

# Appendix A - Plant Specifications

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# Appendix A: Plant Specifications

## Criteria for Choosing Plants

Above all, plants should be chosen using the motto “Right Plant, Right Place”. Plants in BMPs provide many ecological, hydraulic, and social functions, which must be considered. When choosing the best plants as stormwater managers, first consider water quality function of the facility. A diverse assembly of long-lived plants should be chosen according to the guidance provided throughout this appendix. Varying heights and rooting depths are also beneficial, if feasible.

## Recommendations for Stormwater Management

Natives, non-natives, and invasives are not interchangeable terms. Their differences and the reasons for the following recommendations are provided below.

**Suitable Plants Hierarchy.** When choosing suitable plants, use the following hierarchy:

- Due to the availability of a variety of suitable species at nurseries (NPSO [a]), we recommend using native plants (groundcover, forbs (flowers), shrubs, and trees) wherever possible. In the case of street trees, if soils are highly degraded, avoid native trees.
- Use non-native plants only with the following research:
  - Avoid plants that reproduce readily. These are plants that spread by seeds (*e.g.* grasses), rhizomes (when a piece of broken off root will start a new plant, *e.g.* Yellow flag iris), or culms (when a piece of a stem is able to re-root, *e.g.* English Ivy), etc.
  - Avoid plants listed for “Exotic Gardening and Landscaping Plants” on the Native Plant Society’s Emerald Chapter website (NPSO [b]) that are emerging as problematic. Avoid plants listed on the invasive plant lists of Washington (Washington State NWCB) and California (ISCC).
- Avoid invasive plants listed on the Oregon Department of Agriculture “Oregon Noxious Weed List” (Oregon Department of Agriculture, 2016).
- A list of native plant and seed suppliers in Oregon is available on Rogue Valley Sewer Services website under [Appendix A](#).

## Soil Depth Influences Plant Choice

Generally, the more soil, the better it will be for the plant. Choose plants that, at maturity, will still have enough soil to be low maintenance. Too little soil can stunt the size of the plant or, in the case of trees, cause it to be unhealthy and drop limbs. For plants to reach their full size at maturity and be low maintenance, soil depth requirements vary with the plant type. Generally, soil depth minimums are as follows:

- Sedums: 2”
- Grasses: 12”. Generally, the roots of grasses and grass-like plants will be as deep as the plant is tall so some species may benefit from deeper soil.
- Shrubs: 18”, but 24” is preferable.
- Trees: 36”, but depending on the species, trees also need a minimum volume of soil, 400 to 1,000 cubic feet. Since tree roots often don’t extend much deeper than 3 feet, the minimum area needed is 133 to 333 square feet (see Chapter 3 of the LID Guide “Tree Planting BMP”).

**Lined Vegetated Stormwater Facilities.** Trees are not suitable for lined facilities unless additional cost is incurred to incorporate adequate soil depths.

## Plant Spacing, Density & Container Size

**Applicability.** The information in this section applies to the following BMPs:

- Restored Soils BMP
- Vegetated Roofs (Green Roofs) BMP
- Rain Garden BMP
- Stormwater Planter BMP
- LID Swale BMP
- Water Quality Conveyance Swale BMP
- Vegetated Filter Strip BMP

The BMPs above rely on good vegetative cover to optimize water quality treatment and reduce maintenance needs, such as weeding.

Plant spacing and pot size needed to achieve the coverage goals -- provided in the detailed guidance for each BMP in Chapter 4 – vary based on the type of plant, as follows. This section does not apply to street tree planting.

**Suggested Plant Tables for Combining Plant Types.** Plant densities that exceed the following tables may be desired for initial aesthetic reasons. For a cost- and environmentally-effective facility, minimum required plant quantities are as follows:

**Table A-1.** Primarily herbaceous plants, such as flowers, groundcover, grasses, sedges, rushes.

Number of plants	Vegetation type	Per square feet of BMP	Size	Spacing density (average on center)*
66	Herbaceous plants	100	plugs or larger	1.5'
<b>OR</b>				
58	Herbaceous plants	100	plugs or larger	1.5'
4	Small shrubs	100	1 gallon	3' to 4'**
<b>OR</b>				
100% Native low-mow or no-mow seed coverage (follow supplier guidelines for density)				

\* An average on-center density is provided as general guidance. However to prevent short circuiting, plants must be randomly placed throughout per Standard Drawings BMP 1.04, 2.05, 3.03.

\*\* Depending on mature spread. Shrubs may be placed farther away than the density indicated but not closer.

**Table A-2.** If a mix of herbaceous, small and large shrubs is desired, the following minimum plant quantities may be used.

Number of plants	Vegetation type	Per square feet of BMP	Size	Spacing density (average on center)*
55	Herbaceous plants	100	plugs or larger	1.5'
4	Large shrubs	100	1 gallon	4' to 8'**
<b>OR</b>				
6	Medium to small shrubs	100	1 gallon	3' to 8'**
35	Small shrubs	100	1 gallon	3' to 4'**

\* To reduce erosion, plants should be randomly located. The average on-center density is provided as general guidance.

\*\* Depending on mature spread. Shrubs may be placed farther away than density indicated but not closer.

**Table A-3.** Trees may be added to any of the above planting configurations, if appropriate (refer to Chapter 3 of the LID Guide “Tree Planting BMP” “Siting”). The recommended minimum density for trees is as follows.

Number of plants	Vegetation type	Per square feet of BMP	Size
1	Evergreen tree	300	6' minimum height
<b>OR</b>			
1	Deciduous tree	300	1.5" minimum diameter*

\* Measured at a height 6 inches above the base.

## Safety & Crime

Regardless of the land use, vegetation should not block ground floor views either to or from a property (sometimes referred to as “eyes on the street”) or provide hiding places for unauthorized users. Shrubs that grow excessively dense and/or tall should be planted with care. Some questions to ask about chosen plants when they reach their mature height and spread are as follows.

Will this plant (or associated landscape elements such as rocks, benches, etc):


- Obstruct traffic or block road signs? Check for setbacks and height limitations in rights of ways.
- Create a hazard? Does the plant have weak branches or does it tend to create excessively slippery or otherwise hazardous debris?
- Block views of ground floor windows or doors?
- Provide a place for unauthorized users to hide?
- Provide unauthorized access to a roof?
- Redirect foot traffic away from access points with the use of short, impenetrable hedges or thorny shrubs?

## Choosing Plants from Plant Lists Generated Using USDA PLANTS Database

Moisture is considered one of the most important factors in choosing successful plants for your BMPs. Consider the drying effects of sunlight and wind when determining the moisture available at your site. As a result of buildings and other shading infrastructure, even very small sites may have a combination of light and moisture availability.

The USDA has online guidance for finding plants native to your state and even your county. As the search is more and more narrowed, fewer plants will be on the final list. Where you need more detailed guidance, a qualified landscape architect, landscape designer, or horticulturist can assist with narrowing the palette for your region.

**Table A-4.** The following tutorial with screen shots should help you use their website to identify suitable plants for your project. You may want to visit a nearby native plant nursery to check plant availability. If no native plant nursery is nearby, native plants are still likely to be available in your region, but cross-reference what’s available in your area with this database.

Tutorial Directions & Related Information:	What To Look For OR What You’ll See:
Generate a List of Native Plants in Your County:	
<p>1. Go online to the USDA PLANTS Database at: <a href="http://plants.usda.gov">plants.usda.gov</a></p>	 <p>The screenshot shows a web browser window with the URL <a href="http://plants.usda.gov/java/">plants.usda.gov/java/</a>. The page header includes the USDA logo and the text "United States Department of Agriculture" and "Natural Resources Conservation Service". Below the header is a banner for the "PLANTS Database" featuring various plant images. A navigation bar contains "Home" and "About PLANTS" buttons. A search box is visible with a "Name Search" field, a "Scientific Name" dropdown menu, and a "Go" button. To the right of the search box, it says "You are here: Home/" and "The PLANTS Database provides the vascular plants, mosses, the U.S. and its territories." Below this is a section titled "Plant of the Week".</p>
<p>2. In the upper left hand corner click on “Advanced Search”.</p>	

<p>3. We're going to pick and choose a few different items on the "Advanced Search and Download" web page. Not all search options need attention. For any of these scroll menus, you may have to click outside the box in white space to get your choice to "stick".</p> <p>Start by scrolling down under "Part A: PLANTS Core Data" to "1. Distribution" to "County Distribution" and choose your county. For this example, we'll use Coos County.</p>	<p><b>1. Distribution</b></p> <p>PLANTS Floristic Area or Not include: </p> <p>State and Province include: </p> <p>County Distribution (Select a maximum of 256) include: </p> <p><small>Note: PLANTS Floristic Area or Not cannot be used with the next two search boxes.</small></p> <p><small>Note: County results are added to State and Province results. See About the Advanced Search and Download for details.</small></p>
<p>4. Scroll down under "Part A: PLANTS Core Data" to "2. Taxonomy" to "National Common Name" and click the checkbox to the right that says "Display"</p>	<p>National Common Name include: <input type="text"/> <input checked="" type="checkbox"/> Display</p> <p><small>Wild cards are permitted.</small></p>
<p>5. Scroll down under "Part A: PLANTS Core Data" to "3. Ecology" to "Duration" and choose "Perennial"</p>	<p><b>3. Ecology</b></p> <p>Duration include: </p>
<p>6. Scroll down to the next item under "Part A: PLANTS Core Data" to "3. Ecology" to "Native Status" and choose "--L48 Native"</p>	<p><b>3. Ecology</b></p> <p>Duration include: </p> <p>Growth Habit include: </p> <p>Native Status include: </p>

<p>7. A list (partially shown here) is generated of all perennial plants native to your county with their common names. To the right is the beginning of the list for Coos County.</p>	<table border="0"> <thead> <tr> <th data-bbox="750 189 1209 241"><b>Scientific Name</b></th> <th data-bbox="1209 189 1482 241"><b>Common Name</b></th> </tr> </thead> <tbody> <tr> <td data-bbox="750 241 1209 273"><i>Abies grandis</i></td> <td data-bbox="1209 241 1482 273">grand fir</td> </tr> <tr> <td data-bbox="750 273 1209 304"><i>Abronia latifolia</i></td> <td data-bbox="1209 273 1482 304">coastal sand verbena</td> </tr> <tr> <td data-bbox="750 304 1209 336"><i>Abronia umbellata</i></td> <td data-bbox="1209 304 1482 336">pink sand verbena</td> </tr> <tr> <td data-bbox="750 336 1209 367"><i>Abronia umbellata ssp. breviflora</i></td> <td data-bbox="1209 336 1482 367">pink sand verbena</td> </tr> <tr> <td data-bbox="750 367 1209 399"><i>Acer circinatum</i></td> <td data-bbox="1209 367 1482 399">vine maple</td> </tr> <tr> <td data-bbox="750 399 1209 430"><i>Acer glabrum</i></td> <td data-bbox="1209 399 1482 430">Rocky Mountain maple</td> </tr> <tr> <td data-bbox="750 430 1209 462"><i>Acer macrophyllum</i></td> <td data-bbox="1209 430 1482 462">bigleaf maple</td> </tr> <tr> <td data-bbox="750 462 1209 493"><i>Achillea millefolium</i></td> <td data-bbox="1209 462 1482 493">common yarrow</td> </tr> <tr> <td data-bbox="750 493 1209 575"><i>Achillea millefolium var. littoralis</i></td> <td data-bbox="1209 493 1482 575">coast yarrow</td> </tr> </tbody> </table>	<b>Scientific Name</b>	<b>Common Name</b>	<i>Abies grandis</i>	grand fir	<i>Abronia latifolia</i>	coastal sand verbena	<i>Abronia umbellata</i>	pink sand verbena	<i>Abronia umbellata ssp. breviflora</i>	pink sand verbena	<i>Acer circinatum</i>	vine maple	<i>Acer glabrum</i>	Rocky Mountain maple	<i>Acer macrophyllum</i>	bigleaf maple	<i>Achillea millefolium</i>	common yarrow	<i>Achillea millefolium var. littoralis</i>	coast yarrow
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**Displaying Additional Information**

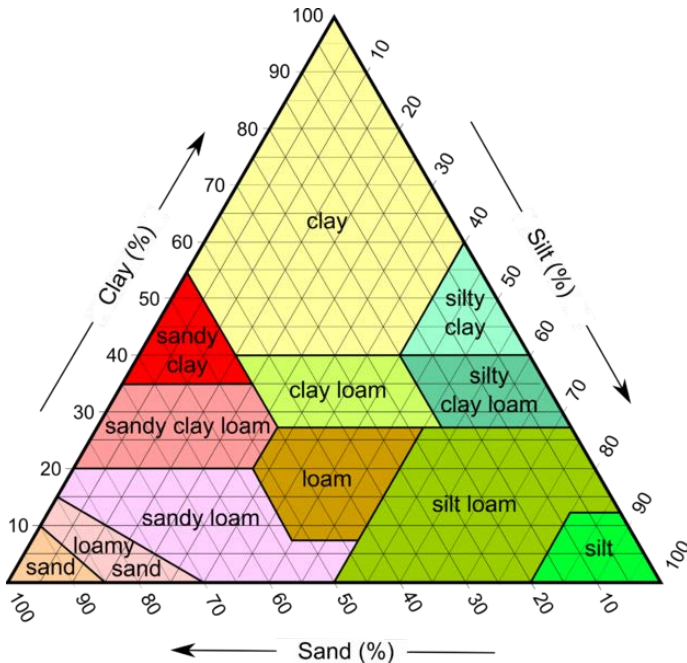
<p>7. Instead of narrowing the list, you can also choose to display information about a particular plant.</p> <p>Scroll down to the next item under “Part B: Characteristics Data” to “2. Growth Requirements” and click the display button next to “Adapted to Coarse Textured Soils”, “Adapted to Medium Textured Soils”, and “Adapted to Fine Textured Soils”. Soil texture is an important consideration for choosing plants when a BMP will have native or amended planting soil.</p>	<p><b>2. Growth Requirements</b></p> <p>Adapted to Coarse Textured Soils include: <input type="text" value="Any"/> <input checked="" type="checkbox"/> Display</p> <p>Adapted to Medium Textured Soils include: <input type="text" value="Any"/> <input checked="" type="checkbox"/> Display</p> <p>Adapted to Fine Textured Soils include: <input type="text" value="Any"/> <input checked="" type="checkbox"/> Display</p>
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According to the PLANTS database website, coarse, medium, and fine soils correspond to the USDA soil texture classes as follows:

Characteristics soil texture groups and corresponding soil texture classes.

Characteristics soil texture group	Corresponding soil texture classes from the Soil Texture Triangle		
<b>Coarse</b>	Sand	Coarse sand	Fine sand
	Loamy coarse sand	Loamy fine sand	Loamy very fine sand
	Very fine sand	Loamy sand	
<b>Medium</b>	Silt	Sandy clay loam	Very fine sandy loam
		Silt loam	Loam
	Silty clay loam	Silt loam	Loam
	Fine sandy loam	Sandy loam	Coarse sandy loam
	Clay loam		
<b>Fine</b>	Sandy clay	Silty clay	Clay

Source: The soil texture classes are from the Soil Science Society of America, <http://www.soils.org/>. An NRCS team partitioned the soil textures into the three groups.



Courtesy of wikimedia user: Mikenorton. Adapted from the USDA.

For a rough field estimate of texture, see Ribbon Testing in Appendix B.

8. Scroll down (or up) to the “Display Results” button and click on it.

**Display Results**

**Review Selections or Sort Report**

Display Results runs the entire search, Parts A and B



9. A list (partially shown here) is generated of all perennial plants native to your county with their common names including the criteria (when data exists) requested by clicking the display button.

Additional data (when it exists) under “Part B: Characteristics Data” that you may want to know about when choosing plants includes:

- \* “Active Growth Period”
- \* C:N Ratio (Carbon to Nitrogen Ratio)
- \* Fire Resistant
- \* Height at Base Age (Base age is 20 years for our region. This info is equivalent to the mature height.)
- \* Nitrogen fixation
- \* Drought tolerance
- \* pH, minimum
- \* pH, maximum
- \* Precipitation, minimum
- \* Precipitation, maximum
- \* Shade tolerance
- \* Vegetative Spread Rate
- \* Many other choices on aesthetics

Click the display check box to see the data of interest.

**Scientific Name**

*Abronia latifolia*  
*Abronia umbellata*  
*Abronia umbellata ssp. breviflora*  
*Achillea millefolium*  
*Achillea millefolium var. litoralis*  
*Achlys triphylla*  
*Actaea rubra*  
*Actaea rubra ssp. arauta*

Active Growth Period	Adapted to Coarse Textured Soils	Adapted to Medium Textured Soils	Adapted to Fine Textured Soils
Spring	No	Yes	No

Narrow the Search for a Particular Plant Type:

10. To narrow the search to certain types of plant click on the “Back” button or back arrow of your internet browser.

Selections that might be appropriate to plant in the BMPs presented here are:

- Forb/herb (flowering plants that aren't grasses, sedges, & rushes)
- Graminoid (grasses, sedges, & rushes)
- Shrub
- Subshrub
- Tree
- Vine



11. Scroll down to “3. Ecology” and “Growth Habit”. For this example, choose “Forb/herb”. (To choose more than one selection at a time in any of these lists, hold down the “Ctrl” button on your computer while scrolling and clicking. Once you’re done selecting, you can double check your selections by letting go of the Ctrl button and scrolling around to see if more than one selection is highlighted. )

**3. Ecology**

**Duration** include: Any, Annual, Biennial, Perennial

**Growth Habit** include: Any, Forb/herb, Graminoid, Lichenous

**Native Status** include: Any, Native to PLANTS Floristic Area, --North America Native, --L48 Native, --AK Native, --CAN Native

12. Your previous choices should still be selected. Scroll to “Review Selections or Sort Report” button in the middle or bottom of the page and click this to see what criteria you’ve entered so far.



13. After you click, you’ll see all your criteria listed.

**Review Selections or Sort Report**

Search and display criteria are listed below. Review your selections, and choose optional sort options if you plan to Display Report. Or, Modify Selections to change your criteria.

**Items Selected for Part A: PLANTS Core Data**

<b>1. Distribution</b>		
County	include: Oregon:Coos	
<b>2. Taxonomy</b>		
Scientific Name	include:	Display in Report
	include: Accepted Names and Synonyms	
<b>3. Ecology</b>		
Duration	include: Perennial	
Growth Habit	include: Forb/herb	
Native Status	include: L48 Native	

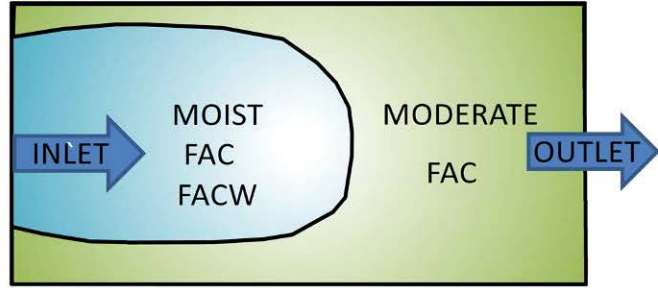
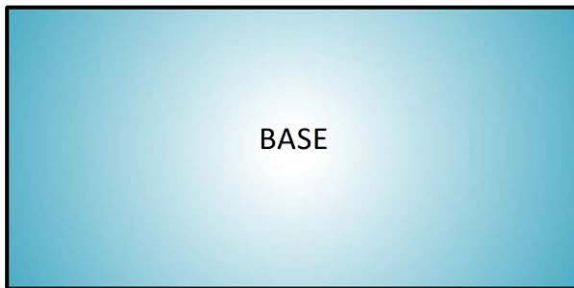
<p>14. Now click the “Display Results” button at the bottom of this page.</p>	<div style="text-align: center;"> <span>Display Results</span> <span style="margin-left: 200px;">Review Selections or Sort Report</span> </div> <p style="text-align: center; font-size: small;">Display Results runs the entire search, Parts A and B</p>																																								
<p>15. A new list (partially shown) is now narrowed to native, perennial forbs (flowers) in Coos County.</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; font-size: small;">Scientific Name</th> <th style="text-align: center; font-size: small;">Active Growth Period</th> <th style="text-align: center; font-size: small;">Adapted to Coarse Textured Soils</th> <th style="text-align: center; font-size: small;">Adapted to Medium Textured Soils</th> <th style="text-align: center; font-size: small;">Adapted to Fine Textured Soils</th> </tr> </thead> <tbody> <tr> <td><i>Abronia latifolia</i></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><i>Abronia umbellata</i></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><i>Abronia umbellata ssp. breviflora</i></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><i>Achillea millefolium</i></td> <td style="text-align: center;">Spring</td> <td style="text-align: center;">No</td> <td style="text-align: center;">Yes</td> <td style="text-align: center;">No</td> </tr> <tr> <td><i>Achillea millefolium var. litoralis</i></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><i>Achlys triphylla</i></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><i>Actaea rubra</i></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Scientific Name	Active Growth Period	Adapted to Coarse Textured Soils	Adapted to Medium Textured Soils	Adapted to Fine Textured Soils	<i>Abronia latifolia</i>					<i>Abronia umbellata</i>					<i>Abronia umbellata ssp. breviflora</i>					<i>Achillea millefolium</i>	Spring	No	Yes	No	<i>Achillea millefolium var. litoralis</i>					<i>Achlys triphylla</i>					<i>Actaea rubra</i>				
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<p>Finding Plants for Moisture Zones in BMPs</p>																																									
<p>16. Moisture zones vary with grades and the location of inlets and outlets in rain gardens, stormwater planters, and swales. The different moisture zones (base, slope, top) can be correlated to National Wetland Indicator Status (Emmanuel, 2010) as indicated in Figure E-2 below.</p> <p>To narrow your search to find plants appropriate for moderate moisture zones (per Figure E-2 below), scroll down to the next item under “Part A: PLANTS Core Data” to “4. Legal Status” and look for “National Wetland Indicator Status”. Choose FAC+</p> <p>(For zones with more than one possible wetland status indicator, hold down the “Ctrl” button on your keyboard, click on FAC+, FACW, FAC, and/or FAC-. (At the time of this publication, simply clicking on the display button did not display any information, even though most plants have a wetland status assigned.)</p>	<p>National Wetland Indicator Status</p> <p>include: <input type="text" value="--FACW? (Possibly Facultative Wetland)"/></p> <ul style="list-style-type: none"> <li>--FACW- (Facultative Wetland-)</li> <li>--FACW-? (Possibly Facultative Wetland-)</li> <li style="background-color: #e0e0ff;">--FAC+ (Facultative+)</li> </ul>																																								
<p>17. Click on the “Display Results” button at the bottom of this page.</p>	<div style="text-align: center;"> <span>Display Results</span> <span style="margin-left: 200px;">Modify Selections</span> </div> <p style="text-align: center; font-size: small;">Display Results runs the entire search, Parts A and B</p>																																								

18. You'll see all the flowering, perennial plants native to Coos County, OR that are appropriate for the moist zones of a rain garden, stormwater planter or swale (as indicated in Figure E-2 below)

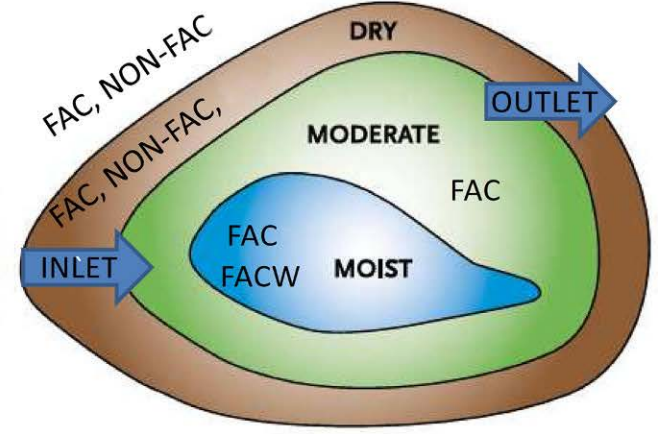
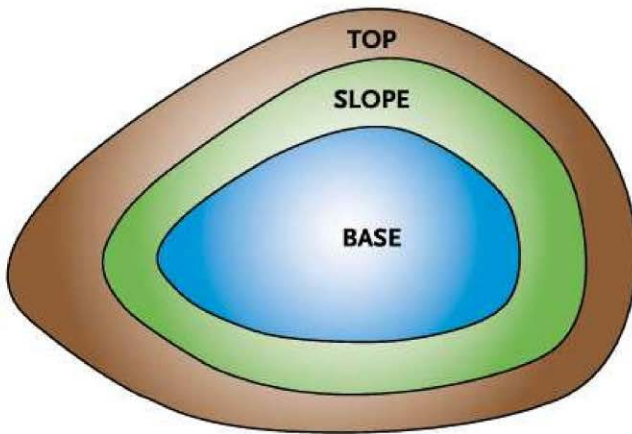
TOPOGRAPHIC ZONES CREATED BY GRADING PLAN

MOISTURE ZONES CREATED BY GRADING PLAN AND INLET & OUTLET LOCATIONS

STORMWATER PLANTERS



RAIN GARDENS



SWALES

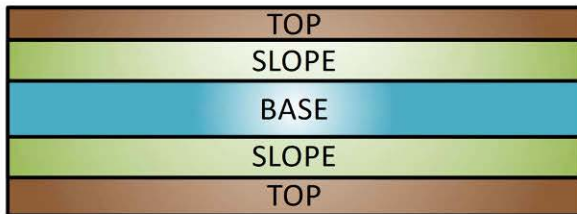


Figure A-1. Wetland status indicator for the moisture zones found in a vegetated stormwater BMP.

## Planting Techniques

Plants from nurseries can often be root-bound in their pots. If the roots aren't loosened and unwound, the roots will continue to twist around in the planting hole instead of growing downwards and outwards, causing poor plant establishment and high maintenance. Another key to low maintenance plants is to ensure that the roots have good contact with the soil.

To plant a tree, see BMP series 1.00.

### Planting in Containers

To properly install plants in Contained Planters:

1. Fill your container with soil to within 4 to 5 inches of the top of the container.
2. Dig a hole twice the size of the pot the plant comes in. Keep the soil pile nearby and clear of leaves and other surface debris.
3. Take note of where the potting soil from the nursery level is compared to the stem of the plant. Many plants have a different color and texture on the section that sits below the soil than on the sections that sit above ground.
4. Gently shake the potting soil off as much of the roots as possible. The nutrition from the potting soil is likely to be exhausted.
5. For balled and burlapped trees, the soil may be left in. However, ensure that burlap or any other confining material will not impede root growth by removing at least the bottom half of the material.
6. Loosen the roots. For 4" root-bound plugs, use hand clippers to cut an X into the bottom of the root wad, then pull it apart to loosen the roots.
7. Taking some of the soil you dug out, create a mound at the bottom of the hole and lightly tamp it down.
8. Drape the plant roots around the mound so that they're touching the mound on the bottom and pointing downwards. There are two kinds of roots, larger structural roots and tiny feeder roots, which is where the plant "drinks" and "eats". In pot-bound plants, some roots may be really long and will just continue winding around the other plant roots. If they're very small feeder roots, shorten them by pulling them off to be a similar length as the other roots. A few of the bigger structural roots can be cut, but it's better to dig a deeper hole and get them pointed downward.
9. As you backfill the hole by pushing soil in around the tops of the roots, hold the plant so that the point at which the plant came out of the soil in its original pot will be the level where the final grade of soil in the contained planter will be (level of soil on the stem is the same). Plants that are planted too deep may drown or the stem may rot. Plants that are too high may not have enough feeder roots in the soil to survive.
10. When finished, tamp down the soil. If the container is very large, step around the stem of the plant. This, combined with previous steps, will ensure good root contact with the soil.
11. Place an organic mulch that meets the specifications in General Notes for Vegetated Facilities to a depth of 2 to 3 inches. For woody stems on shrubs or trees, push the mulch a few inches away or the stems could rot.

### Planting in the Ground

To properly install plants in a Rain Garden, Stormwater Planter, LID Swale, Dispersion Facility, or Conveyance

Swale, follow steps 2-11 for installing plants in a Contained Planter described above.

## Establishment Period Maintenance

Native plants should be allowed to reseed before cutting the plant. When reseeding will occur depends on the chosen plant palette. As a general rule, most spring and summer blooming plants have seeded by August, and fall and winter blooming plants will have set their seed by January. Generally, most plants don't respond well when cut down to less than 6 inches high.

Timing of pruning is important. While common and correct horticultural practices might prune a shrub in the fall, when this is done to a shrub used for stormwater management, the shrub no longer has leaves to evapotranspire stormwater. This reduces the effectiveness of the BMP in reducing runoff.

## Irrigation Guidelines

The goal during the establishment period is to make plants as "drought proof" as possible by watering deeply and infrequently. To establish perennial plants, you'll need to irrigate more in the first year and less to much less in subsequent years. In addition, plants benefit from varying irrigation seasonally. At the beginning of summer, after the rains stop, water a little. Increase irrigation volume as the summer/dry season continues. Taper off irrigation as the rains start to come back.

The volume of water and frequency of watering varies with the type of plant, general guidelines:

- Trees: 5-10 gallons, once/week
- Shrubs: 3-5 gallons once/week
- Groundcover: 1-2 gallons, once or twice/week
- Perennial herbs: ½ gallon, twice/week.

After the 3 year establishment period, irrigation would theoretically not be needed; however plantings surrounded by impervious pavement or hot roofs will probably require occasional irrigation beyond the establishment period, indefinitely.

The City of Medford has put together a Plant Resource List that categorizes the amount of water required by different species from low to high, they also have irrigation system design requirements in their "Landscape and Irrigation Plan Processing Information Packet". Both documents can be accessed here, <http://www.ci.medford.or.us/Page.asp?NavID=3066>

## Integrated Pest Management

Short and long-term maintenance of all landscape areas should be done using integrated pest management techniques.

According to the Oregon Department of Agriculture:

"Integrated pest management (IPM) refers to a coordinated decision-making and action process that uses the most appropriate pest control methods and strategies in an environmentally and economically sound manner to meet agency pest management objectives.

The elements of integrated pest management include the following:

- Preventing pest problems by focusing on developing healthy plant environments (fostering healthy soils, maintaining air flow and utilizing right plant right place techniques)
- Monitoring for the presence of pests and pest damage
- Establishing the density of the pest population, which may be set at zero, that can be tolerated or correlated with a damage level sufficient to warrant treatment of the problem based on health, public safety, economic, or aesthetic thresholds

- Treating pest problems to reduce populations below those levels established by damage thresholds using strategies that may include biological, cultural, mechanical, and chemical control methods and that shall consider human health, ecological impact, feasibility, and cost effectiveness
- Evaluating the effects and efficacy of pest treatments

Pest refers to any vertebrate or invertebrate animal, pathogen, parasitic plant, weed, or similar organism that can cause disease or damage to crops, trees, shrubs, grasses or other plants, humans, animals, or property” (Oregon Department of Agriculture [a]).

For additional resources including the PNW Insect Handbook, PNW Plant Disease Handbook, and the PNW Weed Handbook, visit the Oregon Department of Agriculture website:

<http://www.oregon.gov/ODA/programs/Pesticides/RegulatoryIssues/Pages/IPM.aspx>.

### **Weeding.**

Weeding frequency is generally recommended to be a minimum of twice a year in May and October, but should also be timed to pull whatever invasive plants are on-site before they go to seed. Hand pulling or other mechanical removal technique is preferred. In particular, pesticides, herbicides, and fertilizers should generally be avoided in maintaining any of the BMPs in this guidance as these are pollutants that are easily conveyed in stormwater runoff.



**Figure A-2.** Since weeds need water in the summer but the right natives won't, substantial irrigation beyond the establishment period will only increase maintenance.

### **Sourcing Plants**

Plants may be sourced from a variety of nurseries. Choosing healthy, appropriate specimens is key to high functioning facilities. Some tips for sourcing plants are as follows:

- A list of native plant nurseries can be found on Rogue Valley Sewer Services website: <http://www.rvss.us/pilot.asp?pg=phase2Plants> should be from seeds adapted to either clayey or sandy soil type, according to the on-site soils.
- Plants should be from seeds gathered as locally as possible. For instance, a native alder grown from seed collected in Tillamook County will not be as well adapted to the Rogue Valley.
- An informative slide show on southwest Oregon species by Linda McMahan of OSU Extension is available <http://www.slideshare.net/lindamcmahan/native-plants-for-southwestern-oregon>.

### **References**

Emmanuel, R., Ph.D., Clean Water Services, Hillsboro, OR, personal communication. (2010).

Invasive Species Council of California (ISCC). The California Invasive Species List. Retrieved from: <http://www.iscc.ca.gov/species.html>

Native Plant Society of Oregon (NPSO) [a]. Retrieved from: <http://www.npsoregon.org/landscaping5.php>

Native Plant Society of Oregon (NPSO) [b]. Exotic Gardening and Landscaping Plants Invasive in Native Habitats of the Southern Willamette Valley. Retrieved from: [http://emerald.npsoregon.org/inv\\_orntls.html](http://emerald.npsoregon.org/inv_orntls.html)

Oregon Department of Agriculture [a]. Integrated Pest Management (IPM). Retrieved from: <http://www.oregon.gov/ODA/programs/Pesticides/RegulatoryIssues/Pages/IPM.aspx>

Oregon Department of Agriculture. (2016). Oregon Noxious Weed Profiles. Retrieved from: <http://www.oregon.gov/ODA/programs/Weeds/OregonNoxiousWeeds/Pages/AboutOregonWeeds.aspx>

Washington State Noxious Weed Control Board (NWCB). Retrieved from: <http://www.nwcb.wa.gov/>