



# VISITOR CENTER

## FOREST ENHANCEMENT PLAN



Alice Yeates  
South Slough National Estuarine Research Reserve  
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# 1 Introduction

The South Slough Visitor Center is a focal point, where over 10,000 visitors access the Reserve annually. Due to its accommodation for all hiking levels and proximity to the visitor center, the ten-minute trail is a highly utilized resource and provides a unique opportunity for visitors to learn about and appreciate South Slough Reserve. Due to past forestry actions, followed by minimal forest management, much of the area surrounding the visitor center and the ten-minute trail is currently dense regrowth conifer forest (approx. 30 years old). This forest is largely impenetrable, visually restrictive, provides little biological value for wildlife and poses a serious fire risk (Fig. 1). When the visitor center was originally built, clear-cut forest enabled a view of the estuary (Fig. 2) and maintaining a viewshed was an important component of the South Slough 1991 Facilities Master Plan (see excerpt in Appendix A). The current improvement plan outlines the management of the area surrounding the visitor center to achieve the following objectives: reduce fire risk to the visitor center, improve forest health, increase biological and educational value and to re-establish a visual connection with the South Slough estuary. This plan outlines the potential management actions; however, we will assess our objectives throughout the project and minimize tree removal where possible.



A single gap in adjacent forest limits connection to the estuary with views blocked by 100% crowns and surrounding forests.



Fuel accumulation and poor defensible space in forests adjacent to the visitor center increases fire risk.



Dense forest stands have poor diversity and limited resources for wildlife.

*Figure 1: Current forest conditions*



*Current views (2019) blocked by 100% crowns and dense forest*

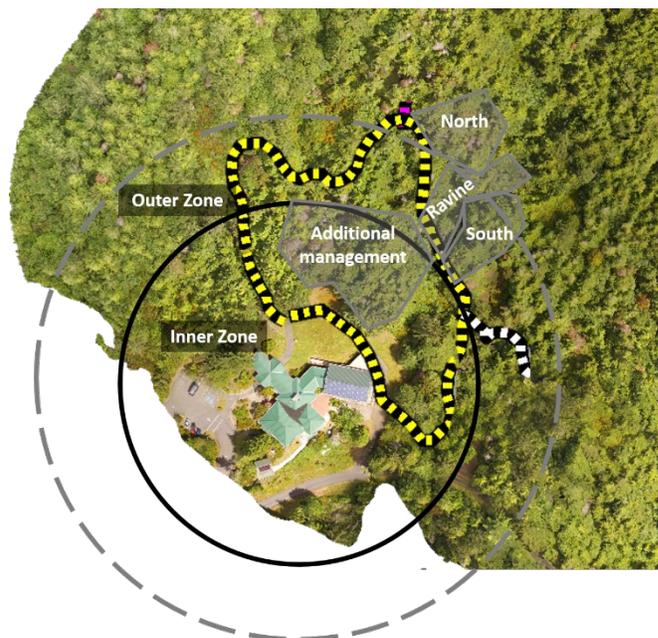


*A 1994 image, following clearcut, shows potential view from visitor center*

*Figure 2: Current and past views through the visitor center covered walkway leadings to the main building entrance (right) and path that leads to education classroom.*

## 2 Management zones

Based on management objectives, the target area is divided into two zones: Inner Zone and Outer Zone (Fig. 3). The Inner Zone is the area extending 100 ft from the visitor center and the primary objectives within this zone are to improve defensible space from wildfires and establish a visual connection with the estuary. A sub-section within this zone (additional management) will undergo additional management in order to meet the latter objective. The Outer Zone extends up to 200 ft from the visitor center and includes the ten-minute trail. The primary objectives of this area are to slow wildfires, increase the biological and educational value along the ten-minute trail and establish a visual connection with the estuary. The Outer Zone is sub-divided into three management sections: North, Ravine and South. A map of the management areas can be found in figure 3.



*Figure 3: Aerial image of South Slough Visitor Center and adjacent forest. Banded lines show the location of the ten-Minute Trail (yellow/black), and intersections with North Creek Trail (pink/black) and Middle Creek Trail (white/black). Management areas include the Inner Zone (within black circle) with an additional management subsection and the Outer Zone (within grey dashed circle) with three subsections (North, Ravine and South). The north section lies outside the Outer Zone however is associated with it for simplicity.*

### 3 Reduce Fire Risk and Improve Forest Health (Inner Zone)

#### Management Directive

“management activities will replicate the functions that produce...late successional or old growth forests.”  
(Robinson 2009)

The goals for the Inner Zone are to promote development of mature conifer forest (approx. 50 trees/acre) with an open understory which reduces fire risk, enables access and provides a fragmented view of the slough (Fig. 4). Due to the age of trees and the current density (over 360 trees/acre) in this area, thinning forests to this

desired density during a single event

would most likely result in shock of remaining trees and reduce their resilience to disease and wind throw; thinning should therefore be in stages. By following good defensible space practices, we can reduce the risk of fire to the visitor center and provide a demonstration area for defensible space workshops. Oregon State University (OSU) Extension’s guidelines for defensible space and fuel reduction (Bennett et al. 2017) specify that the area surrounding a structure (100 ft on flat ground, 200 ft on steep slopes) should be maintained in the following way:

- *“Remove dead fine vegetation, including dead shrubs, fallen branches, thick accumulations of needles and leaves, etc.*
- *Thin out dense patches of trees and shrubs to create separation between them in order to slow the spread of fire.*
- *Reduce ladder fuels by removing low tree branches and shrubs growing directly under trees.*
- *Remove invasive weeds such as blackberries, cheatgrass, and Scotch broom.”*

#### Outreach Opportunity

Opportunity for SSNERR Coastal Training Program to partner with OSU Extension

The visitor center sits atop a ridge on a relatively flat shelf. Due to the surrounding topography, forest within 100 ft (Inner Zone) of existing buildings should be managed to reduce fire risk on a regular basis and an additional 100 ft beyond this (Outer Zone) should be managed to slow fire movement (see section 4.1 for details).

#### 3. 1. Inner Zone management actions

The following actions are recommended for forests within the Inner Zone:

- a) Forests will be thinned to the density of 200 trees/acre. Leave trees (i.e. not removed) will be determined by size and health of tree (e.g. larger DBH and larger crowns), spacing between leave trees (approx. 15 ft) and opening of the viewshed. Additional thinning required in 5-10 years to achieve mature forest stem density.
- b) Remove all Port-Orford-cedar (*Chamaecyparis lawsoniana*). This species is currently stressed and are dying off due to the root disease, *Phytophthora lateralis*. We will continue to plant disease resistant individuals throughout the Reserve to replace these trees.
- c) Remove standing dead trees.
- d) Remove accumulated woody material from the ground. Leave any large, biologically important logs in place and clear smaller debris from around them.
- e) Reduce ladder fuels. Prune lower limbs, approximately 10ft above the ground for large trees and up to a third of the live branches at a time for smaller trees. Stagger heights to create a more

“natural” aesthetic and improve view in target areas. Prune conifers in Autumn/Winter (Nov/Dec) and do not damage the branch collar.

- f) Fragment the continuous shrub layer. There is currently a near continuous shrub layer surrounding the visitor center. Up to 80% of the shrubs in this area will be removed and remnants will be disconnected; this will allow for re-growth to occur before maintenance is required. Shrub removal will be targeted to areas under and adjacent to leave trees.

### 3. 2. Inner Zone (Additional Management Area) management actions

A 0.24-acre sub-section, within the Inner Zone, will receive the following additional management actions:

- a) Thinning of larger trees to 75 trees/acre residual density. This section has approximately 130 small trees (< 10cm DBH) and 87 large trees (37% Sitka spruce, 32% Port-Orford-cedar and 26% western hemlock, 5% other). Thinning to the proposed density will result in 19 large trees remaining in this sub-section, with a mixture of Sitka spruce, Douglas fir and western hemlock.
- b) Removal of all shrubs.
- c) Planting with sword ferns and other native ground cover plants where available. Maintaining an open understory.



*Current conditions*



*Desired conditions*

*Figure 4: Photographs showing the current (2019) forest conditions within the Inner Zone, additional management area and a reference site showing the desired conditions.*

## 4 Increase biological and educational value (Outer Zone)

Proposed management of forests within the Outer Zone will focus on thinning the forest and creating gaps to slow fire movement and to increase the diversity of community types, wildlife habitats and food plants for biological and educational value. Additional management in the Outer Zone is suggested for three areas (Fig. 3): 1) north of ravine, 2) along ravine and 3) south of ravine.

### 4.1 Outer Zone management actions

Dense forests will be thinned to 200 trees per acre to slow fire movement and promote development of old growth forests. Leave trees will be characterized by larger stems and crown size, along with their

proximity to other leave trees (approx. 15 ft spacing). Additional thinning in 5 years is recommended for improving forest health and reducing fire risk.

## 4.2 Northern area management actions

Minimal management is proposed for this section and is limited to the creation of snags (standing dead trees) from the tallest trees. Snags are important wildlife habitat and creation of these will replace the removal of snags within the Inner Zone. Removal of dense foliage in this area will increase the viewshed corridor between the visitor center and South Slough estuary. Up to 10 large trees will be girdled and left standing in place. These trees have been identified from a drone map showing crown elevations likely to restrict views beyond the Inner Zone (Appendix B; created by Earth Design Consultants). Growth of neighboring trees are likely to limit the view to the estuary and future actions may be required to maintain a view corridor; however, due to impacts on tree health and aesthetics topping trees is not recommended.

**Educational Opportunity**  
Look beyond the trail to a biologically important feature in the landscape

## 4.3 Ravine area management actions

Establishing low growing hardwoods and shrubs in this area will promote a view corridor, by slowing the re-establishment of tall conifer species, and will add diversity for both education and wildlife benefit. Hardwood species naturally occur in riparian areas and currently represent only 2% of the Reserve's forest. Large conifer species and tall hardwoods (e.g. red alder [*Alus rubra*]) in this ravine will be felled and left in place to increase habitat complexity. Sparse plantings of low growing native hardwood species will replace any felled trees within this drainage. A list of suggested species can be found in Appendix C.

## 4.4 Southern area management actions

**Ecological Importance**  
Forest gaps, with early successional communities, are a naturally occurring and important component of the landscape and are infrequent in forests regenerating after logging. (Hagar 2007)

This 0.17-acre stand is currently a dense, closed canopy forest and blocks the north-easterly view of the Slough (Fig. 5). The area has approximately 80 small trees (<10cm DBH) and about the same number of larger trees, which are predominantly Port-Orford-cedar. Proposed management of this section includes the felling of all conifer trees followed by planting

flowering shrubs. Plantings will target desired native species and serve to increase diversity as surrounding shrubs naturally colonize this area. A list of suitable plant species can be found in Appendix C. This area will become a pollinator and wildlife hotspot and increase the appeal of the adjacent gathering area to visitors and education groups. Installing native bee and bird boxes (e.g. purple

**Collaboration Opportunity**  
Local stakeholders, such as ODFW, citizen science groups and both the education and science teams can work together to establish and monitor purple martin populations.

martin, tree swallow) with small informational signs will increase the biological and educational value of this area. A forest gap adjacent to a ravine, such as this, is suitable habitat for purple martin and other avian species, which require an open area (min. of 40-60 ft to nearest tree; Purple Martin Conservation Association). Purple martin, an Oregon Conservation Strategy Species, experienced a population crash in South Slough following the 1970's and were not present in a 1998 survey (Joe Metzler pers. comm. 7/29/2019). Due to conservation efforts, South Slough currently has 5 nesting pairs, however their current nesting sites (boxes on slough side pilings) is at risk from decay. Purple martin boxes will be placed on the north eastern section of this gap, to utilize the natural opening of the ravine, thus minimizing gap size requirements. In addition to boxes a few large snags will be left in and near the gap to promote natural nesting sites. Snags will be limbed (2-3 ft lengths) and topped for ideal nesting conditions. Establishment of flowering shrubs in this area will mitigate the impacts of removing these species from the Inner Zone.



*Current conditions*



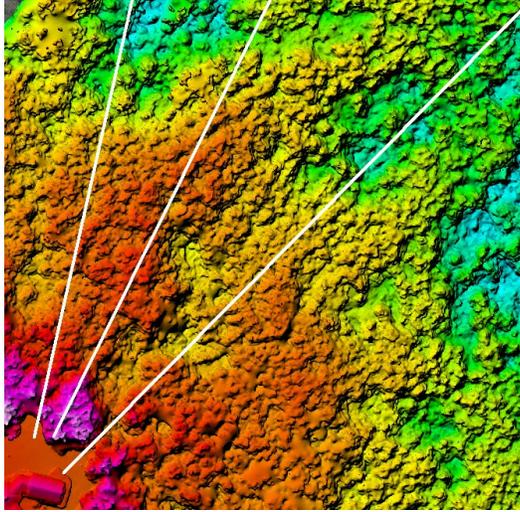
*Desired conditions*

*Figure 5: Photographs showing the current (2019) forest conditions within the Outer Zone - South and desired conditions (clockwise from top left: evergreen huckleberry, flowering red current, salmonberry and salal).*

## 5. Re-establish visual connection (Inner and Outer Zones)

Due to its location on a ridge top and restricted visibility, a large number of the people who stop at the visitor center never see the slough of South Slough Reserve. By implementing the management actions outlined above, we will maximize the visitors experience and increase the viewshed along three pathways (Fig. 6). In addition to these actions, removing select trees adjacent to the current gap (Fig. 1) will widen this viewing area. Maintaining a viewshed in a growing forest will require long term maintenance; the original facilities master plan (1991) suggests a five-year interval. Maintenance includes limb lopping of lower branches, thinning and restricting shrub re-growth in the Inner Zone, and preventing colonization of conifers in key areas of the Outer Zone.

**1991 Facilities Master Plan**  
*"Thinning and cutting should be performed to produce a "natural" appearance, allowing filtered views through small groups or individual trees rather than along sharply defined corridors." p. 27*



*Figure 6: Above - heat map showing elevation of canopy relative to visitor center lawn with approximate view pathways (lines). Right - view pathway lines extended to South Slough. Front page - photograph looking north east at 40 ft above visitor center lawn. Heat map and photograph by Earth Design Consultants.*

## 6. Managing debris from proposed actions

Common forestry practices suggest several potential slash removal methods, which have different restrictions and impacts on a site. After considering the limited access for large machinery (e.g. for mastication), importance of aesthetics, need for fuel reduction (Inner Zone), establishment of desired native species and reduction of negative impacts, such as erosion and invasive species establishment, the following methods are recommended:

Inner Zone: Small stemmed trees and branches of felled trees will be chipped and left in place, while large stems will be cut and removed.

Outer Zone – South: Small stems and branches of felled trees will be chipped and left in place, while many large stems will be left in place to create nurse logs and wildlife habitat. At the outer edge of the gap (away from the trail) small piles of debris will either be left for vegetation to grow over or covered and burnt during the wet season. To increase aesthetics, and reduce material on site, select logs will be cut and removed from the site.

## 7. Safety precautions

This work has a narrow timeframe, with grant completion by December 2019, however safety is a top priority. Work will be timed to minimize disruption to Reserve programs (e.g. school watershed hikes) and risk to the public. The appropriate section of the ten-minute trail will be closed, and the lawn area will be cordoned off during the work. Teams with appropriate experience and lead by trained

professionals will carry out the work and a Reserve Staff member will be on site throughout project completion.

## 8. Outreach and signage

Following approval by the commission, staff will:

- advertise and conduct an information session at the visitor center (September/October 2019), and
- post temporary signage prior to management, which will remain in place for one-year post management. These signs will include project objectives, rationale and timeline.

## 9. Timeline

**June 2019:** First technical advisory group meeting, attended by: Alice Yeates (SSNERR), Alexa Carleton (Coos Watershed Association), Norma Kline (OSU Extension), Greg Erb (ODF), Tristan Huff (BLM) and Ryan Singleton (DSL).

**July 2019:** Staff advisory group meeting, attended by: Alice Yeates, Eric Dean and John Bragg. Draft proposal sent to the technical advisory group, Coquille Indian Tribe, Confederated Tribes of the Siletz Indians, the Confederated Tribes of the Coos, Lower Umpqua and Siuslaw Indians and Reserve staff for review.

**August 2019:** Incorporate comments from the advisory group and staff. Received approval from the Coquille Indian Tribe and Confederated Tribes of the Coos, Lower Umpqua and Siuslaw Indians to conduct work in this area.

**August 29<sup>th</sup>, 2019:** Present proposal to Commission.

**September/October 2019:** Organize contractors and work crews. Conduct public outreach.

**Early November** – Inmate work crews cut small trees and remove debris.

**Late November/early December 2019** – Contractor fells large trees.

**Late December 2019:** Inmate work crews to cut small trees, remove debris, prunes lower branches

**31<sup>st</sup> December 2019:** Close grant

## Resources

Bennett, M., S. Fitzgerald, A. Jones and K. Baylog (2017) A defensible space and fuel reduction guide for homeowners and landowners. Oregon State University.

<https://catalog.extension.oregonstate.edu/sites/catalog/files/project/pdf/em9184.pdf>; accessed May 29<sup>th</sup> 2019.

Hagar, J. (2007) Wildlife species associated with non-coniferous vegetation in Pacific Northwest conifer forests: A review. *Forest Ecology and Management*, 246(1):108-122.

Purple Martin Conservation Association; <https://www.purplemartin.org/purple-martins/attracting/>; accessed July 14<sup>th</sup> 2019.

Robinson, J. 2009. Upper Watershed Restoration Action Plan. South Slough national Estuarine Research Reserve, Charleston, OR. 107 pp.

Withrow-Robinson, B. and D. Maguire (2018) Competition and density in woodland stands. Oregon State University Extension Service.

<https://catalog.extension.oregonstate.edu/sites/catalog/files/project/pdf/em9206.pdf>; accessed August 12<sup>th</sup> 2019.

## Appendix A

Page 27 of the 1991 Facilities Master Plan: South Slough National Estuarine Research Reserve

### VIEWSHED

Previous logging activity has created viewing opportunities of the estuary from a number of upland locations. An excellent viewshed now exists from the Interpretive Center to South Slough that includes Valino Island.

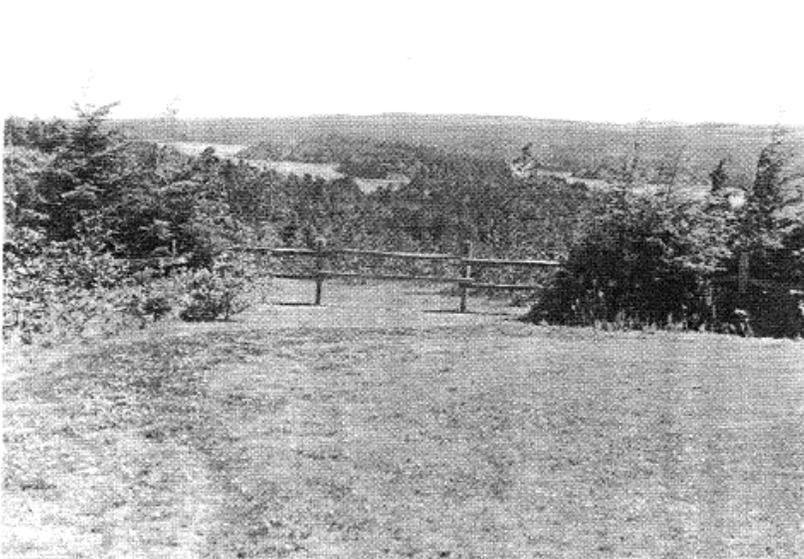
#### RECOMMENDED ACTION:

The views from the Interpretive Center to South Slough should be preserved through creation and maintenance of view corridors. Viewing alignments accomplished through selective topping, pruning and clearing of trees and major vegetation within these corridors. A more thorough and precise site analysis beyond the scope of this report should be performed to determine the number and character of the view corridor(s).

The corridor(s) should be monitored by the SSNERR staff and "managed" on a five-year interval. In addition, consideration should be given to the appearance of the view corridor(s) appearance from the water.

Thinning and cutting should be performed to produce a "natural" appearance, allowing filtered views through small groups or individual trees rather than along sharply defined corridors.

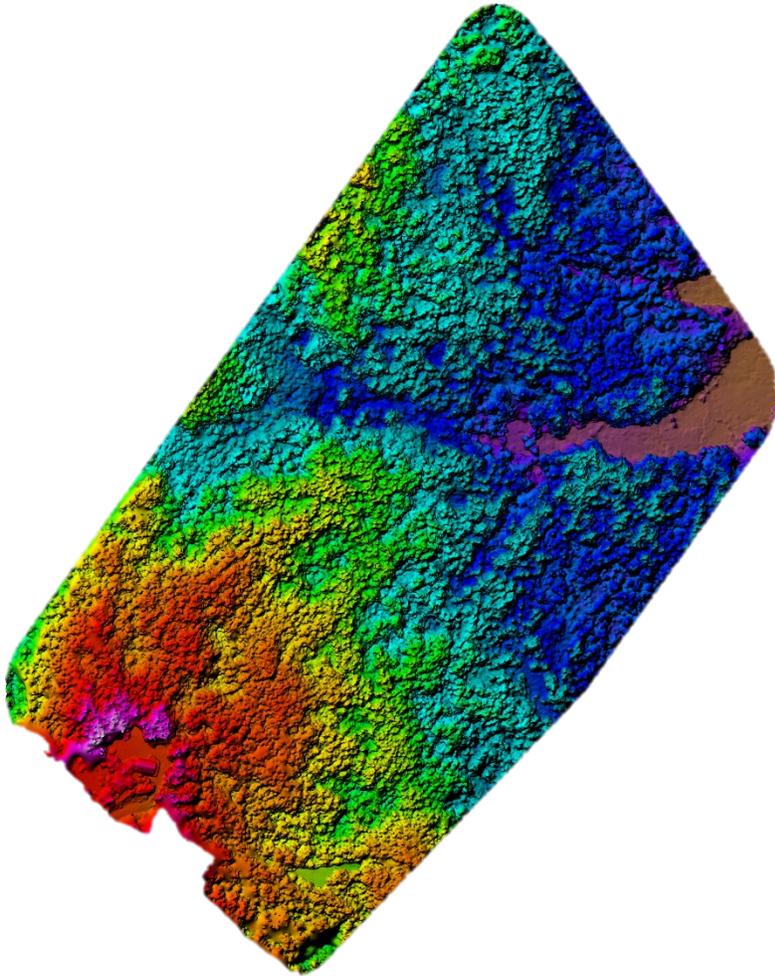
Viewing positions should be obvious and clearly identified through observation sites and discrete signage at the Interpretive Center or along trails.



*View of South Slough and Valino Island from Interpretive Center*

## Appendix B

Digital surface heat map created by Earth Design Consultants from drone imagery showing elevation of upper surfaces (e.g. buildings, canopies, mudflats). Visitor Center is in the lower left corner and Slough Side Pilings Marsh in upper right. Colors indicate elevation relative to launch site (lawn at visitor center), with approximate elevations as follows: orange = 0 ft, red = 30 ft and bright pink = 40 ft above launch site. All other colors have surface elevations below launch site.



## Appendix C

Table 1: Lists of plant species including their common name, Latin names and abbreviated Latin names. Lists include tree species currently present in the Inner Zone – additional management sub-section and the ground cover species to establish in this section, and shrub species to be planted or allowed to colonize the Outer Zone – South and Drainage sub-sections. Culturally important species will be incorporated where appropriate.

Common Name	Latin Name	Abbreviated Latin	Notes
<b>Current tree species (Inner Zone – addition management)</b>			
Port-Orford-cedar	<i>Chamaecyparis lawsoniana</i>	<i>C. lawsoniana</i>	Remove all
Douglas-fir	<i>Pseudotsuga menzeseii</i>	<i>P. menzeseii</i>	
Sitka spruce	<i>Picea sitchensis</i>	<i>P. sitchensis</i>	
Western hemlock	<i>Tsuga heterophylla</i>	<i>T. heterophylla</i>	
Shore (Lodgepole) pine	<i>Pinus contorta</i>	<i>P. contorta</i>	
<b>Potential ground cover species to establish (Inner Zone – additional management)</b>			
Western columbine	<i>Aquilegia formosa</i>	<i>A. formosa</i>	Plant
Western swordfern	<i>Polystichum munitum</i>	<i>P. munitum</i>	Plant
Oregon fawn lily	<i>Erythronium oregonum</i>	<i>E. oregonum</i>	Plant
Western bleeding heart	<i>Dicentra formosa</i>	<i>D. formosa</i>	Plant
<b>Potential shrub species to establish (Outer Zone -South)</b>			
Kinnikinnick	<i>Arctostaphylos uva-ursi</i>	<i>A. uva-ursi</i>	Plant
Coyotebrush	<i>Baccharis pilularis</i>	<i>B. pilularis</i>	Plant
Salal	<i>Gaultheria shallon</i>	<i>G. shallon</i>	Colonizer
Oceanspray	<i>Holodiscus discolor</i>	<i>H. discolor</i>	Plant
Oregon grape (compact)	<i>Mahonia aquifolium</i>	<i>M. aquifolium</i>	Plant
Oregon grape (cascade)	<i>Mahonia nervosa</i>	<i>M. nervosa</i>	Plant
Pacific waxmyrtle	<i>Myrica californica</i>	<i>M. californica</i>	Plant
Red-flowering currant	<i>Ribes sanguineum</i>	<i>R. sanguineum</i>	Plant
Salmonberry	<i>Rubus spectabilis</i>	<i>R. spectabilis</i>	Plant
Trailing blackberry	<i>Rubus ursinus</i>	<i>R. ursinus</i>	Plant
Evergreen huckleberry	<i>Vaccinium ovatum</i>	<i>V. ovatum</i>	Colonizer
Red huckleberry	<i>Vaccinium parvifolium</i>	<i>V. parvifolium</i>	Plant
<b>Shrub species to establish (Outer Zone – Drainage)</b>			
Cascara	<i>Rhamnus purshiana</i>	<i>R. purshiana</i>	Colonizer
Pacific rhododendron	<i>Rhododendron macrophyllum</i>	<i>R. macrophyllum</i>	Plant