that will remove an existing overwater structure

You receive a proposal to remove an existing dock and construct a new one (Figure 24). The proposed dock will be narrower but total length will remain the same. Proposed dimensions will bring the dock into compliance with current SMP regulations, and the project can meet all other performance standards.

A dive survey has found submerged aquatic vegetation native to Washington state, such as native eelgrass (*Zostera marina*), in waters on the eastern portion of the site near the existing dock. As a result, the applicant proposes to construct the new dock thirty feet west of the current location in an area where vegetation does not exist. When built, the new dock will be an improvement over the existing structure in the following ways:

- Light-transmissible decking will replace wooden boards,
- Eight steel piles will replace 12 creosote piles,
- The total area of over-water coverage will be reduced, and
- The new location will avoid native vegetation.

Upon review, you determine that impacts have been avoided and that replacement should improve existing habitat and water quality conditions at the site. Although removal of the existing dock is required by the SMP, it is also a mitigation action. You're confident the applicant has documented how the mitigation sequence will be applied to achieve NNL.

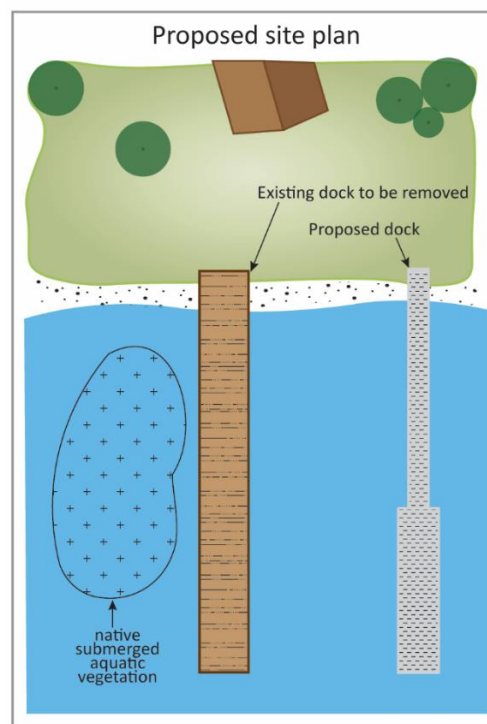


Figure 24. An existing dock is removed and a new one built.

## A park redevelopment project

The local Parks Department is redesigning a lakefront park. The project is extensive and includes new trails, a dock, a children's play area, bathrooms/changing rooms, a swim area, a boathouse, and a splash park (Figure 25). A great deal of community input went into the proposed design, and there is political support for the project. The Planning Department has not publicly commented on the conceptual plans shared during the community engagement process.

Recently, the Parks Department applied for a pre-application meeting to discuss the permitting process. You are relieved to see that the site has ample opportunities to mitigate permanent impacts and that the proposal includes both a mitigation planting site and voluntary shoreline restoration. You also see that the proposal avoids the removal of existing trees. However, you are concerned that some of the uses proposed within the shoreline buffer are inconsistent with the SMP.

At the pre-application meeting, you tell the project manager that three uses should be relocated outside of the buffer, including the splash park, play area, and bathrooms/changing rooms, because they are non-water oriented. You communicate that the other uses proposed within the buffer are water-oriented, including the boathouse, dock, swim area, and trails.

The concept plan has community buy-in, and the Parks Department pushes back on the idea of making revisions. The project manager wants to know why the site's use as a park, which is an allowed use in the environment designation, needs to be further broken down into component elements.

You explain that limiting uses that aren't preferred under the SMA is key to achieving NNL within the shoreline jurisdiction. Ensuring that only water-oriented components of the park proposal are authorized within the buffer or waterward of the OHWM minimizes impacts to shoreline functions. Those uses allowed within the buffer and waterward of the OHWM will need to demonstrate NNL.

Soon thereafter, the Parks Department sends you a revised concept plan and asks for feedback (Figure 25). The plan shows the bathroom/changing room, play area, and splash park outside the buffer, along with a new mitigation planting site near the proposed dock. You confirm that the uses proposed within the buffer and waterward of the OHWM are consistent with the local SMP and that an NNL analysis and mitigation plan will be needed to address impacts from the new dock, swim area, boat house, and all trail segments within the buffer.

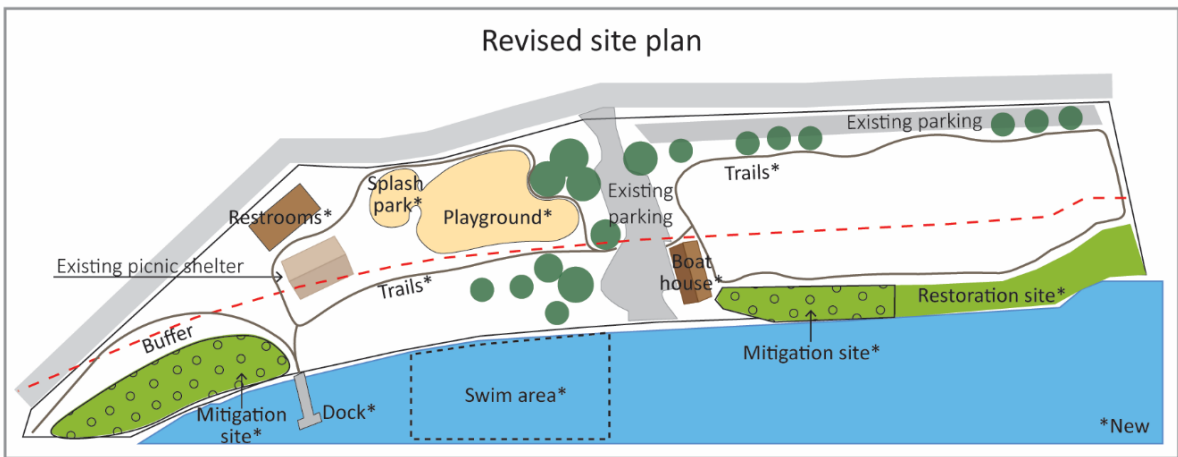
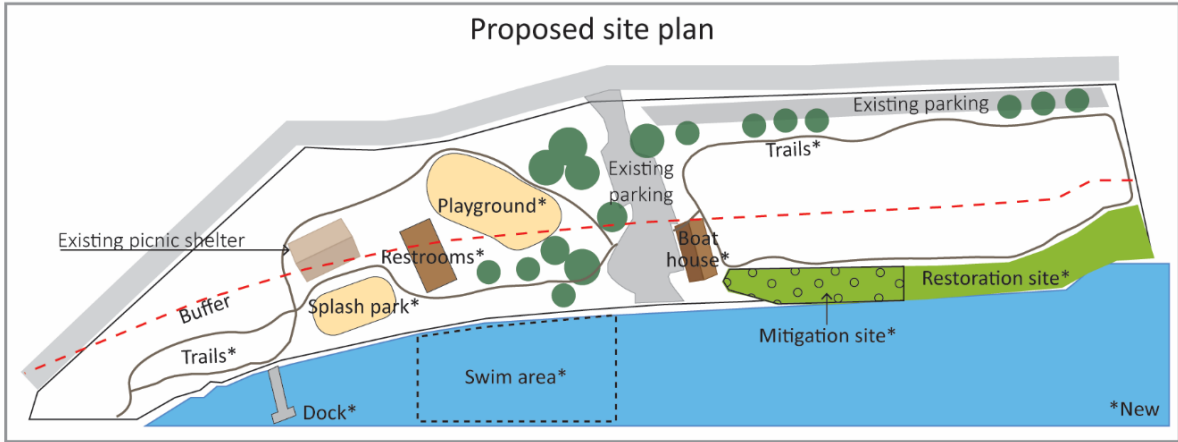


Figure 25. Park redevelopment.

## A proposal to expand a cabin within the buffer

You are reviewing application materials for a proposal to remodel and enlarge a cabin on a small waterfront lot. The proposal is exempt from the SDP process but, because the cabin is a nonconforming structure (located entirely within the shoreline buffer), your SMP requires the applicants to seek approval through a shoreline CUP (see sidebar).<sup>47</sup>

Existing impacts at the site include a driveway, the cabin, and a septic system (Figure 26). The site has a few mature trees and some areas of lawn but is otherwise unvegetated.

The applicants propose a new residence with a slightly larger footprint, a pervious paver driveway, and to retain the existing septic system (Figure 26). The applicants are showing a shoreline access pathway on plans that meets SMP requirements for a water access trail.

Consistent with your SMP, the plans show no waterward expansion of development. However, your SMP only allows the expansion of nonconforming residences when NNL can be achieved.

The submittal includes a NNL analysis and mitigation plan submitted by a qualified professional. To compensate for impacts, the applicants propose to plant native vegetation between the new home and the shoreline's edge. Onsite mitigation is possible because the site is previously developed, and applicants have minimized the impacts of new development.

You're confident the applicant has documented how mitigation sequencing will be applied to achieve NNL. You contemplate what conditions of approval might be necessary to further ensure the success of the proposed mitigation. You decide to require a notice to title and a Nootka Rose hedge to identify the location of the mitigation site.

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<sup>47</sup> Local SMPs typically develop their own approach to nonconforming structures. For this reason, there is considerable variation between local governments in how nonconforming structures are regulated within the shoreline jurisdiction. This scenario may not be allowed by your SMP's nonconforming provisions and/or the permitting pathway used in this scenario may not be what's required by your SMP.

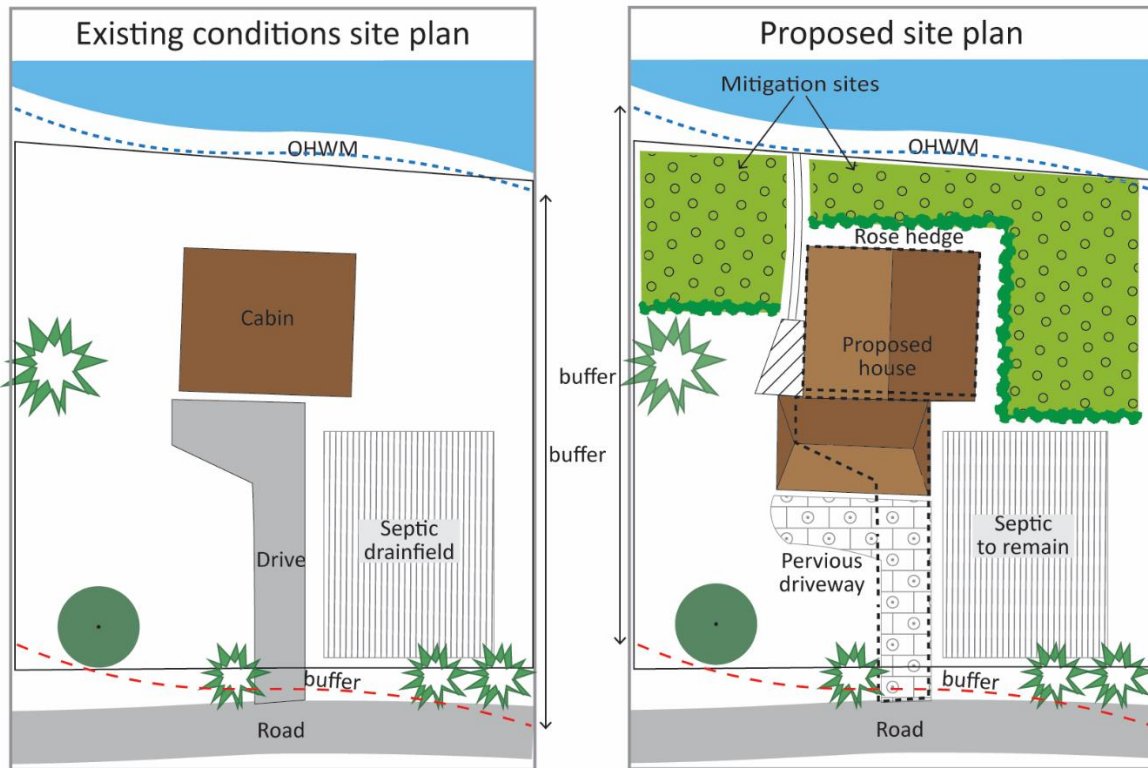


Figure 26. The expansion of a nonconforming residential structure.

**Note:** While this scenario doesn't provide guidance on how to review a project for consistency with the shoreline conditional use permit approval criteria of WAC 173-27-160, two criteria relate directly to NNL.

First, WAC 173-27-160(1)(a) requires applicants to demonstrate consistency with the "policies of RCW 90.58.020 and the master program." Amongst others, your SMP includes policies that assure NNL (WAC 173-26-201(2)(c)) consistent with the policy of the SMA (enunciated in RCW 90.58.020).

Second, WAC 173-27-160(1)(d) requires applicants to demonstrate "That the proposed use will cause no significant adverse effects to the shoreline environment in which it is to be located."

## A commercial redevelopment project

You are reviewing application materials for a commercial redevelopment project that would replace an existing restaurant and accessory parking with a mixed-use development (retail and residential) with a combination of underground and surface parking (Figure 27, proposed site plan). The parcel is a fill site that is heavily armored with rip rap and almost completely impervious (Figure 27, existing condition site plan). The proposed use is allowed in the high intensity shoreline environment designation with a 75-foot shoreline setback.

Your primary concern is whether applicants are correctly applying the mitigation sequence to achieve NNL. Besides complying with landscaping requirements along the street frontage required by the zoning code, the applicants are not proposing any changes that will improve the shoreline area. You see that the proposal doesn't change the area of the shoreline setback covered by hard surfaces.

You ask the applicant to explain their plans for the area that is currently the restaurant. They confirm it will be hardscaped as a public path and outdoor terrace. You explain that while the proposed use of the setback complies with the SMP, the plan to hardscape the entire area does not appear to comply with requirements to apply the mitigation sequence for new development within the setback. You encourage the applicants to integrate native plants into the design of the outdoor space and especially those that will overhang the existing rip rap armoring.

When revised site plans arrive, you're pleased to see the public outdoor space has been reimagined (Figure 27, revised site plan). The area will be landscaped with native plants including bushy shrubs that will overhang the bulkhead. With this change, you're confident the NNL requirement of your SMP can be met.





Figure 27. The redevelopment of a commercial property.

## A new single-family residence within a wetland buffer

You are reviewing pre-application materials for a new single-family residence on a shoreline site that is almost completely encumbered by a wetland, wetland buffer, and shoreline buffer (Figure 28). The site is currently undeveloped and heavily forested with native vegetation.

During the pre-application conference, the applicants share a proposed site plan that documents their efforts to minimize development impacts (Figure 28, proposed site plan). The applicants propose to:

- Build a comparatively small house;
- Avoid accessory structures;
- Locate development as far from the wetland and shoreline's edge as possible (requiring applicants to seek a variance from the zoning code's front-yard setback standard); and
- Reduce driveway/parking areas.

Opportunities to compensate for unavoidable impacts are limited at the site, and achieving NNL through onsite mitigation alone may not be possible. You encourage the applicants to consider a combination of onsite and offsite mitigation and tell them about a wetland mitigation bank in the area.

Sometime later, the owners apply for an SDP exemption and shoreline variance permit (see sidebar).<sup>48</sup> Their submittal includes an NNL analysis and mitigation plan. The following onsite and offsite mitigation is proposed:

- A split rail fence will be placed outside the developed area, helping to identify and protect the buffers.
- A conservation covenant will be placed on the property waterward of the fenced area.
- Impacts from the septic system will be rectified by planting shallow-rooted native plants appropriate for septic drainfield landscaping.<sup>49</sup>
- Trees removed during development will be placed as habitat features within in the buffers.
- Songbird nest boxes will be placed within the buffer.
- Tires dumped near the shoreline's edge will be removed.
- Credits will be purchased at a wetland mitigation bank.

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<sup>48</sup> Applicants will not be applying for a separate critical areas permit because the wetland is within shoreline jurisdiction, where impacts are regulated solely by the SMP.

<sup>49</sup> Recommendations for landscaping septic areas with native plants are available in some areas. These resources are provided by Washington State University County Extensions and county governments. Check with your local health department for restrictions.

The project can meet the NNL requirement because a combination of onsite and offsite mitigation will be used. It's unlikely you could approve the project if offsite mitigation were unavailable to compensate for impacts to the wetland buffer. This is because the space and opportunity to meet your SMP's ratio-based mitigation requirements for wetland buffer impacts is not available at this site. At the same time, wetland mitigation banks are not designed to compensate for the loss of shoreline ecological functions. For this reason, the ability to provide onsite mitigation in the form of onsite shoreline buffer enhancement was critical to the project's achieving NNL. Remember, projects that cannot meet the NNL requirement of the SMA and your SMP are properly denied.

**Note:** One of the shoreline variance approval criterion requires that applicants demonstrate “that the design of the project ... will not cause adverse impacts to the shoreline environment” (WAC 173-27-170(2)(c)). This scenario focuses on compliance with this *one* requirement by highlighting the application and documentation of mitigation sequencing to achieve NNL.

This scenario doesn't address shoreline variance permit approval criteria related to reasonable use, hardship, design compatibility, special privilege, minimum necessary, and the public interest (WAC 173-27-170).

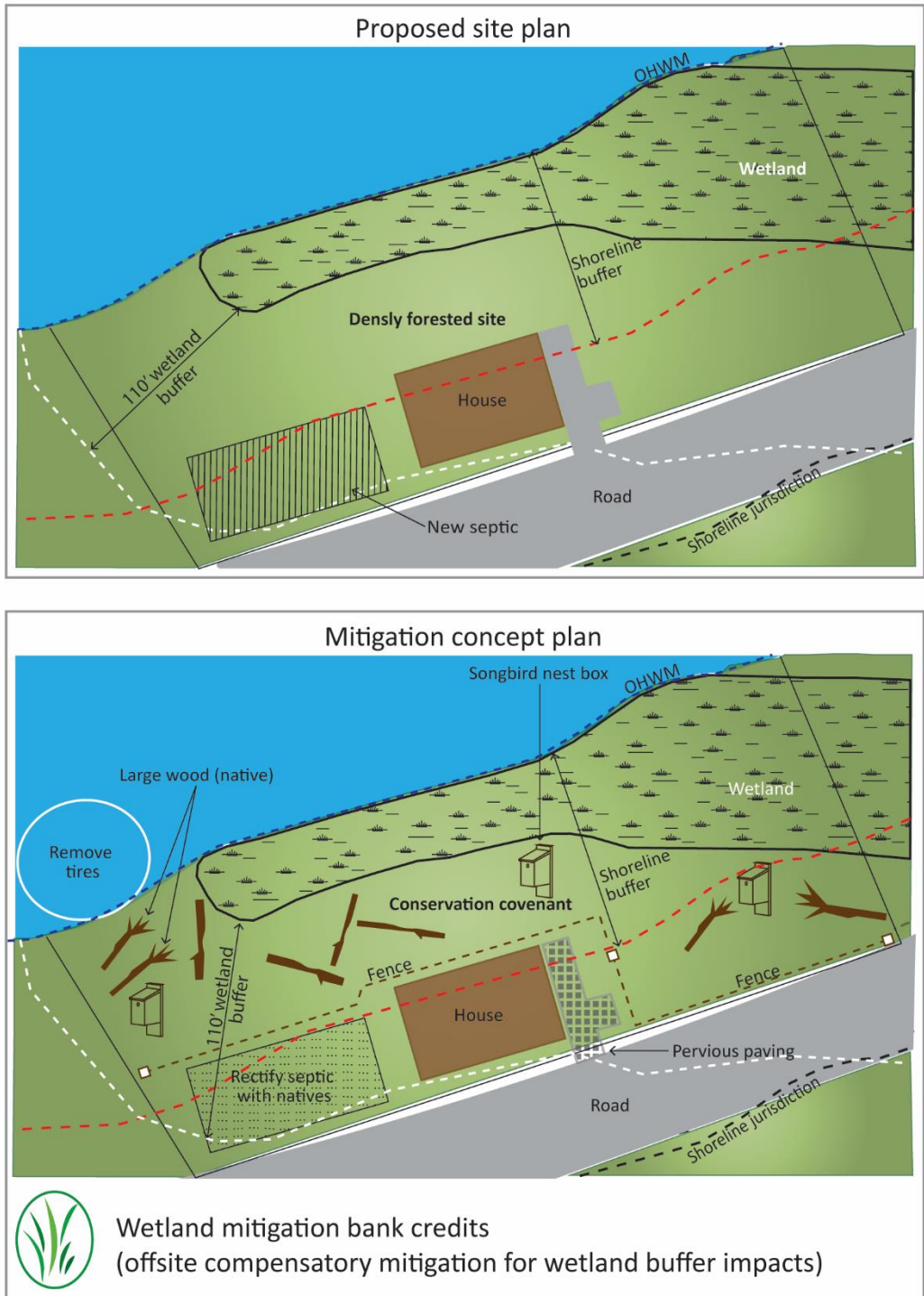


Figure 28. A project that requires onsite and offsite mitigation.

# Mitigation Plan Basics

A mitigation plan lays out how an applicant proposes to mitigate shoreline impacts and is developed by a qualified professional. The initial submittal is considered a **proposed** mitigation plan and is subject to review and approval by the jurisdiction along with the rest of the application.

[Appendix A](#) lists recommended components for an NNL analysis and mitigation plan and can be used during the permitting process by local governments that haven't adopted specific requirements.

## Performance standards

Performance standards are a necessary component of a mitigation plan. They are used to:

- Help determine the parameters to be monitored and data to be collected during monitoring. Data collection efforts should focus on determining whether performance standards are being met.
- Determine whether a mitigation project is achieving its objectives.
- Document a desired state, threshold value, or amount of change necessary to indicate that a particular function is being performed or structure has been established as specified in the design.

During initial review of a proposed mitigation plan, ensure that the submitted document includes performance standards that are clear, achievable, and directly linked to ecological success. For example:

In year 1, survival of planted woody vegetation at the mitigation site will be 100%. If all dead plantings are replaced, the standard will be considered met.

Performance standards are also commonly referred to as success criteria, success measures, standards of success, performance metrics, and success standards. It is also important to consider the following:

- Performance standards must be site specific and project specific and should be tailored to the goals and objectives of a site's mitigation plan.
- Regulatory requirements must be enforceable. Therefore, performance standards need to be meaningful, measurable, and achievable by the methods and in the timeframe identified.
- Consider the amount of effort that will be necessary to effectively monitor and manage the site when developing standards. Complex standards may add significant monitoring effort without significant benefits.

## Key components of good performance standards

As you review proposed mitigation plans, keep in mind this list of the key components of good performance standards.

- **Indicators:** They identify what will be monitored, such as woody vegetation, invasive species, canopy cover, etc.
- **Attributes:** They identify what aspect of the indicator will be monitored, such as plant survival, percent cover (e.g., of vegetation), size (e.g., of riparian buffer), or percent area (e.g., cleared of invasive species).
- **Actions:** They identify the verb, such as plant and preserve, will not exceed, remove, and will have.
- **Quantities/Status:** They identify the amount of change or the desired level the attribute should reach, such as achieving X% of total aerial cover of trees and shrubs, or identify a maximum percent cover for invasive species.
- **Time frames:** They identify when the quantity/status should be achieved or at what time the effectiveness of management of the site should be evaluated. Performance standards should be included for interim years in addition to the beginning and end of the monitoring period. It is important to note that when mitigation is first installed (e.g., year zero) performance standards typically don't apply. Following installation, an applicant submits an as-built mitigation report but generally does not need to address performance standards until year one.
- **Locations:** They identify the geographical area where the indicator will be monitored, such as a particular mitigation site or a sub-area within the mitigation site.

Examples of poor performance standards are those that are too general, too easy to attain, cannot be measured and therefore cannot be used to evaluate success, contain confusing or ambiguous language, or are unachievable.

## Permanently protecting mitigation sites

Whenever compensatory mitigation is required, local governments should consider whether there is a need for one or more mechanisms that will ensure that the mitigation site is known to future property owners and/or is permanently protected. This will often be the case. If so, the specific mechanism or mechanisms are typically required as a condition of approval, and evidence of completion is required. Common mechanisms include:

- Signage identifying mitigation site as a protected area.
- Notice on title (evidence is a copy of the recorded notice).
- Conservation easement (Provides legal protection in perpetuity. Can be between the property owner and the local government or a non-profit conservation organization. Easements are recorded and run with the land.).



- Perpetual maintenance agreement between jurisdiction and property owner (recorded and runs with land).
- Dedication of property (the giving of land by a private owner/entity to a government entity as a condition of a real estate development).

## Financial assurance

There is a risk that permittees will not successfully complete the mitigation they are responsible for. To address this risk, local governments can require a financial assurance mechanism that is tied to the successful implementation of a mitigation plan. This has become a common best practice in environmental permitting.

The most common form of financial assurance is a performance bond but other mechanisms are used (e.g., letters of credit, escrow accounts, insurance, etc.). In this context, a performance bond is a contract between a bonding agency (also called a surety company) and a local government that guarantees that if an applicant fails to perform the required mitigation, the bonding agency will either perform the work or pay the amount of the bond so the local government can correct or complete the mitigation.

The amount of the financial assurance is tied to the estimated cost of the mitigation project (installation, maintenance, and monitoring). Typically, the financial assurance should be more than 100% the estimated cost.<sup>50</sup> For example, a bond could be for 125% or 150% the cost of completing a mitigation plan.

Financial assurances should be in place prior to an applicant commencing permitted work. A financial assurance is released when all project performance standards have been met. In some cases, financial assurances can be phased out as a mitigation project meets performance milestones.

Some local governments have developed boilerplate agreements for financial assurances and worksheets for estimating the cost of mitigation. The City of Redmond and Whatcom County have made these applicant resources available online.

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<sup>50</sup> Financial assurances should be more than 100% the estimated cost of site installation, maintenance, and monitoring. This cushion accounts for the increasing cost of materials and labor over time.

## Mitigation planting resources

Identify one or more regionally appropriate resource that you can share with applicants who will be installing native plantings, such as:

- [Native Plant Guide for Western Washington Yards](#), King County (includes sample planting plans)<sup>51</sup>
- [Riparian Plant Guide](#), Chelan County Natural Resources Department<sup>52</sup>
- [Riparian Planting Mitigation Plan Requirements](#), US Army Corps of Engineers Seattle District (Note: Includes lists of native plants appropriate for mitigation in Western Washington, Eastern Washington, and saltwater environments<sup>53</sup>
- [Streamside Planting Guide for Western Washington](#), published by the Cowlitz Conservation District, Harza Northwest Inc., and Pierce Conservation District<sup>54</sup>
- [Trees and Shrubs for Riparian Plantings](#), Natural Resources Conservation Service Washington and USDA (statewide resource with planting recommendations by major land resource area)<sup>55</sup>

## Mitigation pitfalls

When reviewing a proposed mitigation plan, there are a few things local governments should watch out for. When one of the pitfalls listed below is identified, communicate the problem to the applicant. Make it clear that resolution to the issue is needed before staff can approve, or recommend approval of, the proposed project.

- **Double-counting mitigation:** If a project has multiple impacts, each impact must be mitigated fully. The same mitigation cannot be used to compensate for multiple impacts. For example, if impact A requires 1,000 sf of shoreline plantings to fully mitigate for the impact, and impact B requires 500 sf of plantings, then there will need to be 1,500 sf of plantings to achieve NNL.
- **Quality of mitigation site chosen:** If an applicant proposes shoreline plantings for mitigation, but the mitigation site is already well vegetated with native vegetation, then this is not an appropriate location for mitigation plantings. This location is already highly functioning, so there will be no ecological lift to offset the ecological loss caused by the

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<sup>51</sup> <https://your.kingcounty.gov/dnrp/library/water-and-land/yard-and-garden/native-plant-guide-western-washington.pdf>

<sup>52</sup> [http://www.co.chelan.wa.us/files/natural-resources/documents/Outreach/riparian\\_booklet\\_lowres.pdf](http://www.co.chelan.wa.us/files/natural-resources/documents/Outreach/riparian_booklet_lowres.pdf)

<sup>53</sup>

<https://www.nws.usace.army.mil/Portals/27/docs/regulatory/permit%20guidebook/Mitigation/Riparian%20Planting%20Mit%20Plan%20Requirements%204-20-17.pdf?ver=2017-04-20-180500-970>

<sup>54</sup> <https://s3.wp.wsu.edu/uploads/sites/2079/2015/06/streamside-planting-guide-for-western-washington.pdf>

<sup>55</sup> [https://www.nrcs.usda.gov/Internet/FSE\\_PLANTMATERIALS/publications/wapmstn13160.pdf](https://www.nrcs.usda.gov/Internet/FSE_PLANTMATERIALS/publications/wapmstn13160.pdf)

impact. An appropriate location would have little to no existing native vegetation or poor-quality vegetation.

- **Temporal loss:** If there is a time delay between when the impact occurs and when the mitigation will occur or reach full function, then there will be a temporal loss of ecological function. Common ways to compensate for temporal losses are to increase the quantity of mitigation higher than a 1:1 mitigation-to-impact ratio. For example, if an applicant is mitigating for the removal of large trees, it will take years for the newly planted trees to reach the same level of function as the removed trees. A replacement ratio is commonly used to address temporal loss (e.g., planting X number of new trees for every one large tree removed). Your SMP may have specific replacement ratios but if not, an applicant's NNL analysis should address how temporal losses will be compensated.
- **Quantifying out-of-kind mitigation:** It can be hard to determine what quantity of out-of-kind mitigation is needed to achieve NNL. For example, if someone is proposing a new dock and plans to plant native vegetation in the shoreline buffer as mitigation, how much planting area should be required? We recommend considering the functions that will be impacted by the proposed project and the types of functions that will be created or enhanced by the proposed mitigation (Pages 38 through 45). Looking at the impact and mitigation on a function-by-function level can help compare impacts and mitigation to determine NNL.

## Careful and Complete Implementation

While all comprehensively updated SMPs are consistent with the NNL requirement, NNL will be met only when SMPs are carefully and completely implemented. As you administer your SMP, understand that your responsibility is to ensure that authorized activities within the shoreline correctly apply mitigation sequencing.

All local approvals within shoreline jurisdiction must be consistent with the SMP. This requirement is not limited to actions requiring a shoreline substantial development permit (SDP), shoreline conditional use permit (CUP), or variance permit.<sup>56</sup> If no shoreline permit is necessary, SMP consistency review will typically be completed through the local process for authorizing an exemption from an SDP. However, SMP consistency review may occur in conjunction with other local authorizations (e.g., change-of-use/occupancy permits, sign permits, authorizations to remove vegetation, plat approvals, business licenses, demolition permits, special event permits, etc.).

Consider whether your jurisdiction has a process for completing an SMP consistency review for all local approvals within shoreline jurisdiction, even if a shoreline permit or exemption from an SDP is not required.

### **Remember BMPs!**

Construction site best management practices (BMPs) related to stormwater, surface water, and other development impacts (e.g., tree protection, wind erosion, waste management, etc.) can often be overlooked when reviewing shoreline development. Ensuring that BMP standards are included in project plans and implemented in the field is critical to avoiding and minimizing impacts. BMPs establish safe work windows, preserve vegetation, mark clearing limits, establish a stabilized construction access, stabilize soils, protect slopes, stabilize channels and outlets, control pollutants, and much more. Project review should ensure that BMPs are adequate and that construction site inspections are scheduled to ensure proper installation.

## The importance of site visits

It's hard to overstate the importance of conducting a site visit for proposed shoreline developments. Careful and complete SMP implementation requires an accurate understanding of current site conditions. This includes the identification of onsite and nearby critical areas and a correct OHWM determination. Ecology provides technical assistance to local governments in

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<sup>56</sup> WAC 173-27-140 states that "No authorization to undertake use or development on shorelines of the state shall be granted by the local government unless upon review the use or development is determined to be consistent with the policy and provisions of the Shoreline Management Act and the master program."

determining the OHWM and the presence of wetlands. Contact your Ecology [shoreline permit reviewer](#)<sup>57</sup> for assistance.

## Is the NNL requirement working?

Understanding whether the NNL requirement is being achieved requires efforts at two levels.

First, it requires local governments to continuously improve SMP implementation to ensure policies and regulations designed to achieve NNL are being carefully and completely implemented. We recommend that local governments develop a permit monitoring system that:

1. Collects information on whether authorizations within shoreline jurisdiction are consistent with the SMP and whether built projects comply with issued permits and authorizations (a step known as permit implementation monitoring); and
2. Analyzes this information over time to answer questions about how effectively the SMP is being implemented through the permit system (a step known as effectiveness monitoring).

Monitoring may shed light on SMP implementation gaps that local governments can address by modifying the permit system. For example, local governments may adjust the permit system by revising application forms, training staff, writing administrative interpretations, and/or by revising policies and regulations. Once new changes are put in place, monitoring will provide feedback on whether changes improved SMP implementation. This feedback loop is known as adaptive management. For more information on permit monitoring and regulatory adaptive management see the Department of Commerce's [Critical Areas Handbook, Chapter 7](#).

Second, answering questions about NNL requires scientific investigations that seek to answer general ecosystem questions about whether shoreline ecological functions have been negatively impacted by shoreline development. This step is called validation monitoring and it is typically conducted regionally or as part of a particular scientific study. Validation monitoring is probably beyond the resources of most local governments (Commerce 2018).

Validation monitoring efforts will ultimately answer questions about whether NNL is being achieved. However, without first knowing how carefully and completely local SMPs are being implemented, it will be unclear how to translate the results of validation monitoring. In other words, how will Ecology know what needs to be fixed in its SMP guidelines without knowing whether local government SMP regulations are being carefully and completely implemented?

Importantly, some ecological indicators of shoreline health, like water quality and salmon run numbers, are impacted by activities within and outside of shoreline jurisdiction. Impacts from upland land uses, ocean acidification, drought, climate change, wildfires, landslides, pollution,

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<sup>57</sup> Find your community's shoreline permit review staff on Ecology's Shoreline Management Contacts webpage, <https://ecology.wa.gov/Water-Shorelines/Shoreline-coastal-management/Shoreline-coastal-planning/Contacts>.

and other pressures, both human and natural, cannot be mitigated and managed by shoreline regulations alone. This means that declines in some indicators of shoreline ecological health can occur even while local governments are correctly applying the NNL provisions of their SMPs.



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# Appendix A. Recommended Components: No Net Loss Analysis and Mitigation Plan

## Project description

- Describe the nature and intensity of the proposed use or activity in sufficient detail to allow analysis of the effect of the land use change on shoreline habitat and functions.

## Existing conditions

- Identify and assess existing conditions at the project site including its physical and biological characteristics using a combination of text, maps, and plans.
- Describe the ecological functions of the existing conditions and how they contribute to the shoreline. This may require the consideration of these ecological functions within the larger system.
- Include site photographs that document existing conditions.

## Project impacts

- Mitigation sequencing analysis.** Discuss how the project proposes to implement the mitigation sequencing steps, in their listed order, to achieve no net loss of shoreline ecological functions. In other words, a project must first be designed to avoid (step 1) impacts altogether before minimizing unavoidable impacts (step 2) and so on. Discuss how the application of the mitigation sequence influenced design decisions related to a project's location, scope, timing, size, materials, construction methods, etc.
  1. **Avoiding** the impact altogether by not taking a certain action or parts of an action;
  2. **Minimizing** impacts by limiting the degree or magnitude of the action and its implementation by using appropriate technology or by taking affirmative steps to avoid or reduce impacts;
  3. **Rectifying** the impact by repairing, rehabilitating, or restoring the affected environment;
  4. **Reducing** or eliminating the impact over time by preservation and maintenance operations;
  5. **Compensating** for the impact by replacing, enhancing, or providing substitute resources or environments; and
  6. **Monitoring** the impact and the compensation project and taking appropriate corrective measures.
- Unavoidable impacts.** For projects with unavoidable impacts, identify and quantify impacts to shoreline functions and habitat. Show the location and extent of impacted

areas, including temporary construction-related impacts, using a combination of text, plans, drawing, and photos. Projects that result in unavoidable shoreline impacts must complete a Proposed Mitigation Plan (see item 4 below). If trees will be removed, indicate the number, species, diameter (measured at 4 feet above ground level), and show their locations on a site plan/map.

### **Proposed mitigation plan (Required when a project will result in unavoidable impacts.)**

- Proposed Mitigation.** Show where and how mitigation is proposed using a combination of text, drawings, plans, and maps. Include the location of wildlife-safe fencing and signage.
- Goal and Objectives.** Define achievable mitigation goals and objectives.
- Performance Standards.** Identify performance standards (i.e., success criteria) for measuring the success of mitigation over time.
- Contingency plan.** Describe when and what actions will be taken if mitigation efforts fail, or only partially succeed, in meeting performance standards and goals.
- Monitoring program.** Describe the proposed monitoring schedule, monitoring methods, and measurable data to be collected. The proposed monitoring program should be appropriate for the scale and scope of the project. The shoreline administrator will provide a schedule for submitting monitoring progress reports.
- Financial assurance.** A performance bond or other security to ensure that mitigation work is completed may be necessary. Provide a detailed cost estimate for the proposed mitigation program.
- Permanent protection.** A permanent conservation covenant, conservation easement, or other assurance of protection in perpetuity may be required. If known, provide details on the method/mechanism for permanent protection.

## Appendix B. Design Techniques for Avoiding and Minimizing Buffer Impacts

The following design techniques can contribute to the avoidance and minimization of impacts to shoreline buffers or areas set aside for the conservation of vegetation. This checklist is a resource for local governments and should be completed by applicants proposing development within a shoreline buffer, setback, or vegetation conservation area. Check 'yes' for all design techniques that have been incorporated.

Yes	Design technique	Notes on how project incorporates technique
<input type="checkbox"/>	Use alternative, space-saving septic design (non-conventional)	Click or tap here to enter text.
<input type="checkbox"/>	Reposition structures and/or access to the lot	Click or tap here to enter text.
<input type="checkbox"/>	Cluster structures	Click or tap here to enter text.
<input type="checkbox"/>	Decrease building footprint (e.g. add stories, reduce total square footage, reduce deck area, etc.)	Click or tap here to enter text.
<input type="checkbox"/>	Reduce the width of access roads or driveways	Click or tap here to enter text.
<input type="checkbox"/>	Build a road pull off for extra parking where it will reduce the amount of new impervious surfaces within the buffer	Click or tap here to enter text.
<input type="checkbox"/>	Request variances from common property line setbacks if it will help avoid or minimize impacts	Click or tap here to enter text.
<input type="checkbox"/>	Focus development in existing disturbed areas	Click or tap here to enter text.
<input type="checkbox"/>	Use no-excavation or minimal-excavation technologies for building foundations (e.g., pin foundations)	Click or tap here to enter text.
<input type="checkbox"/>	Avoid grading by incorporating natural topography into site design	Click or tap here to enter text.
<input type="checkbox"/>	Avoid or minimize the removal of native trees and shrubs through site design and by incorporating plants already on site into landscape design	Click or tap here to enter text.
<input type="checkbox"/>	Use pervious materials for construction of hard surfaces	Click or tap here to enter text.

Yes	Design technique	Notes on how project incorporates technique
<input type="checkbox"/>	Disperse downspouts to vegetated areas or into rain gardens instead of impervious surfaces	Click or tap here to enter text.
<input type="checkbox"/>	Install signage and/or wildlife-permeable fencing at boundaries of protected areas	Click or tap here to enter text.



## Appendix C. As-Built Report Template for Homeowners and Other Small-Site Mitigation Areas

**Instructions:** Unless an alternate timeline has been agreed to, complete and submit within 13 months of shoreline permit issuance, or within one month of planting completion, whichever comes first. Please submit a digital copy (preferred) of this monitoring report to **<insert email address here>** with the subject line “As-built Mitigation Report Submittal.” Otherwise, a paper copy can be mailed to **<insert your department’s mailing address here>**. Please call **<insert phone number>** or email **<insert email>** with questions about completing and submitting this form.

**Project number/ID:** Click or tap here to enter text.

**Applicant name:** Click or tap here to enter text.

**Property address:** Click or tap here to enter text.

**Mailing address:** Click or tap here to enter text.

**Email:** Click or tap here to enter text.

**Type of mitigation:**

Buffer/riparian plantings     Other(specify) Click or tap here to enter text.

**Date mitigation installation completed:** Click or tap to enter a date.

**[For official use] Date of as-built inspection:**

**Step 1.** Attach an as-built mitigation site plan that shows any changes that occurred during plant installation (or the installation of other types of mitigation) and that establishes permanent photo points or locations from which photographs will be taken throughout the monitoring period to document plant growth. **The drawing must be labeled “as-built.”**

**Step 2.** Using Table 1, list the species name and quantity of trees, shrubs, and herbaceous plants installed. If the number cannot be counted, estimate what percentage of the mitigation site is covered by that category of plant. Note that herbaceous plants will likely be estimated as percent cover, not an individual plant count.

**Step 3.** Attach color photos of the installed mitigation area taken from photo points. Use Table 2 to describe the photos.

Table 1. Mitigation plantings.

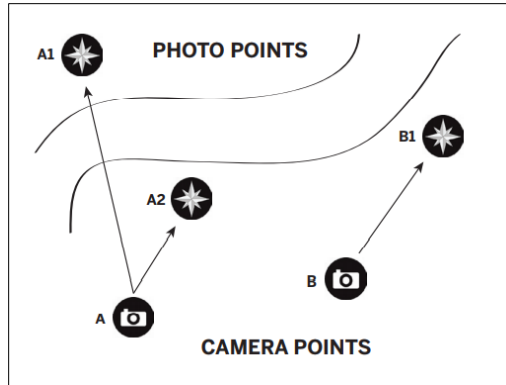
Date of installation	Species name of plants	Number installed or % cover
Click or tap to enter a date.	Click or tap here to enter text.	Click or tap here to enter text.
Click or tap to enter a date.	Click or tap here to enter text.	Click or tap here to enter text.

<b>Date of installation</b>	<b>Species name of plants</b>	<b>Number installed or % cover</b>
Click or tap to enter a date.	Click or tap here to enter text.	Click or tap here to enter text.
Click or tap to enter a date.	Click or tap here to enter text.	Click or tap here to enter text.
Click or tap to enter a date.	Click or tap here to enter text.	Click or tap here to enter text.
Click or tap to enter a date.	Click or tap here to enter text.	Click or tap here to enter text.

Table 2. Photo log of mitigation.

<b>Photo</b>	<b>Photo point location</b>	<b>Comments/Notes</b>
1	Click or tap here to enter text.	Click or tap here to enter text.
2	Click or tap here to enter text.	Click or tap here to enter text.
3	Click or tap here to enter text.	Click or tap here to enter text.
4	Click or tap here to enter text.	Click or tap here to enter text.

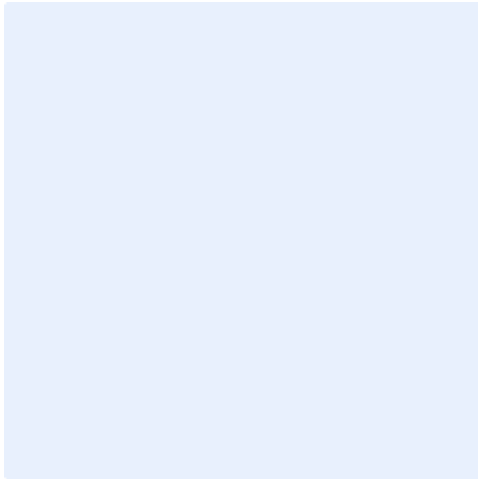
**Photo point monitoring** is a way of tracking changes that occur at a mitigation site over time. Photographs of mitigation plantings are taken from established camera points and used in mitigation monitoring reports. Camera points must be permanent landmarks like trees, building corners, and fences, or they can be marked by steel stakes or fence posts that remain in the ground for the duration of the monitoring timeframe. The photo points are where the camera lens is pointing, and one camera point can have several photo points. Photo points must also be permanently marked.



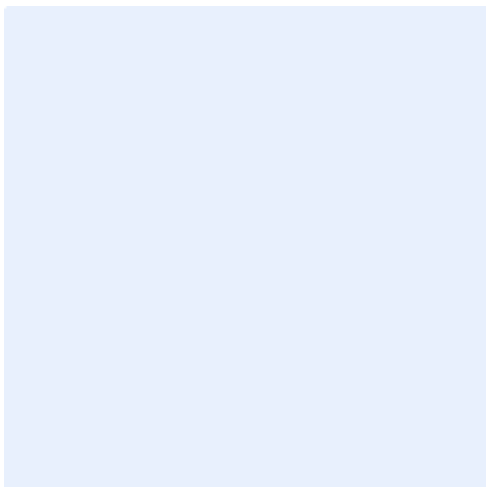
Source: Oregon State University, Stream Webs Student Stewardship Network,  
[www.streamwebs.org](http://www.streamwebs.org)

Attach photos here: Add captions and Alt Text.

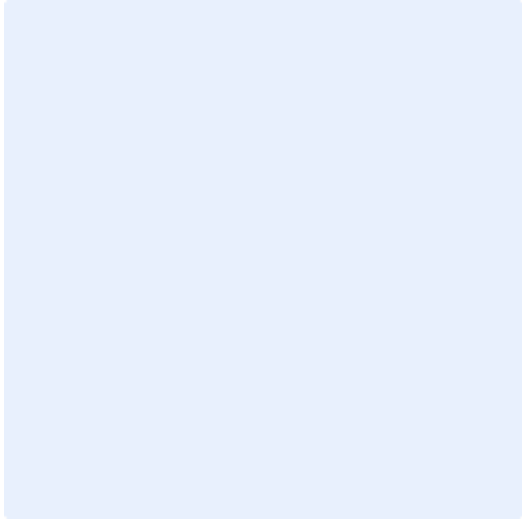
**Photo 1**



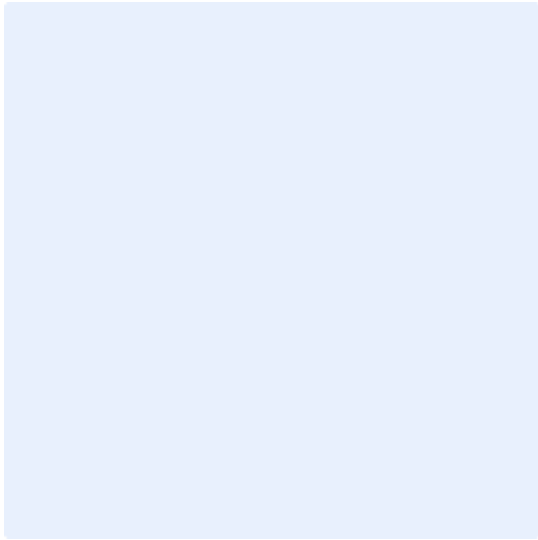
**Photo 2**



**Photo 3**



**Photo 4**



## Appendix D. Monitoring Report Template for Homeowners and Other Small-Site Mitigation Areas

**Submitting your report.** Please submit a digital copy (preferred) of this monitoring report to **<insert email address here>** with the subject line “Mitigation Monitoring Report Submittal.” Otherwise, a paper copy can be mailed to **<insert your department’s mailing address here>**. Please call **<insert a phone number>** or email **<insert email>** with questions about completing and submitting this report.

**Project number/ID:** Click or tap here to enter text.

**Monitoring report for year:** 1  2  3  4  5  6  7  8  9  10

**Applicant name(s):** Click or tap here to enter text.

**Property address:** Click or tap here to enter text.

**Mailing address:** Click or tap here to enter text.

**Email address:** Click or tap here to enter text.

**Phone:** Click or tap here to enter text.

**Date monitoring report completed:** Click or tap to enter a date.

**Did you have access to the as-built mitigation report?** No  Yes

**Step 1.** Describe current conditions at the mitigation site as they relate to the performance standards in your mitigation plan. Include information on the health or condition of installed plants; the presence of any volunteer native vegetation; and the presence of any invasive, non-native species<sup>58</sup>. Describe any significant events, adaptive management actions, or replacement plantings that have occurred. Please note that signs of poor health include yellow or brown leaves and lack of growth. Signs of good health include green leaves, new stems, and noticeable growth since the previous year.

Click or tap here to enter text.

**Step 2.** Using Table 1, list the number of plants in each category. If the number cannot be counted, estimate what percentage of the mitigation site is covered by that category of plant. Note that herbaceous plants will most likely be estimated as percent cover, not an individual

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<sup>58</sup> Visit <https://www.nwcb.wa.gov/> for noxious weed lists, pictures, and identification help.

plant count. Using Table 2, insert performance standards from the mitigation plan and indicate if the standard has been met.

Table 3. Plant count.

Category	Initially Installed <sup>o</sup> (Number or % cover)	Dead (Number or % Cover)	Replanted (Number or % Cover)	Current <sup>†</sup> (Number or % Cover)
Individual trees	Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.
Individual shrubs	Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.
Herbaceous layer	Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.
Invasive or non-native species	NA	NA	NA	Click or tap here to enter text.

<sup>o</sup>Information on initial planting counts and percent cover can be found in your as-built mitigation report.

<sup>†</sup> Include replanted plants in your count or estimate of percent coverage.

Table 2. Performance standards.

Category	Performance standard	Performance standard met?
Individual trees	Click or tap here to enter text.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Individual shrubs	Click or tap here to enter text.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Herbaceous layer	Click or tap here to enter text.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Invasive or non-native species	Click or tap here to enter text.	<input type="checkbox"/> Yes <input type="checkbox"/> No

**Step 3.** Using Table 3, attach color photographs taken from photo points identified in your as-built mitigation report. If photo points have not been established, create them by marking locations (e.g., photo point A, B, C, etc.) on the mitigation site plan and submitting that document with this monitoring report. Consistent photo points should be used year after year, throughout the monitoring period. Use the table below to tell us more about your photos.

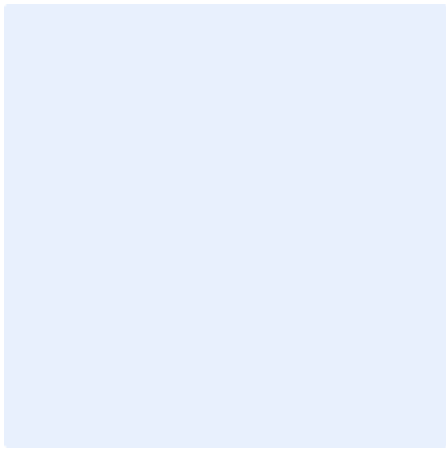


Table 3. Photo log.

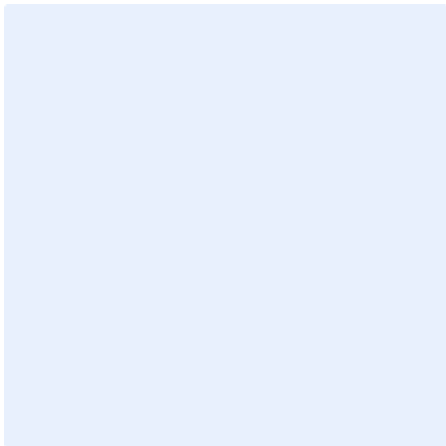
Photo	Photo point location	Notes
1	Click or tap here to enter text.	Click or tap here to enter text.
2	Click or tap here to enter text.	Click or tap here to enter text.
3	Click or tap here to enter text.	Click or tap here to enter text.
4	Click or tap here to enter text.	Click or tap here to enter text.

Attach photos here: Add captions and Alt Text.

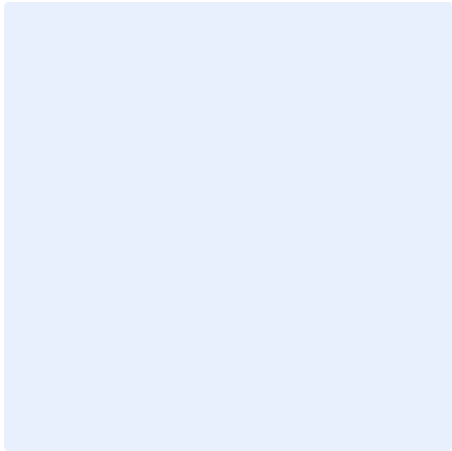
**Photo 1**



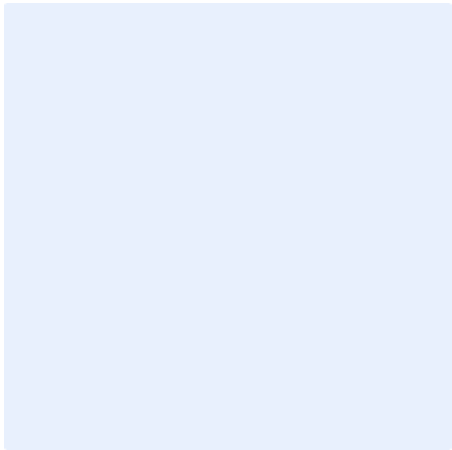
**Photo 2**



**Photo 3**



**Photo 4**



## Appendix E. Key Resources

This list of publicly available documents, websites, maps, and other resources is commonly used by shoreline administrators to review permits, as reference materials, and for training staff. Published information is updated overtime. Please ensure you are using the most recent agency guidance.

### Shoreline management

[Shoreline Permitting Manual](#) (Ecology) – SMP implementation guidance for local governments.

[Shoreline Master Programs Handbook](#) (Ecology) – SMP planning guidance for local governments.

### Shoreline stabilization

[Chapter 15 \(Shoreline Stabilization\) of the Shoreline Master Programs Handbook](#) (Ecology) – SMP planning guidance for local governments.

[Examples of Soft Shore and Armor Alternative Projects](#) (Ecology) – Web mapper with before and after photographs and project details.

[Marine Shoreline Design Guidelines](#) (WDFW) -A comprehensive framework for site assessment and alternatives analysis to determine the need for shore protection and identify the technique that best suits the conditions at a given site.

[Integrated Streambank Protection Guidelines](#) (WDFW) – A framework for site and reach assessment, understanding different streambank-protection techniques, and identifying the most suitable solution.

[Shorefriendly.org](#), a public information website for waterfront homeowners who care about the health of Puget Sound.

[Your Marine Waterfront: A guide to protecting your property while promoting healthy shorelines](#) (WDFW)

### Critical areas protection

[Calculating Credits and Debts for Wetlands](#) (Ecology) - A tool to calculate when a proposed compensatory wetland mitigation project will adequately replace the functions lost due to wetland impacts.

[Critical Areas Handbook: A Handbook for Reviewing Critical Areas Regulations](#) (Commerce)

[Interagency Regulatory Guide: Advance Permittee-Responsible Mitigation \(2012\)](#) – Interagency guide on advance permittee-responsible compensatory mitigation for unavoidable impacts to wetlands.

[Locations of Rare Plans and Rare/High-quality Ecosystems](#) (DNR) – Publicly available GIS datasets.

[Priority Habitats and Species on the Web](#) (WDFW) – A web app to find information about known locations of priority habitats and species in Washington.

[Riparian Ecosystems, Volume 1: Science Synthesis and Management Implications](#) (WDFW)

[Riparian Ecosystems, Volume 2: Management Recommendations](#) (WDFW)

[Wetland Mitigation in Washington State: Part 1 – Agency Policies and Guidance, Version 2 \(2021\)](#) - Outlines the information the agencies (U.S. Army Corps of Engineers, EPA Region 10, and Ecology) use to determine whether specific mitigation proposals are appropriate and adequate to compensate for the proposed impacts.

[Wetland Mitigation in Washington State: Part 2 – Developing Mitigation Plans, Version 1 \(2006\)](#) – Interagency guidance (U.S. Army Corps of Engineers, EPA Region 10, and Ecology) to help the regulated community comply with environmental laws and policies and to improve the quality and effectiveness of mitigation in Washington State.

[Wetland rating system, mitigation, tools, and resources](#) (Ecology)

[Wetlands of High Conservation Value Map Viewer](#) (DNR) - This map viewer depicts the known locations of wetland and riparian plant communities, rare plants, and rare nonvascular species tracked by the Washington Natural Heritage Program.

## **State agency spatial data and imagery**

[Coastal Atlas](#) (Ecology): public beaches, slope stability, shoreline photos, shoreline biology, and more.

[Forage Fish Spawning Map](#) (WDFW) - documented spawning locations of Pacific Sand Lance, Surf Smelt, and Pacific Herring in Washington State.

[Washington State Department of Natural Resource GIS Open Data](#) – Aquatics, forest practices, hydrology, natural heritage, soils, and more.

## **Trainings**

[Coastal Training Program](#) (Ecology): Hosts trainings on shoreline permitting, how to determine the ordinary high water mark, shoreline stabilization, the State Environmental Policy Act, the wetland rating system, credit-debit method for estimating wetland mitigation needs, forage fish surveying, the National Flood Insurance Program, and more.