Single Family Residence Shoreline Mitigation Manual

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Contents

Introduction

This manual provides guidance for City of Bainbridge Island (City) homeowners as well as City staff and consultants on requirements and mitigation opportunities for specific types of single-family residential (SFR) development within the shoreline jurisdiction of the City.

Under Washington State Shoreline Management Act Guidelines [WAC 173-26-186(8) & 201(2)(c)], all new development, activities and uses must meet the standard of no net loss of ecological functions and shoreline processes. To ensure the standard of no net loss is met, any adverse impacts from new, repaired, or replaced development must be mitigated in accordance with the Mitigation Sequence (see Page 2) described in WAC 173-26-201((2)(e). When there are permanent impacts not addressed in sequence number 2, 3, or 4 the applicant must provide mitigation for the remaining adverse impacts to meet the no net loss standard.

The City's Shoreline Management Program (SMP) regulations require an applicant submit a site-specific analysis to demonstrate that the no net loss standard has been met. A site-specific analysis is a technical report that identifies existing conditions and ecological functions, impacts from the project, and proposed mitigation.

To give homeowners a low cost alternative for meeting the no net loss standard, this manual was developed and provides mitigation for common types of SFR development as an alternative to submitting a site-specific analysis.

This manual provides City requirements for single family residences when mitigating construction, repair or replacement of SFR primary and accessory structures. Subdivisions, including short plats and other development, and uses or activities not associated with SFR development, are required to provide a site-specific analysis in accordance with the SMP Section 4.1.2 Environmental Impacts.

A homeowner can use this shoreline mitigation manual if:

- the SFR is not part of a new subdivision application; and
- the proposed project is located within a qualifying site (see below); and
- the proposed project is listed among the development and structure types and maximum size constraints covered by this guidance (shown in Table 1).

What sites qualify for this approach?

Sites which qualify for this manual are SFR shoreline parcels that are not adjacent to a marsh or a lagoon. Marshes and lagoons are a critical habitat feature for many protected species and therefore development proposals affecting these sites require a higher level of examination. Proposed development on SFR sites with an adjacent marsh or lagoon must complete a site-specific analysis that complies with the requirements of SMP Section 4.1.2, Environmental Impacts, and/or Appendix B, Critical Areas.

Washington State Shoreline Management Act Guidelines:

http://www.ecy.wa.gov/programs/sea/sma/guidelines/downloads/Draft_2002_SMP_Rule.pdf

What is mitigation?

Mitigation is the process of avoiding, limiting, reducing, or eliminating the adverse environmental impacts of a project over time, and ultimately compensating for impacts that remain. Mitigation for impacts follows a specific sequence described in WAC 173-26-201((2)(e) as follows:

1. **Avoid** the impact altogether by not taking a certain action or parts of an action;
2. **Minimize** 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. **Rectify** the impact by repairing, rehabilitating, or restoring the affected environment;
4. **Reduce** or eliminate the impact over time by preservation and maintenance operations;
5. **Compensate** for the impact by replacing, enhancing, or providing substitute resources or environments; and
6. **Monitor** the impact and the mitigation activities and take appropriate corrective measures as needed.

The mitigation strategies identified in this manual are for environmental impacts that cannot reasonably be avoided (steps 2 through 6 of this sequence).

New in-water or overwater structures (such as shoreline stabilization construction or docks) are not covered by this guidance. Applications for new in-water or overwater development must submit a site-specific analysis in accordance with the City's SMP.

An applicant must also obtain a U.S. Army Corps of Engineers (USACE) and Washington Department of Fish and Wildlife (WDFW) Hydraulic Project Approval (HPA) for any new in-water or overwater structure as well as for a repair or replacement of an existing structure. Mitigation is typically required by those agencies as well, however the City may determine that mitigation and permit conditions required by federal and state agencies are sufficient to meet City requirements according to provisions in the SMP. Note that the SMP prohibits new overwater covered moorage in the marine environment .

Shoreline with native vegetation.

Mitigation activities prescribed for the qualifying types of construction in this document are selected to directly compensate for environmental impacts that are not prevented through careful site design, structure design or use of best practices. Examples of best practices are low impact development methods for managing stormwater, retractable docks or beach nourishment for shoreline stabilization. For example, permanent clearing of vegetation is mitigated by replanting vegetation, and any permitted fill placed below the ordinary high water mark (OHWM) is mitigated by removing fill already located below the OHWM.

Mitigation is first required to be conducted on the same parcel (on site) as the proposed construction unless impractical. In most cases, more mitigation is required when it will occur on a different parcel (off site).

These measures ensure that mitigation is clearly linked to the type and location of impact the development would have on the shoreline. This approach also supports the City's responsibility to ensure there is no net loss of shoreline functions.

In some cases, onsite mitigation may not be feasible or offsite mitigation may be preferred based on shoreline physical processes. In either case, check with City of Bainbridge Island Planning and Community Development Department for preferred locations recommended by the City's Shoreline Restoration Plan or for other guidance related to acceptable offsite mitigation. In limited cases, a reduction in mitigation requirements for offsite compensatory mitigation may be allowed if the Administrator determines a greater ecological benefit is achieved at the proposed location.

Bainbridge Island shoreline and dock.

Homes near this marsh would not quality for the mitigation approach in this manual.

What kinds of SFR development qualify for this guidance?

SFR development that qualify for this guidance includes: a new home, accessory structure (to existing SFR), and expansion, replacement, and repair of a SFR or accessory structure. Within these SFR development categories, structures that qualify must be within specific size constraints. The types of structures and size constraints for use of this manual are provided in Table 1. Examples include construction of a new home no larger than 4000 ft^2; an accessory structure to an existing home, such as a detached garage no larger than 580 ft^2, a patio no larger than 120 ft^2; stairs to the beach between 50 ft^2 and 300 ft^2 (mitigation is not required for stairs less than 50 ft^2) ; remodel of an existing structure; and replacement or repair of shoreline structures such as a bulkhead, stairs or a dock. Note that the listed size constraints are not the maximum permitted by City regulations, but are the maximum for which this manual can be used to determine appropriate mitigation without a site-specific study.

Development of each of these structures typically results in one or more of the following shoreline and nearshore disturbances that require mitigation: 1) vegetation is cleared, 2) new impervious surface is created, 3) fill is placed below the OHWM or 4) aquatic habitat is permanently disturbed. Table 1 identifies which of these disturbances may apply based on your proposed development.

To use Table 1:

1. Select the category of development (new, accessory etc.) that applies to your project from the first column.
2. Select the type of structure from the second column.
3. Check to make sure your proposed development is within the maximum size constraints for that structure. If they are not, you will need a site-specific analysis.
4. Review the impacts requiring mitigation and identify those that apply to your project.
5. For each impact requiring mitigation, go to the corresponding section under Mitigation Requirements for a description of what is required.

Table 1. Qualified Single Family Residential (SFR) developments and associated impacts requiring mitigation.

			Impacts Requiring Mitigation			
Development Category	**Structure Type**	**Maximum Size Constraints (based on footprint)**	**Vegetation is Cleared**	**New Impervious Surface is Created**	**Permitted Fill is Placed Below OHWM**	**Aquatic Habitat is Disturbed**
New[a]	SRF including any accessory development	4,000 ft^2	♦	♦		
	Driveway or parking area	No maximum	♦	♦		
Accessory Note: the footprint of existing SRF including all accessory developments with the exception of a guest house or accessory dwelling unit (ADU) cannot exceed 4000 ft^2	Detached garage or carport	580 ft^2	♦	♦		
	Guest house or ADU	800 ft^2	♦	♦		
	Boathouse (only in upland)	200 ft^2	♦	♦		
	Patio –with or without BBQ pit or deck	120 ft^2	♦	♦		
	Hot tub + deck/ patio	120 ft^2	♦	♦		
	Sport court	200 ft^2	♦	♦		
	Gazebo, utility shed, well house, greenhouse	200 ft^2	♦	♦		
	Retaining wall – new or replacement (upland)	3.5 ft. depth and 4 ft. height with no surcharge[b]	♦	♦		
	Deck (attached to house)	400 ft^2	♦	♦		
	Stairs to beach[c]	50 ft^2 to 300 ft^2	♦	♦[d]		

Table 1. Qualified SFR developments and associated impacts requiring mitigation (CONTINUED).

			Impacts Requiring Mitigation			
Development Category	**Structure Type**	**Maximum Size Constraints (based on footprint)**	**Vegetation is Cleared**	**New Impervious Surface is Created**	**Permitted Fill is Placed Below OHWM**	**Aquatic Habitat is Disturbed**
SFR (primary) Replacement or Expansion Note: the footprint of replaced or expanded SFR including all accessory developments cannot exceed 4000 ft²	Replace (demolished)	Same size as existing structure in same location	No Mitigation Requirement			
		Expand size	♦	♦		
	Expansion of or addition to SFR	4,000 ft² including existing structure	♦	♦		
Accessory replacement[e]	Bulkhead	Same as existing	♦	♦	♦	
	Boathouse	200 ft²	♦	♦	♦	♦[f]
	Stairs to beach[c]	50 ft² to 300 ft²	♦	♦[d]	♦	
	Dock	Same as existing	♦		♦	♦[f]
Accessory repair[e]	Bulkhead	3.5 ft. depth and 4 ft. height with no surcharge[b]			♦	
	Boathouse	200 ft²			♦	♦[f]
	Stairs to beach[c]	50 ft² to 300 ft²	♦	♦[d]	♦	
	Dock	Same as existing			♦	♦[d, f]

[a] New dock, or other new in-water or overwater structures are not covered by this manual. Covered moorage is prohibited by the City.

[b] Surcharge is the slope above and behind a retaining wall or bulkhead.

[c] No mitigation is required for beach stairs with a footprint smaller than 50 ft².

[d] If stairs are grated and pass stormwater freely no mitigation for impervious area is required.

[e] This program does not cover mitigation required for use of barges. If you intend to use a barge for construction, you will need to submit a site-specific study.

[f] Repairs or replacements of this in-water and overwater structure are exempt from this mitigation requirement if the footprint and impact is reduced (such as by replacing wood decking with grating to increase light penetration and reducing the number of pilings). Specific requirements for footprint and impact reduction are explained in the section called ***Mitigation Exemption for Repair or Replacement of Overwater Structures***.

Mitigation Requirements

Review each section that follows as it pertains to your project's environmental impacts.

Vegetation is Cleared

Shoreline vegetation is considered important to supporting the ecological functions found in the nearshore. Vegetation along the shoreline at minimum infiltrates stormwater, and can provide large woody debris, bank stability, food sources such as detritus and insects for aquatic species, and temperature moderation of the beach and nearshore substrate. Multistoried vegetation can provide an overhanging, complex network of branches, trunks, stems and roots that also moderate nearshore wave energy.

Native vegetation is preferred for shorelines because native species are better adapted to local physical conditions such as soil, geology, and climate and therefore require less maintenance, are resistant to most pests and diseases, and require little or no irrigation or fertilizers, once established. Thus maintaining native plant species along the shoreline can also have consequent benefits on maintaining water quality. Native vegetation also provides more food sources for native wildlife.

Mitigation for vegetation cleared in the shoreline jurisdiction requires replacement with an equivalent or larger area of native multistoried vegetation (includes groundcovers, shrubs, and trees). Areas planted for mitigation are subject to final approval by the Administrator and must be recorded with the County Auditor on a Notice on Title, or other similar document, prior to approval of the project. Areas planted for mitigation are intended to be protected in perpetuity, although future alterations may be allowed with an approved mitigation plan.

What best describes the character of the vegetation in the area you will be clearing?

Is it predominantly:

- Mowed grass or lawn?
- Non-native landscaping?
- Native Vegetation?

Based on the dominant character of the vegetation that will be cleared and where you intend to plant, different ratios of native vegetation planted area to cleared area are required. These ratios are provided in *Mitigation Requirements for Vegetation Clearing*.

If you intend to plant native vegetation within 30 feet landward of the OHWM (called Zone 1 of the Shoreline Buffer—see Figure 1) the ratios for planting in Zone 1 are lower than if you plant outside of Zone 1. The lower ratio is intended to encourage homeowners to plant in Zone 1 where native vegetation has the greatest effect on nearshore habitat and processes. Ratios are also higher if you are clearing native vegetation, as compared with removing mowed grass or lawn, for the same reason.

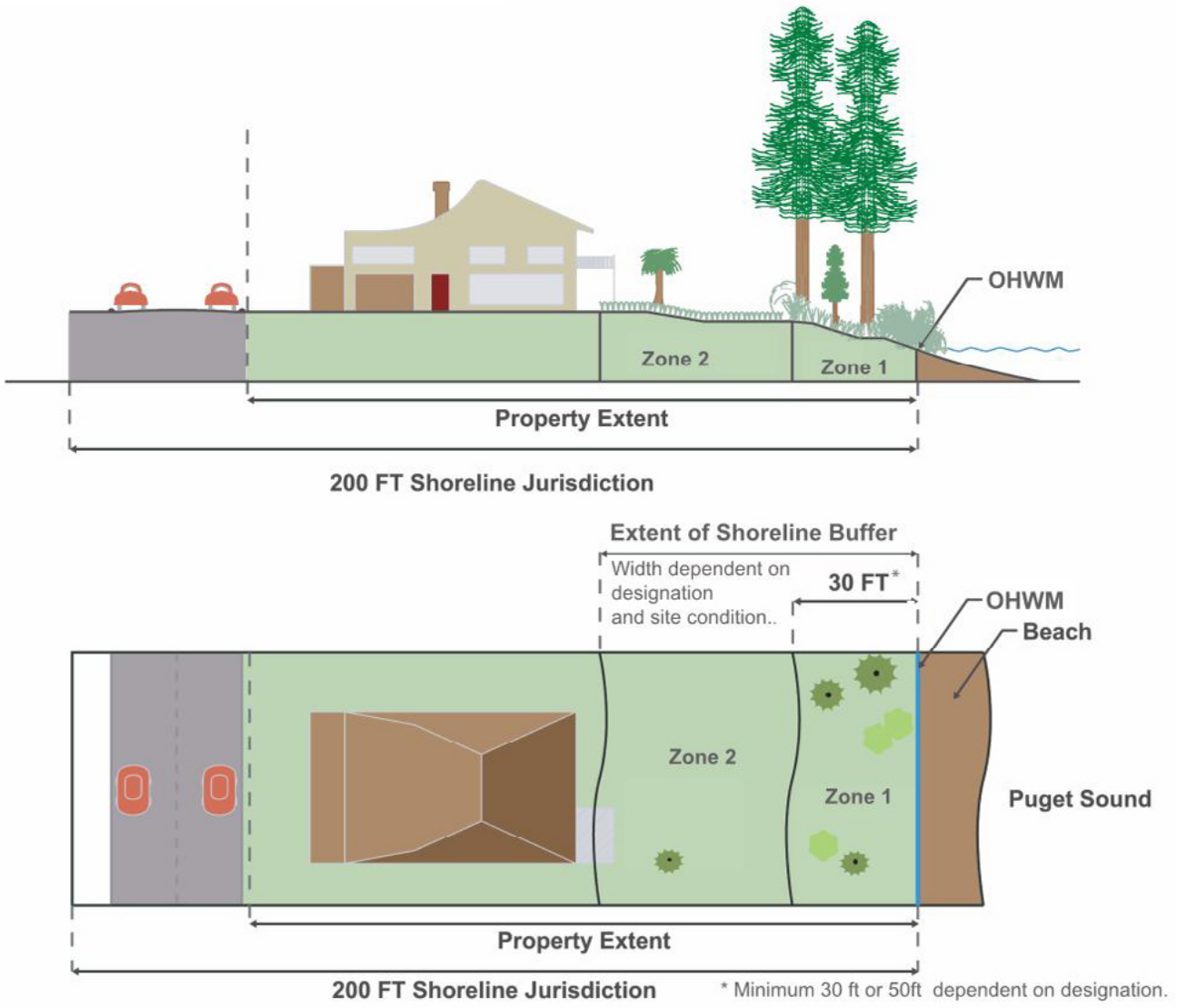


Figure 1. Zones related to the shoreline buffer area.

What is Native Vegetation?

Native vegetation is an assemblage of plants native to Bainbridge Island, which are species that occur or historically occurred on the island based upon the best available scientific and historical documentation. Native vegetation includes a selection of multistoried species (ground covers, shrubs and trees). Acceptable species are listed in Appendix A. Other species may be planted if it can be demonstrated they are native and appropriate to the site conditions.

When planting native vegetation for mitigation, you must provide a plan view of the project area showing where clearing will occur and where native vegetation will be planted for mitigation (including species, spacing and plant sizes). Species are to be planted with spacing designed to achieve a minimum 65 percent native vegetation coverage within 10 years within the replanted area. To assist you, a list of native species suitable for the City's shorelines is provided in Appendix A along with planting details showing typical tree, shrub and groundcover spacing and recommended plant sizes.

Note that your planting plan may be designed to protect views from your primary SFR.

Figure 2. Planting should incorporate trees, shrubs, and groundcovers to provide multiple layers of vegetation (multistoried).

Mitigation Requirements for Vegetation Clearing

Select character of vegetation being cleared	Will mitigation planting be located within Zone 1?	Mitigation Requirement
Area is comprised of mowed grass or lawn	YES	Plant ½ the equivalent area of mowed grass or lawn with multistoried, native vegetation
	NO	Plant the equivalent area of mowed grass or lawn with multistoried, native vegetation.
Area is comprised of non-native landscaping (including groundcovers, shrubs or trees).	YES	Plant the equivalent area of cleared non-native landscaping with multistoried, native vegetation.
	NO	Plant 2 times the area of cleared non-native landscaping with multistoried, native vegetation.
Area is comprised of native landscaping (including groundcovers, shrubs or trees).	YES	Plant 2 times the area of cleared native landscaping to multistoried native vegetation.
	NO	Plant 3 times the area of cleared native landscaping with multistoried, native vegetation

To mitigate for new impervious surface, you can:

- Remove existing impervious surface of equal area within your shoreline buffer and replant with native vegetation, or
- Install a rain garden that is sized to be at least 20 percent of the area of your new impervious surface.

The use of a rain garden for mitigating impervious surface is based on the understanding that rain gardens can help provide the water collection, retention, and infiltration capacity that are lost when vegetated areas are made impervious. The Rain Garden Handbook for Western Washington Homeowners describes how rain-gardens mimic a native forest by collecting, absorbing, and filtering stormwater runoff from rooftops, driveways, patios, and other areas that don't allow water to soak in.

To install a rain garden, follow the methods available at www.raingarden.wsu.edu/index.html. There you will find instructions for calculating your drainage area, and locating, designing (sizing), planting and maintaining your rain garden. Local landscape architects, Kitsap County WSU Extension office, Kitsap County Conservation District, and the City's Planning and Community Development Department are other resources available for assistance.

The Rain Garden Handbook for Western Washington Homeowners:

www.raingarden.wsu.edu/index.html

Rain Garden Installation Guidance:

www.raingarden.wsu.edu/index.html

Rain Gardens

- Can be shaped and sized to fit your yard
- Are constructed with soil mixes that allow water to soak in rapidly and support healthy plant growth
- Can be landscaped with a variety of plants that look beautiful and help manage stormwater

Caution:

Collecting and allowing water to soak into a landslide hazard area can cause instability and potentially endanger your structure. If you need to place your rain-garden on or near a landslide hazard area (any slope greater than 15 percent), a letter or report from a qualified licensed geologist or geotechnical engineer that evaluates the site and your rain garden design must be submitted with your application for review and approval by the Administrator.

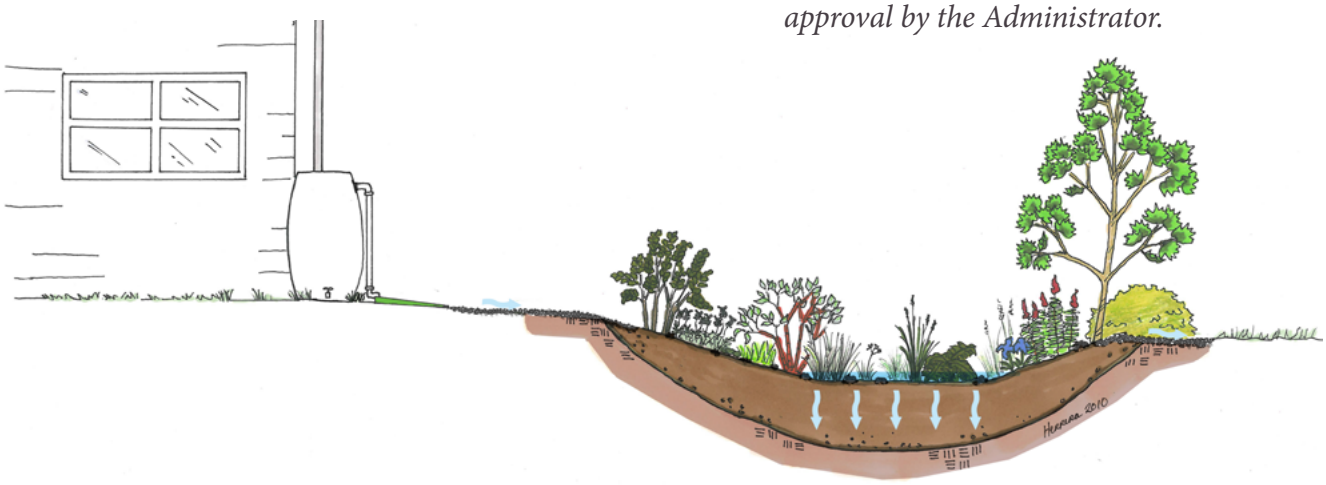


Figure 3. Rain gardens can help mitigate stormwater runoff from new impervious surfaces.

Permitted Fill Material is Placed below OHWM

Fill placed below the OHWM permanently eliminates aquatic habitat and can interrupt nearshore sediment flow. These factors both eliminate and reduce ecological functions within the area of fill and may adversely affect adjacent shorelines through reduced sediment supply and increased fragmentation of habitat.

All shoreline structures or modifications that include placing fill below the OHWM will require an equivalent volume of fill removal from below the OHWM elsewhere for mitigation (Table 2). Typical shoreline structures and modifications that include fill placed below the OHWM include stairs, boathouses, docks and bulkheads.

If mitigation for fill removal will occur within the same parcel, the volume removed must be at minimum equal to the volume of fill material placed. If the fill removal occurs on a different parcel, than the volume removed must be two times the volume of fill material placed. See Table 2. This is to encourage mitigation for fill placement at the same location as the environmental impact.

Examples of types of fill that may be removed for mitigation include construction debris such as concrete pieces, riprap, creosote logs, pilings, and failing bulkheads.

In addition to fill removal, bulkhead repair or replacement will require beach nourishment in addition to fill removal as part of mitigation (Table 2).

Beach nourishment differs from fill because it is mobile and permeable, unlike piers, concrete, riprap, or other immobile elements typically associated with nearshore structures. Beach nourishment provides spawning habitat for forage fish species, which are food sources for salmon and other fish species, birds, and marine mammals. While nearshore structures can provide a type of nearshore habitat (for example docks provide holdfasts for barnacles and mussels), these habitats do not improve impaired features of the nearshore ecosystem or support natural geomorphic processes in the way that mobile beach sand can.

Removing unused piers can provide shoreline mitigation.

Retractable Structures

In many instances structures can be constructed that can be retracted when not in use (for example retractable access stairs or docks). Retractable structures associated with a SFR are exempt from the City's requirement for mitigation for impacts occurring waterward of the OHWM.

In addition, if the footprint of fill below the OHWM is smaller than 10 square feet, the structure is exempt from providing mitigation as the area is considered too small to significantly impact aquatic resources.

Table 2. Mitigation requirements for fill material placed below the OHWM.

Development Type	Location of Fill Removal		Beach Nourishment Required?
	On Site	Off Site[a]	
• Stair construction, repair or replacement • Boathouse repair or replacement • Dock repair or replacement	Remove fill equivalent to volume placed below OHWM	Remove fill equivalent to 2 times volume placed below OHWM	No
• Bulkhead repair or replacement	Remove fill equivalent to volume placed below OHWM	Remove fill equivalent to 2 times volume placed below OHWM	Yes

[a] A reduced ratio for offsite fill removal may be used In limited instances when the Administrator determines that a greater ecological benefit is obtained at on offsite location than would occur on site.

What is beach nourishment?

Beach nourishment is where sediment (usually sand) is placed to protect an eroding beach. Beach sediment lost through alongshore drift or erosion is replaced from sources outside of the eroding beach (often an upland source). Nourishment creates "soft" (non-permanent) protection by creating a larger sand reservoir, pushing the shoreline seaward. Beach nourishment can protect beaches and your property, and avoid or minimize the negative effects of bulkheads.

A shoreline that has recently undergone beach nourishment.

How do I provide beach nourishment?

Generally, beach nourishment should be located onsite, waterward of the bulkhead; however nourishment may be located off site if the Administrator determines that a greater ecological benefit is obtained at an offsite location than would occur on site. For example, nourishment will be more effective if it is placed in the up-drift area of a drift cell. Its benefit will be longer lasting and spread over a greater portion of the drift cell. The City can help you determine the best location for beach nourishment.

Beach nourishment should cover an area, at minimum, equivalent to the length of the repaired or replaced bulkhead. It should be comprised of mobile sediments suitable for nearshore forage fish spawning habitat. Beach nourishment material should be comprised of 100 percent WDFW Fish Mix or other material approved by the Administrator.

The volume of nourishment should rise at least 1-foot above OHWM and have a foreshore slope no greater that 1 vertical unit per 5 horizontal units (1:5 slope).

The frequency of nourishment must follow WDFW recommendations or occur every five years over a 25-year period. The frequency of nourishment may be less if a sediment loss analysis completed by a qualified professional recommends otherwise. The required frequency of nourishment will be documented in an agreement between you and the City.

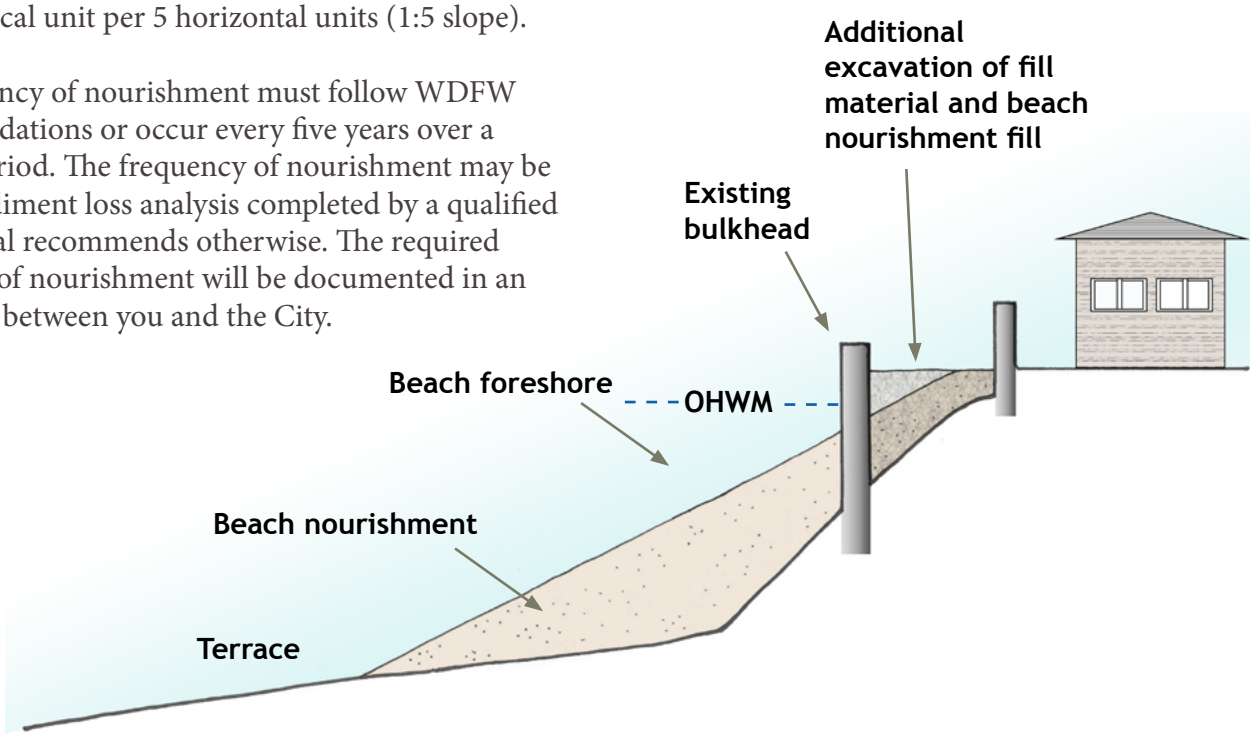


Figure 4. Beach nourishment illustration.

Aquatic Habitat is Disturbed

In-water or overwater structures have the potential to interrupt or negatively affect ecological functions and processes such as shading or eliminating aquatic habitat, increasing predator opportunities, and interrupting nearshore sediment flow and beach formation. Mitigation is required for repair or replacement because impacts continue to occur for the life of the structure. Construction activities related to repair or replacement may also temporarily affect fish and wildlife, water quality, or shoreline processes.

New in-water or overwater structures are not covered by this manual. Only repair or replacement of in-water or overwater structures are covered by this manual and they must fall within the size constraints identified in Table 1. Qualifying projects must satisfy the SMP requirements for a repair or replacement and must mitigate for the loss of ecological functions.

In-water and overwater repairs and replacements covered by this guidance include bulkheads, boathouses, stairs to the beach, and docks (the components of a dock include ramps, piers and floats, and requirements apply to all components). Note that in-water and overwater repairs and replacements of any structure may require permits from USACE and WDFW, as well as the City.

Upon project completion all areas of shoreline disturbed for the repair or replacement should be restored to as near pre-project configuration as possible and replanted with native vegetation appropriate to the site and approved by the City.

Exemption from mitigation is provided for repair or replacement of structures which meet certain structure impact reduction provisions (such as narrowing a dock or using grating to increase sunlight penetration). These are detailed in the section called *Mitigation Exemption for Repair or Replacement of Overwater Structures*. When there is no reduction of the structure, you are required to remove an equivalent or greater area of overwater structure elsewhere within the City; contact the Planning and Community Development Department for more details and appropriate locations.

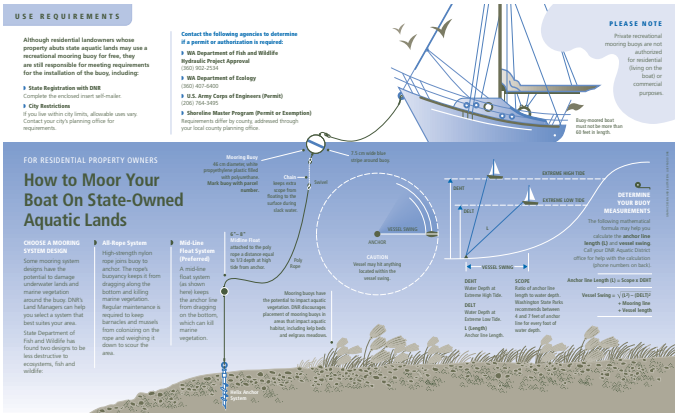
Mitigation Exemption for Repair or Replacement of Overwater Structures

Replacement of docks or stairs with retractable systems are exempt from City required mitigation for impacts to ecological functions and processes occurring waterward of OHWM. Repairs or replacements that reduce the shading footprint of an existing dock are also exempt.

To qualify, any two of the following measures may be used, in accordance with provisions in the SMP:

- Replace dock surface with grating or gridding
- Reduce dock width, to meet current SMP and USACE requirements
- Increase dock height, to meet current SMP, WDFW or USACE recommendations.

These alterations must conform to the most recent design guidance provided by the USACE found in its current *Regional General Permit for Residential Inland Marine Overwater Structures* (Permit Number CENWS-OD-RG-RGP-6) or meet City requirements, whichever standard provides a smaller footprint and greater light penetration. The Department of Planning and Community Development is available to assist with making this determination. Please contact the department if you have any questions.



Washington State Department of Natural Resources' *Recreational Mooring Buoys* brochure. Find the brochure at http://www.dnr.wa.gov/Publications/aqr_mooring_buoy_brochure.pdf.

Some considerations when planning to repair or replace your dock to avoid mitigation:

- Use a mooring buoy instead of repairing or replacing your dock.
- Replace your fixed dock with a dock that can be retracted when not in use to minimize disturbance to aquatic habitat.
- Share a neighbor's dock instead of repairing or replacing yours.

To avoid mitigation for repairs or replacements of both fixed or floating docks, the city requires that both of the following be met:

- The dock is no wider than 4 feet for a single use dock and 6 feet for a joint use dock.
- Grating or gridding and replacement floats must be installed that result in a total open area of a minimum of 30 percent. For example, this can be achieved by installing grating with 60 percent open area on at least 50 percent of the dock or by grating a larger percentage of the dock with openings of less than 60 percent. The following equation is used:

% Grating Open Area * % Dock Area = > 30%

Example 0.6 (60%) * 0.5 (50%) = 0.3 (30%)

What is the Process for Obtaining Approval to Use this Guidance?

- Submit your project proposal, completed checklist, and site plan along with your list of required mitigation activities and their proposed design to Planning and Community Development for review and approval by the Administrator.
- Obtain all required shoreline permits as outlined in Table 4-1 of the SMP.
- Submit these applications along with your project proposal.
- A preapplication conference may be required.

A checklist is provided in this manual to assist you with submitting a complete proposal that fulfills the requirements of this manual. Please contact Planning and Community Development by phone at (206) 780-3750 or by email at pcd@bainbridgewa.gov if you have any questions.

Checklists for Mitigation Approval

For each item below, please attach additional information to this checklist as needed to describe fully your project and proposed mitigation.

General Checklist for All Sites

	ITEM	NOTES
☐	Project description	Include a brief description of your proposed structure, along with its footprint.
☐	List of impacts requiring mitigation	See Table 1.
☐	Proposed mitigation description	Will mitigation be onsite or offsite? For offsite mitigation, provide location and confirmation that the property owner has agreed to have mitigation on their property.
☐	Site plan	Show locations of existing and proposed structure(s) as well as location(s) for mitigation.

ITEM

☐ Vegetation Clearing

- ☐ Areas of Clearing and Replanting
- ☐ Species List
- ☐ Example Spacing for Planting Species
- ☐ Plant Sizes

☐ Creation of New Impervious Area

- ☐ Provide the location and area of impervious surface to be reomoved and replanted.

OR

- ☐ If constructing a RAIN GARDEN
  - ☐ Drainage area calculation
  - ☐ Location and size of rain garden using methods from *Rain Garden Handbook for Western Washington Homeowners* found at www.raingarden.wsu.edu/index.html

☐ Permitted Fill Below OHWM

- ☐ Provide calculation of fill volume and proposed location for removing required fill volume

☐ Beach Nourishment

- ☐ Provide location and volume to be deposited
- ☐ Provide frequency of nourishment

☐ USACE permit or WDFW HPA is obtained

- ☐ Brief description of mitigation requirements
- ☐ Provide copy of each permit and any associated conditions

Appendix A

Native Plant List and Suggested Plant Spacing

Native Plant List

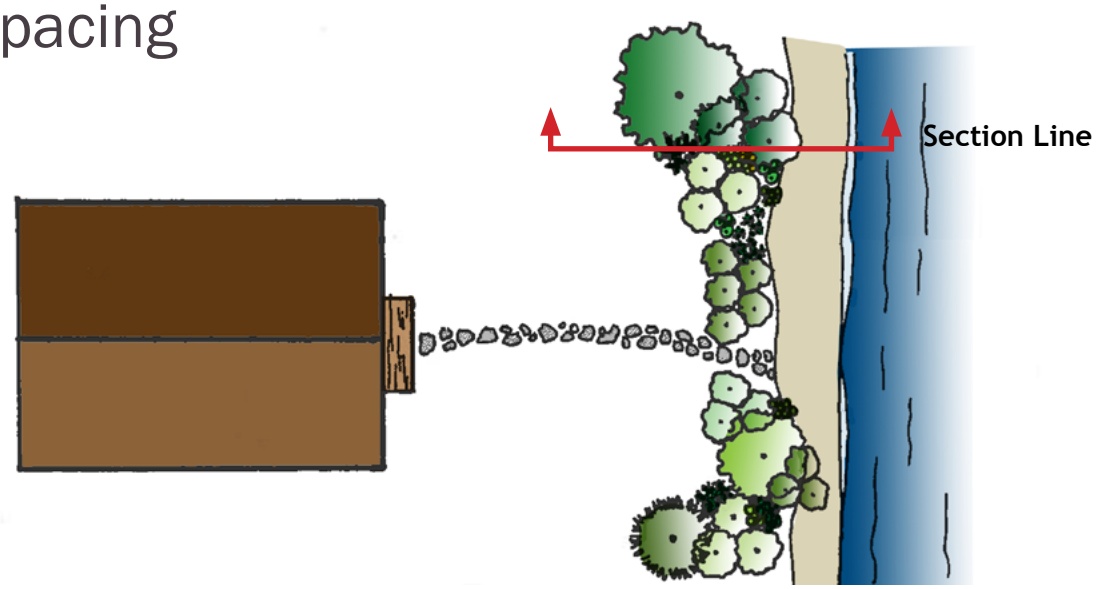
The following tables provide a list of native trees, shrubs, groundcovers, and seed mixes for different site conditions along with their recommended on-center spacing, maintenance notes, and aesthetic qualities.

Additional information on native plants appropriate for Bainbridge Island can be found at:

http://www.kitsapgov.com/dcd/lu_env/native_plants/native_plants.pdf

Examples of a plan view of a planting plan and a section view showing typical plant spacing are provided below.

Plant Spacing



Plan view of native multistoried plant clusters.

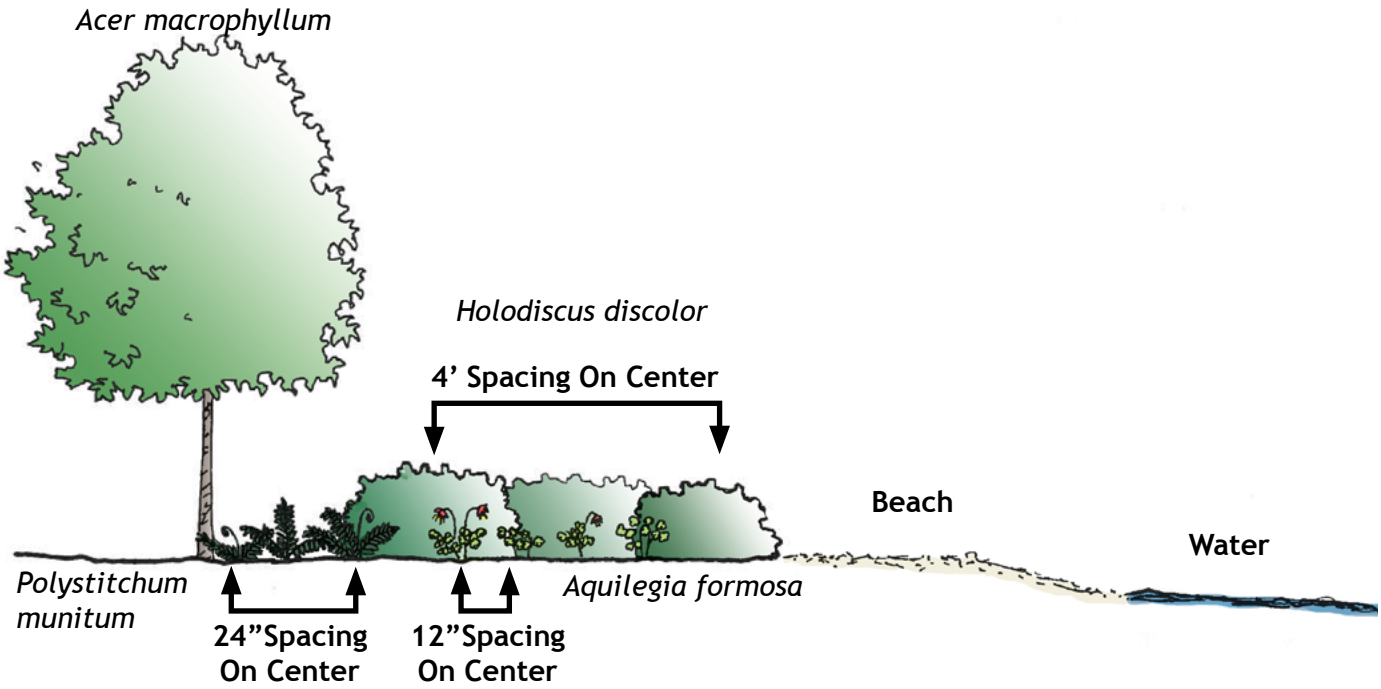


Illustration of on-center native plant spacing.

Bainbridge Island Mitigation Manual Plant List

Deciduous Trees				Plant Placement					Seasonal Water Level Tolerance					Marine Shoreline (Saltwater Tolerant)
Latin Name	Common Name	Site Conditions	Mature Height	Wet Slopes (WS)	Dry Slopes (DS)	Top of Bank (TOB) or Upland (U)	Spacing On Center (O.C.)	Maintenance Notes and Aesthetic Qualities	Dry	Moist to Saturated	0 to 1 foot	1 to 2 feet	2 to 3 feet	
Acer circinatum	Vine maple	Part shade. Moist soil.	10' to 15'	✓	✓	✓	10'	Provides vibrant fall color. Good for seasonally wet soils.	✓	✓				
Acer macrophyllum	Big-leaf maple	Part shade to full sun. Moist, well drained soils.	90'			✓	30'	Vigorous grower. Good for seasonally wet or seasonally dry soils. Plant away from pond inlets and outlets to avoid leaf litter debris clogging structures.	✓	✓				
Alnus rubra	Red alder	Full sun. Poor, moist soil.	100'			✓	15'	Short lived tree. Plan on harvesting and/or replacing in 50 year cycle. Important species for nitrogen fixation. They establish well on disturbed sites.		✓	✓			
Amelanchier alnifolia	Serviceberry	Full sun. Well drained soil. Very drought tolerant.	10'			✓	10'	Early spring bloomer. Use this tree for Spring interest. Good for seasonally dry soils.	✓	✓				✓
Arbutus menziesii	Pacific madrone	Full sun. Well drained, poor, dry rocky soil.	50'			✓	20'	Difficult species to transplant.	✓					✓
Corylus cornuta	Western hazelnut	Part shade to full sun. Well drained soil. Understory species.	20'			✓	15'	This small tree is sometime classified as a shrub. The spring flowers appear before the leaves in yellow catkins. The fall leaves are pale yellow.	✓					✓
Fraxinus latifolia	Oregon ash	Part shade to full sun. Moist to saturated soils.	75'	✓		✓	20'	Fast growing for first third of life span and long lived. Good for seasonally wet soils. This species is often found growing in dense stands.		✓				
Prunus emarginata	Bitter cherry	Part shade to full sun. Dry to moist sites.	30'	✓	✓	✓	15'	Short lived. Plan on harvesting and/or replacing within 40 to 50 years.	✓	✓				

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Deciduous Trees				Plant Placement					Seasonal Water Level Tolerance					Marine Shoreline (Saltwater Tolerant)
Latin Name	**Common Name**	**Site Conditions**	**Mature Height**	**Wet Slopes (WS)**	**Dry Slopes (DS)**	**Top of Bank (TOB) or Upland (U)**	**Spacing On Center (O.C.)**	**Maintenance Notes and Aesthetic Qualities**	**Dry**	**Moist to Saturated**	**0 to 1 foot**	**1 to 2 feet**	**2 to 3 feet**	
Rhamnus purshiana	Cascara	Part shade. Moist, well drained soils.	30'			✓	15'	Usually an understory species, Cascara is a beautiful small tree that produces berries attractive to birds and small mammals.	✓	✓				
Salix hookeriana	Hooker's willow	Full sun. Moist, sand/gravelly soil. Flood tolerant.	20'	✓	✓			Native willow that will sprout multiple stems.		✓				✓
Salix lucida var. *lasiandra*	Pacific willow	Full sun. Moist, sand/gravelly soil. Flood tolerant.	40'	✓	✓	✓	6'	This fast growing species is one of the tallest native willows.		✓	✓	✓	✓	
Salix scouleriana	Scouler's willow	Full sun. Moist, sand/gravel soil.	30'	✓	✓	✓	6'	A native to moist woodland and meadow areas, Scouler's willow grows rapidly and can reseed after soil disturbance.		✓	✓	✓		
Sorbus sitchensis	Sitka mountain ash	Full sun. Moist, rich soil.	10'	✓		✓	6'	A small tree or shrub, this species is often multi-stemmed with a rounded crown. Flowers are creamy white and the fruits persist in winter, providing important winter forage for birds and wildlife.		✓	✓			

Conifers				Plant Placement					Seasonal Water Level Tolerance					Marine Shoreline (Saltwater Tolerant)
Latin Name	**Common Name**	**Site Conditions**	**Mature Height**	**Wet Slopes (WS)**	**Dry Slopes (DS)**	**Top of Bank (TOB) or Upland (U)**	**Spacing On Center (O.C.)**	**Maintenance Notes and Aesthetic Qualities**	**Dry**	**Moist to Saturated**	**0 to 1 foot**	**1 to 2 feet**	**2 to 3 feet**	
Pinus contorta var. *contorta*	Shore pine	Full sun. Well drained soil.	50'			✓	30'	This slender evergreen has orange-brown twigs that darken with age. Cones are asymmetrical and 1" to 2" long. Good to plant along the upland border of a pond.	✓					✓
Picea sitchensis	Sitka spruce	Part shade to full sun. Moist or saturated soils.	250'	✓		✓	30'	Large evergreen with sage green or light green foliage.		✓	✓			

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Conifers				Plant Placement					Seasonal Water Level Tolerance					Marine Shoreline (Saltwater Tolerant)
Latin Name	**Common Name**	**Site Conditions**	**Mature Height**	**Wet Slopes (WS)**	**Dry Slopes (DS)**	**Top of Bank (TOB) or Upland (U)**	**Spacing On Center (O.C.)**	**Maintenance Notes and Aesthetic Qualities**	**Dry**	**Moist to Saturated**	**0 to 1 foot**	**1 to 2 feet**	**2 to 3 feet**	
Thuja plicata	Western red cedar	Full shade to full sun. Moist to swampy soil.	100'	✓	✓	✓	30'	Long-lived western native that can survive moist, mucky conditions.		✓	✓			
Tsuga heterophylla	Western hemlock	Full shade. Wet soil.	150'	✓	✓	✓	30'	Young trees have foliage with a feathery appearance. The 1" long cones are small and papery. Species can be shallow rooted and prone to blow down in some locations.		✓	✓			

Deciduous Shrubs				Plant Placement					Seasonal Water Level Tolerance					Marine Shoreline (Saltwater Tolerant)
Latin Name	**Common Name**	**Site Conditions**	**Mature Height**	**Wet Slopes (WS)**	**Dry Slopes (DS)**	**Top of Bank (TOB) or Upland (U)**	**Spacing On Center (O.C.)**	**Maintenance Notes and Aesthetic Qualities**	**Dry**	**Moist to Saturated**	**0 to 1 foot**	**1 to 2 feet**	**2 to 3 feet**	
Cornus sericea (stolonifera)	Red-osier dogwood	Shady stream banks. Moist, well drained soils.	15'	✓	✓	✓	4'	Plant minimum of 4' from all walkways, roads, and fences in order to avoid pruning. Prune 2-3 branches of a multi-stemmed specimen to the base every other year to stimulate new branch development. New branches have bright red color and will provide winter interest.		✓	✓			
Holodiscus discolor	Ocean spray	Part shade to full sun. Well drained, dry soil.	15'			✓	4'	Large, vase-shaped shrub with arching branches. The big foamy white clusters of flowers bloom throughout the summer months, making this an excellent pollinator species. Good for seasonally dry soil.	✓	✓				✓
Lonicera involucrata	Black twinberry	Part shade. Moist soils.	2' to 7'			✓	4'	This erect, thinly branches species has twin tubular yellow flowers. The shiny black fruits are cupped by two showy purplish-maroon bracts.	✓					

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Deciduous Shrubs				Plant Placement					Seasonal Water Level Tolerance					Marine Shoreline (Saltwater Tolerant)
Latin Name	Common Name	Site Conditions	Mature Height	Wet Slopes (WS)	Dry Slopes (DS)	Top of Bank (TOB) or Upland (U)	Spacing On Center (O.C.)	Maintenance Notes and Aesthetic Qualities	Dry	Moist to Saturated	0 to 1 foot	1 to 2 feet	2 to 3 feet	
Myrica gale	Sweet gale	Part shade to full sun. Moist to wet soils.	5'	✓		✓	4'	Upright growth form. Can be used as a windbreak when planted in rows. Good nitrogen-fixing soil properties. Has a spicy scent on hot summer days. Can grow in relatively poor soils.		✓				

Deciduous Shrubs				Plant Placement					Seasonal Water Level Tolerance					Marine Shoreline (Saltwater Tolerant)
Latin Name	Common Name	Site Conditions	Mature Height	Wet Slopes (WS)	Dry Slopes (DS)	Top of Bank (TOB) or Upland (U)	Spacing On Center (O.C.)	Maintenance Notes and Aesthetic Qualities	Dry	Moist to Saturated	0 to 1 foot	1 to 2 feet	2 to 3 feet	
Myrica californica	California gale	Part shade to full sun. Moist to wet soils.	6'-18'	✓		✓	4'	A large shrub to small tree with an upright growth pattern. Great for border planting.		✓				
Oemleria cerasiformis	Indian plum	Part shade. Moist to dry, well-drained soil.	5'- 16'			✓	4'	An early bloomer, Indian plum is one of the first shrubs to flower in the spring. The drooping chains of white flowers appear just before the leaves. Birds love the small fruit that begin as yellow-gold and transform into a bluish-black color later in the summer. In the sun, this species can grow as a large, dense plant, but in the shade it will take on a more open and sprawling growth form.	✓	✓				
Philadelphus lewisii	Mock orange	Part shade to full sun. Well drained soil.	5' -10'			✓	4'	This species is an ornamental favorite. The white flowers that appear in late spring and early summer have a lovely sweet smell. This species is great for pollinators, along borders, and clustered in odd numbers.	✓	✓				
Physocarpus capitatus	Pacific ninebark	Full sun. Moist soil.	6' -12'	✓			3'	This multi-stemmed shrub has interesting bark that looks as if it is shedding layers. The flowers appear as white clusters in later spring and early summer.		✓				

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Deciduous Shrubs				Plant Placement					Seasonal Water Level Tolerance					
Latin Name	**Common Name**	**Site Conditions**	**Mature Height**	**Wet Slopes (WS)**	**Dry Slopes (DS)**	**Top of Bank (TOB) or Upland (U)**	**Spacing On Center (O.C.)**	**Maintenance Notes and Aesthetic Qualities**	**Dry**	**Moist to Saturated**	**0 to 1 foot**	**1 to 2 feet**	**2 to 3 feet**	**Marine Shoreline (Saltwater Tolerant)**
Ribes sanguineum	Red-flowering currant	Part shade to full sun. Moist to dry, well drained soil.	8' -10'		✓	✓	4'	The pink to deep red sprays of flowers on this shrub are a favorite early source of food for hummingbirds. Other birds eat the blue-black berries before the end of summer.	✓	✓				
Rosa nutkana	Nootka rose	Full sun. Moist soil.	3' 6'	✓	✓	✓	4'	Fast growing. Good for seasonally wet or seasonally dry soils. Bright pink flowers May through June. Rose hips are purplish-red in fall.		✓				
Rubus parviflora	Thimbleberry	Part shade to full sun. Moist to dry soil.	4' -6'		✓	✓	4'	Medium growth rate. Tolerates dry to seasonally wet soil. Spreads through rhizomes. Large leaves emerge in Spring. Flowers are large, papery, and white. Edible red berries look like raspberries.	✓					
Rubus spectabilis	Salmonberry	Full shade to full sun. Moist soil.	3'- 10'	✓	✓	✓	4'	Fast growing. Bright pink to magenta flowers appear single or in small groups from March through April. The yellow to reddish fruit provide wildlife forage.	✓	✓	✓			
Sambucus racemosa	Red elderberry	Part shade to full sun. Moist soil.	5' -8'			✓	10'	Fast growing. Good for seasonally wet or seasonally dry soils. This shrub can grow into the form of a small tree. Clusters of white flowers in May. Red berries appear June through July.		✓				
Spiraea douglasii	Douglas spirea	Full sun. Wetland or lake edge.	4' -7'	✓		✓	6'	Fast growing. Prefers moist to wet soils. Will tolerate dry soils once established, but will do best on moist or boggy sites. Needs regular water during establishment. Can form thickets in boggy areas. Large clusters of tiny pinkish red flowers. Flower plumes dry and remain on plant through winter.		✓	✓	✓	✓	

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Deciduous Shrubs				Plant Placement					Seasonal Water Level Tolerance					
Latin Name	**Common Name**	**Site Conditions**	**Mature Height**	**Wet Slopes (WS)**	**Dry Slopes (DS)**	**Top of Bank (TOB) or Upland (U)**	**Spacing On Center (O.C.)**	**Maintenance Notes and Aesthetic Qualities**	**Dry**	**Moist to Saturated**	**0 to 1 foot**	**1 to 2 feet**	**2 to 3 feet**	**Marine Shoreline (Saltwater Tolerant)**
Symphoricarpus albus	Snowberry	Part shade to full sun. Moist to dry, well drained soil.	2' -6'	✓	✓	✓	3'	Good for seasonally wet or seasonally dry soils. If pruned to ground in early spring, plant will resprout vigorously with more fruit. White to pink bell-shaped flowers. White waxy, non-edible fruit.						✓
Symphoricarpus mollis	Creeping snowberry	Full shade to full sun. Moist to dry, well drained soil.	2'	✓	✓	✓	3'	This trailing species spreads by sending out new roots from along its stem. This low-growing shrub is an excellent groundcover in areas where visibility needs to be maintained.	✓	✓				

Evergreen Shrubs				Plant Placement					Seasonal Water Level Tolerance					
Latin Name	**Common Name**	**Site Conditions**	**Mature Height**	**Wet Slopes (WS)**	**Dry Slopes (DS)**	**Top of Bank (TOB) or Upland (U)**	**Spacing On Center (O.C.)**	**Maintenance Notes and Aesthetic Qualities**	**Dry**	**Moist to Saturated**	**0 to 1 foot**	**1 to 2 feet**	**2 to 3 feet**	**Marine Shoreline (Saltwater Tolerant)**
Arctostaphyllos uva-ursi	Kinnikinnick	Full sun. Dry soil.	12"		✓	✓	2'	Low-growing evergreen shrub that is also commonly used as a groundcover.	✓					
Berberis aquifolium	Tall Oregon grape	Part shade. Well drained soil.	5' -8'			✓	4'	Tall shrub with bright yellow clusters of flowers and clusters of blue fruit in late summer and fall. Good for seasonally dry soil and open areas. Good bird forage species.	✓					
Berberis nervosa	Dull Oregon grape	Part shade. Moist, well drained soil.	2' -3'	✓	✓	✓	3'	Low-growing shrub that prefers shade, but will tolerate open areas. Flowers are bright yellow clusters and fruits are in blue berry-like clusters.	✓	✓				
Ceanothus velutinus	Snowbrush	Full sun. Moist to dry soil, well drained.	20'			✓		Large, pyramidal-shaped clusters of small white flowers. This shrub has a spicy scent. The new bark is reddish or purplish in color.	✓	✓				

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Evergreen Shrubs				Plant Placement					Seasonal Water Level Tolerance					Marine Shoreline (Saltwater Tolerant)
Latin Name	**Common Name**	**Site Conditions**	**Mature Height**	**Wet Slopes (WS)**	**Dry Slopes (DS)**	**Top of Bank (TOB) or Upland (U)**	**Spacing On Center (O.C.)**	**Maintenance Notes and Aesthetic Qualities**	**Dry**	**Moist to Saturated**	**0 to 1 foot**	**1 to 2 feet**	**2 to 3 feet**	
Gaultheria shallon	Salal	Part shade to full sun. Well drained soil.	3' -6'		✓	✓	3'	Good for seasonally dry soil. The more sun, the less the plant will spread. Spreads by layering, suckering, and sprouting. Does best with some moisture and part shade. Deer, rabbit, and snail resistant.	✓					✓
Vaccinium ovatum	Evergreen huckleberry	Shade to full sun. Moist, well drained soil.	3' in full sun. 15' in deep shade.	✓		✓	4'	This shrub has shiny, leathery leaves and tiny pink bell-shaped flowers that bloom from April through July. In areas with full sun, this shrub will have a more open form		✓				

Groundcovers				Plant Placement					Seasonal Water Level Tolerance					Marine Shoreline (Saltwater Tolerant)
Latin Name	**Common Name**	**Site Conditions**	**Mature Height**	**Wet Slopes (WS)**	**Dry Slopes (DS)**	**Top of Bank (TOB) or Upland (U)**	**Spacing On Center (O.C.)**	**Maintenance Notes and Aesthetic Qualities**	**Dry**	**Moist to Saturated**	**0 to 1 foot**	**1 to 2 feet**	**2 to 3 feet**	
Adiantum aleuticum	Maidenhair fern	Full shade. Moist to wet soil.	2'	✓		✓	24"	A black-stemmed fern with delicate palmately arranged leaves.	✓	✓				
Angelica lucida	Sea-watch	Part shade to full sun. Moist to wet soil.	5'	✓			3'	Single-stemmed plant with tight clusters of small white flowers. Blooms in late spring.		✓				✓
Aquilegia formosa	Western columbine	Part shade to full sun. Moist soil.	2'	✓	✓	✓	12"	The beautiful red and yellow flowers bloom in spring and summer. The delicate leaves die back in the winter months and resprout in the spring.	✓	✓				
Armeria maritima	Sea thrift	Full sun. Dry soils.	12"	✓	✓		12"	A popular garden flower with a slow-growing spreading habit. Good for cut flower arrangements.	✓	✓				✓

Bainbridge Island Mitigation Manual Plant List

Groundcovers				Plant Placement					Seasonal Water Level Tolerance					Marine Shoreline (Saltwater Tolerant)
Latin Name	Common Name	Site Conditions	Mature Height	Wet Slopes (WS)	Dry Slopes (DS)	Top of Bank (TOB) or Upland (U)	Spacing On Center (O.C.)	Maintenance Notes and Aesthetic Qualities	Dry	Moist to Saturated	0 to 1 foot	1 to 2 feet	2 to 3 feet	
Aruncus sylvester	Goat's beard	Part shade. Moist soil.	3'- 5'	✓		✓	4'	A deciduous wildflower with large masses of airy white flowers that turn brownish-red as the seasons progress. This plant has a great form throughout the winter and resprouts new arching stems each spring.		✓				
Aster subspicatus	Douglas' aster	Part shade to full sun. Moist to dry soils.	3'	✓	✓	✓	3'	A perennial herb with bluish-purple ray flowers. Blooms in late summer.	✓					✓
Athyrium filix-femina	Lady fern	Full shade. Moist to wet soil.	2'-5'	✓		✓	24"	This fern has delicate feathery fronds and red stems. It is a reliable groundcover.		✓	✓			
Blechnam spicant	Deer fern	Full shade. Moist soil.	2'	✓		✓	24"	A low-growing, hardy fern that does well under the shade of plants.		✓				
Camassia quamash	Common camas	Part shade to full sun. Moist to moderately dry soils.	18"-24"	✓	✓	✓	12"	This pale to deep blue, occasionally white, lily has spike with 5 to many flowers. This showy plant blooms over a short few weeks in late spring.	✓	✓				
Clarkia amoena	Dwarf godetia	Full sun. Moist to moderate soils.	8"- 14"	✓	✓	✓	18"	This pink to rose-purple flower blooms in mid-summer and continues to bloom for several weeks. A taprooted species, it is good for drier sites.	✓	✓				
Dicentra formosa	Pacific bleeding heart	Full shade. Moist soil.	18"	✓	✓	✓	24"	A delicate-leaved plant with little pink heart-shaped flowers, this plant spreads by rhizomes (underground root systems).	✓	✓				

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Groundcovers				Plant Placement					Seasonal Water Level Tolerance					Marine Shoreline (Saltwater Tolerant)
Latin Name	Common Name	Site Conditions	Mature Height	Wet Slopes (WS)	Dry Slopes (DS)	Top of Bank (TOB) or Upland (U)	Spacing On Center (O.C.)	Maintenance Notes and Aesthetic Qualities	Dry	Moist to Saturated	0 to 1 foot	1 to 2 feet	2 to 3 feet	
Epilobium angustifolium	Fireweed	Full sun. Moist to dry soil.	2'-6'		✓	✓	24"	Showy rose to purple flowers in tall spike-like clusters. This plant spreads by seed and rhizome and will continue to thrive as long as it gets sun.	✓	✓				
Fragaria chiloensis	Coastal strawberry	Part shade to full sun. Sandy soil.	6"	✓	✓	✓	12"- 18"	A hardy, small strawberry plant that will colonize open areas and create a dense groundcover.	✓	✓				✓
Heuchera micrantha	Alumroot	Full shade. Moist soil.	18"-24"	✓		✓	18"	A delicate native with a tall spike of small white flowers. Great for shady sites.	✓	✓				
Lupinus polyphyllus	Large-leaf lupine	Part shade. Moist soil.	12"-36"	✓	✓	✓	12"	Big, robust plant with bold, rich-green palmate leaves. The flowers are large spikes of deep-blue to purplish flowers. This plant blooms biennially and will spread from seed.	✓	✓				
Mimulus guttatus	Yellow monkey flower	Full sun. Moist to wet soil.	18"- 30"	✓		✓	24"	This perennial herb spread by rhizomes and has bright happy yellow flowers with crimson to reddish-brown spots.		✓	✓			
Oxalis oregana	Sorrel	Full shade. Moist soil.	12"	✓	✓	✓	14"	This clover-like species spreads by rhizomes and forms a nice groundcover. The small white flowers bloom in spring and summer.	✓	✓				

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Groundcovers				Plant Placement					Seasonal Water Level Tolerance					
Latin Name	Common Name	Site Conditions	Mature Height	Wet Slopes (WS)	Dry Slopes (DS)	Top of Bank (TOB) or Upland (U)	Spacing On Center (O.C.)	Maintenance Notes and Aesthetic Qualities	Dry	Moist to Saturated	0 to 1 foot	1 to 2 feet	2 to 3 feet	Marine Shoreline (Saltwater Tolerant)
Plectritis congesta	Sea blush	Full sun. Moist to wet soil.	6"-24"	✓		✓	12"	This small herb has an upright stem that supports a head of showy pink flowers.	✓	✓				
Polystitchum munitum	Sword fern	Moist to dry soil.	2'- 5'	✓	✓	✓	24"	One of the most adaptable, hardy ferns this species stays green year-round.	✓	✓				
Potentilla anserina var. pacifica	Silverweed	Part shade to full sun. Moist to wet soil.	18"	✓			24"	Small spreading plant with yellow flowers. Blooms late spring through mid-summer.		✓				✓
Sedum spathulifolium	Broad-leaved stonecrop	Full sun. Dry soils.	6"		✓	✓	12"	A native sedum with green and red succulent foliage. The yellow flowers bloom in June and July.	✓					✓
Sidalcea hendersonii	Henderson's checkermallow	Full sun. Moist to wet soil.	5'	✓			3'	A tall native herbaceous perennail with a stalk of pink to mauve flowers that bloom early to mid-summer.		✓				✓
Sisyrinchium idahoense	Blue eyed grass	Part shade to full sun. Moist soils.	24"	✓	✓	✓	12"	This perennial herb has grass-like leaves, but has a light blue to dark purple (sometimes white) flower.	✓	✓				
Tellima grandiflora	Fringecup	Part shade. Moist soil.	14"- 30"	✓		✓	18"	A perennial herb with a spike of fragrant, greenish-white flowers that turn pink or reddish as the flowers age.	✓	✓				
Tolmiea menziesii	Youth-on-age	Full shade. Moist soil.	6" -12"	✓		✓	12"	Small plant that forms a delicate groundcover. The tiny flowers are brownish-purple.	✓	✓				

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Grasses, Sedges, and Rushes				Plant Placement					Seasonal Water Level Tolerance					
Latin Name	Common Name	Site Conditions	Mature Height	Wet Slopes (WS)	Dry Slopes (DS)	Top of Bank (TOB) or Upland (U)	Spacing On Center (O.C.)	Maintenance Notes and Aesthetic Qualities	Dry	Moist to Saturated	0 to 1 foot	1 to 2 feet	2 to 3 feet	Marine Shoreline (Saltwater Tolerant)
Agrostis exarata	Spiked bentgrass	Full sun to part shade. Moist, saturated, or seasonally to permanently flooded conditions.	1'-3'	✓			12"	A perennial grass that grows in tufted form and has erect spikes, as its name suggests.		✓	✓			
Beckmannia syzigachne	American sloughgrass	Full sun to part shade. Moist, saturated, or seasonally to permanently flooded conditions.	1'-3'	✓			12"	A stout grass with somewhat spongy stems, this plant grows on its own or in groups. This species can be planted or seeded.		✓	✓			
Bromus sitchensis	Sitka brome	Full sun. Dry soils.	6"- 18"			✓	12"	A stout perennial grass with flowers in open, airy panicles.	✓					
Carex lyngbyei	Lyndgye's sedge	Part shade to full sun. Wet soils.	3'	✓			12"	A wetland sedge with lime to medium green foliage. Tops of leaf blades sometimes slightly arching. Brown flower stalks.		✓				✓
Carex obnupta	Slough sedge	Full sun to part shade. Moist, saturated, or seasonally to permanently flooded conditions.	1'-3'	✓			12"	A large tufted sedge with erect, then arching leaf blades and large brown arching flower heads.		✓	✓	✓		
Carex stipata	Saw beaked sedge	Full sun to part shade. Moist, saturated, or seasonally to permanently flooded conditions.	1'-3'	✓			12"	A tufted arching sedge, this plant has pyramidal flower clusters that turn from light green to golden as they mature. Flower stems are erect and leaves are bright spring green.		✓	✓			
Danthonia californica	California oat grass	Full sun. Dry to moist soil.	10"- 12"		✓	✓	12"	A delicate, native, clumping grass with purplish-red flowers.	✓	✓				
Deschampsia cespitosa	Tufted hairgrass	Full sun. Moist to wet soil.	18"- 4'	✓	✓	✓	12"	This large, clumping grass has big feathery flower heads with bronze arching flowers.	✓	✓	✓			✓
Eleocharis palustris	Common spikerush	Full sun to part shade. Moist, saturated, or seasonally to permanently flooded conditions.	1'-3'	✓			12"	A mat-forming perennial spikerush with erect slender stems.		✓	✓	✓	✓	
Elymus glaucus	Blue wildrye	Full shade to full sun. Dry to moist soil.	2'-4'	✓	✓	✓	12"	A tufted perennial grass that forms small clumps and has light blue-green green leaf blades.	✓	✓				✓

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Grasses, Sedges, and Rushes				Plant Placement					Seasonal Water Level Tolerance					
Latin Name	Common Name	Site Conditions	Mature Height	Wet Slopes (WS)	Dry Slopes (DS)	Top of Bank (TOB) or Upland (U)	Spacing On Center (O.C.)	Maintenance Notes and Aesthetic Qualities	Dry	Moist to Saturated	0 to 1 foot	1 to 2 feet	2 to 3 feet	Marine Shoreline (Saltwater Tolerant)
Elymus mollis	Dune grass	Full sun. Moist to wet soil.	3'	✓			24"	An industrial strength dune grass that forms large clumps and spreads via underground stems. A hearty weed competitor.		✓				✓
Festuca rubra	Red fescue	Full sun to full shade. Dry to moist soil.	2'	✓	✓	✓	12"	A versatile grass that spreads by rhizome. One of the few shade tolerant grasses.	✓	✓				
Glyceria occidentalis	Northwestern mannagrass	Full sun to part shade. Moist, saturated, or seasonally to permanently flooded conditions.	1'-5'	✓			12"	A tall perennial wetland grass.		✓	✓	✓	✓	
Hordeum brachyantherum	Meadow barley	Full sun. Dry to moist soil.	1'-3'	✓	✓	✓	12"	A hardy native tolerant of wet, dry, and saline sites. This species is used for erosion control and as a groundcover. Can sometimes compete with reed canary grass.	✓	✓				
Juncus ensifolius	Dagger-leaf rush	Full sun to part shade. Moist, saturated, or seasonally to permanently flooded conditions.	6" to 2.5'	✓			12"	A small rush with an erect form, this wetland species spreads by rhizome.		✓	✓	✓		
Juncus tenuis	Slender rush	Full sun to part shade. Moist, saturated, or seasonally to permanently flooded conditions.	6" to 2'	✓			12"	This rush is best planted, due to its low seed fertility rate. A clump forming perennial rush.		✓	✓	✓		
Schoenoplectus acutus	Hardstem bulrush	Full sun to part shade. Moist, saturated, or seasonally to permanently flooded conditions.	3' to 6'	✓			12"	A good wetland species to use for soil stabilization and water treatment. Birds eat the seeds, but this plant is not a preferred food of deer and elk.		✓	✓	✓	✓	
Schoenoplectus microcarpus	Soft stem bulrush	Full sun to part shade. Moist, saturated, or seasonally to permanently flooded conditions.	2' to 3'	✓			12"	A good soil stabilization and water quality species, this plant spreads readily by rhizome.		✓	✓	✓		

Bainbridge Island Mitigation Manual Plant List

Bainbridge Island Emergent Seed Mix			Seasonal Water Level Tolerance				
Latin Name	**Common Name**	**% Mix**	**Dry**	**Moist to Saturated**	**0 to 1 foot**	**1 to 2 feet**	**2 to 3 feet**
Beckmannia syzigachne	American sloughgrass	20		✓	✓	✓	
Carex obnupta	Slough sedge	10					
Eleocharis palustris	Common spikerush	10					
Elymus glaucus	Blue wildrye	20					
Glyceria occidentalis	Northwestern mannagrass	10					
Juncus ensifolius	Dagger-leaf rush	10					
Juncus tenuis	Slender rush	10					
Schoenoplectus acutus	Hardstem bulrush	5					
Schoenoplectus microcarpus	Soft stem bulrush	5					

Bainbridge Island Wetland Bottom Seed Mix			Seasonal Water Level Tolerance				
Latin Name	**Common Name**	**% Mix**	**Dry**	**Moist to Saturated**	**0 to 1 foot**	**1 to 2 feet**	**2 to 3 feet**
Agrostis exarata	Spiked bentgrass	20		✓	✓	✓	✓
Carex stipata	Saw beaked sedge	30					
Glyceria occidentalis	Northwestern mannagrass	20					
Schoenoplectus microcarpus	Soft stem bulrush	30					

Bainbridge Island Moist to Dry Slope Seed Mix			Seasonal Water Level Tolerance				
Latin Name	**Common Name**	**% Mix**	**Dry**	**Moist to Saturated**	**0 to 1 foot**	**1 to 2 feet**	**2 to 3 feet**
Deschampsia cespitosa	Tufted hairgrass	20	✓	✓			
Hordeum brachyantherum	Meadow barley	30					
Elymus glaucus	Blue wildrye	15					
Festuca rubra var *rubra*	Red fescue	20					
Bromus carinatus	California brome	15					

Bainbridge Island Mitigation Manual Plant List

Bainbridge Island Emergent Wildflower/Pollinator Seed Mix			Seasonal Water Level Tolerance				
Latin Name	**Common Name**	**% Mix**	**Dry**	**Moist to Saturated**	**0 to 1 foot**	**1 to 2 feet**	**2 to 3 feet**
Camassia quamash	Common camas	25	✓	✓			
Erigeron speciosus	Aspen daisy	25					
Lupinus polyphyllus	Large-leaf lupine	25					
Sisyrinchium idahoense	Blue eyed grass	25					

Bainbridge Island Upland Grass Seed Mix			Seasonal Water Level Tolerance				
Latin Name	**Common Name**	**% Mix**	**Dry**	**Moist to Saturated**	**0 to 1 foot**	**1 to 2 feet**	**2 to 3 feet**
Bromus carinatus	California brome	20	✓				
Festuca rubra var. rubra	Red fescue	30					
Hordeum brachyantherum	Meadow barley	50					

Bainbridge Island Upland Forb Seed Mix			Seasonal Water Level Tolerance				
Latin Name	**Common Name**	**% Mix**	**Dry**	**Moist to Saturated**	**0 to 1 foot**	**1 to 2 feet**	**2 to 3 feet**
Achillea millefolium	Yarrow	25	✓				
Clarkia amoena	Farewell-to-spring	25					
Lupinus bicolor	Bicolor lupine	25					
Solidago canadensis	Canada goldenrod	25					