

Appendix E - Plant Specifications

TABLE OF CONTENTS

Criteria for Choosing Plants.....	E-1
Recommendations for Stormwater Management.....	E-1
Soil Depth Influences Plant Choice.....	E-1
Safety & Crime.....	E-2
Choosing Plants from Plant Lists Generated Using USDA PLANTS Database.....	E-2
Planting Techniques.....	E-6
Planting in Containers.....	E-7
Planting in the Ground.....	E-7
Establishment Period Maintenance.....	E-7
Irrigation.....	E-8
Integrated Pest Management.....	E-8
Sourcing Plants.....	E-9
References.....	E-9

Appendix E - 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 E](#).

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.

Appendix E - Plant Specifications

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):

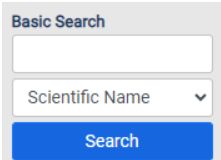
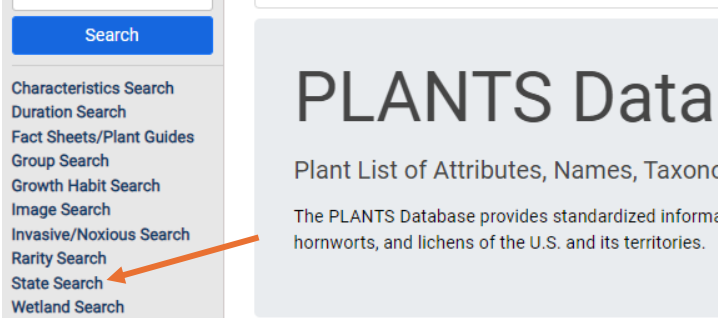
- Obstruct traffic or block road signs? Check for setbacks and height limitations in rights of ways.
- Create a hazard? Does the plant have weak branches or does it tend to create excessively slippery or otherwise hazardous debris?
- Block views of ground floor windows or doors?
- Provide a place for 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 E-1. The following tutorial with screen shots should help you use their website to identify suitable plants for your project. This tutorial shows native plants for Jackson County suitable for wetland areas. 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 Jackson County:	
1. Go online to the USDA PLANTS Database at: plants.usda.gov	
2. In the upper left hand corner click on “State Search”.	

Appendix E - Plant Specifications

<p>3. From the list, select Oregon and then scroll down to Jackson County.</p>	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <input type="checkbox"/> North Carolina <input type="checkbox"/> Oklahoma <input type="checkbox"/> Rhode Island </div> <div style="width: 45%;"> <input type="checkbox"/> North Dakota <input checked="" type="checkbox"/> Oregon <div style="border: 1px solid gray; padding: 2px; margin-bottom: 5px;"> Harney Hood River Jackson Jefferson </div> <input type="checkbox"/> South Carolina </div> </div>																
<p>4. On the bottom of the page, click “Display Results”.</p>	<p>3. Sort by:</p> <p> <input checked="" type="radio"/> Scientific Name <input type="radio"/> Common Name <input type="radio"/> Symbol </p> <div style="text-align: right; margin-top: 10px;">  <input type="button" value="Display Results"/> </div>																
<p>5. We’re going to pick and choose a few different items on the “Filtering Options” list to the left to narrow down the plant list. Select the following options.</p> <p>Duration</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Perennial <p>Growth Habitat</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Forb/herb <p>Nativity Status</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Native – L48 <p>Wetland Region</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Western Mountains, Valleys, and Coast 	<div style="background-color: #f0f0f0; padding: 5px;"> <p>Filtering Options</p> <p>Duration</p> <input type="checkbox"/> Annual (691) <input type="checkbox"/> Biennial (170) <input checked="" type="checkbox"/> Perennial (1972) </div> <div style="background-color: #f0f0f0; padding: 5px; margin-top: 5px;"> <p>Fact Sheet/Plant Guide</p> <input type="checkbox"/> Has Fact Sheets/Plant Guides (298) </div> <div style="background-color: #f0f0f0; padding: 5px; margin-top: 5px;"> <p>Group</p> <input type="checkbox"/> Dicot (1923) <input type="checkbox"/> Fern (43) <input type="checkbox"/> Gymnosperm (35) <input type="checkbox"/> Horsetail (6) <input type="checkbox"/> Lycopod (4) <input checked="" type="checkbox"/> Show More </div> <div style="background-color: #f0f0f0; padding: 5px; margin-top: 5px;"> <p>Growth Habit</p> <input checked="" type="checkbox"/> Forb/herb (1880) <input type="checkbox"/> Graminoid (377) <input type="checkbox"/> Shrub (242) <input type="checkbox"/> Subshrub (288) </div> <div style="margin-top: 10px;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 150px;">ABGR12</td><td><i>Abies grat</i> (Silba) Silt</td></tr> <tr><td>ABGRG</td><td><i>Abies grat</i></td></tr> <tr><td>ABGRI</td><td><i>Abies grat</i> Silba</td></tr> <tr><td>ABLA</td><td><i>Abies lasioca</i></td></tr> <tr><td>ABLAL</td><td><i>Abies lasioca</i></td></tr> <tr><td>ABBAL</td><td><i>Abies bals</i> Boivin</td></tr> <tr><td>ABBAF</td><td><i>Abies bals</i></td></tr> <tr><td>ABBI3</td><td><i>Abies bifo</i></td></tr> </table> </div>	ABGR12	<i>Abies grat</i> (Silba) Silt	ABGRG	<i>Abies grat</i>	ABGRI	<i>Abies grat</i> Silba	ABLA	<i>Abies lasioca</i>	ABLAL	<i>Abies lasioca</i>	ABBAL	<i>Abies bals</i> Boivin	ABBAF	<i>Abies bals</i>	ABBI3	<i>Abies bifo</i>
ABGR12	<i>Abies grat</i> (Silba) Silt																
ABGRG	<i>Abies grat</i>																
ABGRI	<i>Abies grat</i> Silba																
ABLA	<i>Abies lasioca</i>																
ABLAL	<i>Abies lasioca</i>																
ABBAL	<i>Abies bals</i> Boivin																
ABBAF	<i>Abies bals</i>																
ABBI3	<i>Abies bifo</i>																
<p>6. On the bottom left, select “Apply filters”.</p>	<div style="background-color: #f0f0f0; padding: 5px; margin-bottom: 10px;"> <input type="button" value="Clear"/> <input checked="" type="button" value="Apply filters 4"/> </div> <div style="margin-top: 10px;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 150px;">AMRU2</td><td><i>Ambrosia</i></td></tr> <tr><td>ANMA</td><td><i>Anaphalis m</i></td></tr> </table> </div>	AMRU2	<i>Ambrosia</i>	ANMA	<i>Anaphalis m</i>												
AMRU2	<i>Ambrosia</i>																
ANMA	<i>Anaphalis m</i>																

Appendix E - Plant Specifications

7. A list (partially shown here) is generated of all perennial plants native to Jackson county that are found in wetland areas. The name in blue is the general plant, the names in black under the blue name are variations of the general plant.

ARLU	Artemisia ludoviciana Nutt.	white sagebrush
ASSP	Asclepias speciosa Torr.	showy milkweed
ASGI6	<i>Asclepias giffordii</i> Eastw.	showy milkweed
BLSP	Blechnum spicant (L.) Sm.	deer fern
BLSPN	<i>Blechnum spicant</i> (L.) Sm. ssp. <i>nipponicum</i> auct. non (Kunze) Á. Löve & D. Löve	deer fern
BLSPE	<i>Blechnum spicant</i> (L.) Sm. var. <i>elongatum</i> (Hook.) B. Boivin	deer fern
LOSP4	<i>Lomaria spicant</i> (L.) Desv.	deer fern


Displaying Additional Information

8. By clicking on the blue plant name, you can open a page with additional information about the selected plant.

General Images Subordinate Taxa Wetland Related Links Sources

Characteristics

[Achillea millefolium L.](#)
common yarrow



common yarrow General Information	
Symbol:	ACMI2
Group:	Dicot
Duration:	Perennial
Growth Habit:	Forb/herb
Native Status:	AK N CAN N

9. Characteristics data (when it exists) contains information that you may want to know about when choosing plants:

- * "Active Growth Period"
- * C:N Ratio (Carbon to Nitrogen Ratio)
- * Fire Resistant
- * Height, Mature
- * Soil Adaptation
- * Drought tolerance
- * pH, minimum
- * pH, maximum
- * Precipitation, minimum
- * Precipitation, maximum
- * Shade tolerance
- * Vegetative Spread Rate
- * Many other choices on aesthetics

General Images Subordinate Taxa Wetland Related Links Sources

Characteristics

[Circaea alpina L.](#)
small enchanter's nightshade

Characteristics

Morphology/Physiology

Active Growth Period	Summer
After Harvest Regrowth Rate	Slow
Bloat	None
C:N Ratio	Medium
Coppice Potential	No
Fall Conspicuous	No
Fire Resistant	No
Flower Color	White
Flower Conspicuous	Yes
Foliage Color	Green
Foliage Porosity Summer	Porous
Foliage Porosity Winter	Porous
Foliage Texture	Medium

Finding Plants for Moisture Zones in BMPs


10. 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-1** below.

By selecting wetland data, you can see the National Wetland Indicator Status for the selected plant.

- OBL: Obligate wetland
Almost always occurs in wetlands.
- FACW: Facultative wetland
Usually occurs in wetlands.
- FAC: Facultative
Occurs in wetlands and non-wetlands.
- FACU: Facultative upland
Usually occurs in non-wetlands.
- UPL: Obligate upland
Almost always occurs in non-wetlands.

General Images Subordinate Taxa **Wetland** Related Links Sources

Characteristics



Achillea millefolium L.
common yarrow

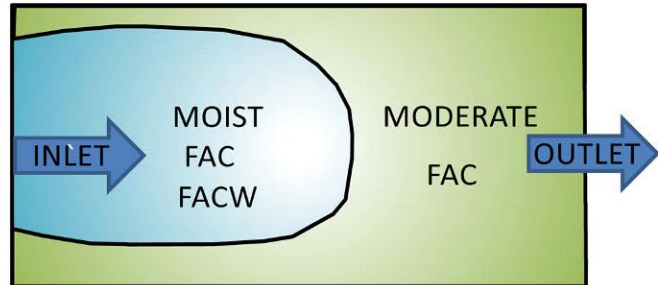
About the National Wetland Plant List
Wetland Regions

Region	Status
Alaska	FACU
Arid West	FACU
Atlantic and Gulf Coastal Plain	FACU
Eastern Mountains and Piedmont	FACU
Great Plains	FACU
Hawaii	UPL
Midwest	FACU
Northcentral & Northeast	FACU
Western Mountains, Valleys, and Coast	FACU

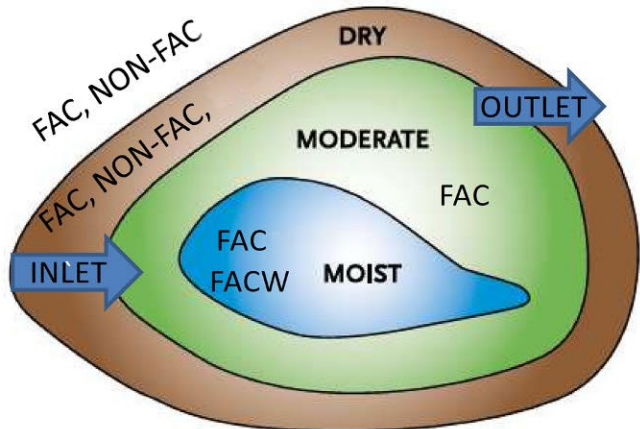
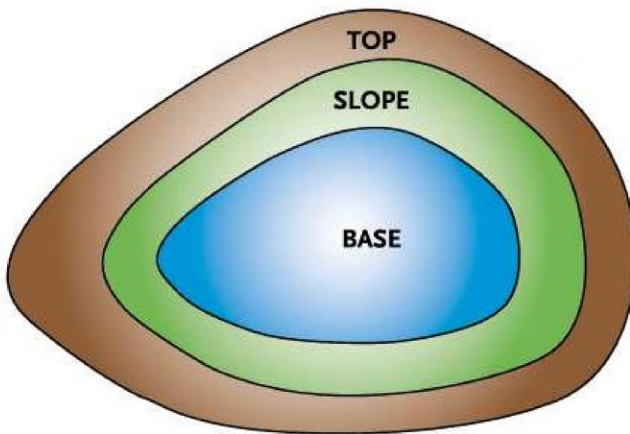
TOPOGRAPHIC ZONES CREATED BY GRADING PLAN

MOISTURE ZONES CREATED BY GRADING PLAN AND INLET & OUTLET LOCATIONS

STORMWATER PLANTERS



RAIN GARDENS



SWALES

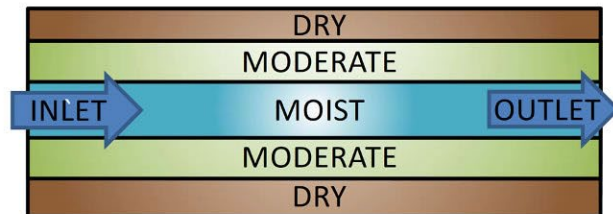


Figure E-1. Wetland status indicator for the moisture zones found in a vegetated stormwater BMP.

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 the Standard Details in Appendix F.

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.

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, <https://www.medfordoregon.gov/Government/Departments/Planning/Landscape-Irrigation>

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 E-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 and seed suppliers in Oregon is available on Rogue Valley Sewer Services website under [Appendix E](#).
- 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_ornmtls.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 (NWCBC). Retrieved from: <http://www.nwcb.wa.gov/>