



# **NATURESCAPING**

**A DESIGN GUIDE FOR HOMEOWNERS**

**HEALTHY ENVIRONMENT – BEAUTIFUL LANDSCAPES**

# NATURESCAPING

## Project Partners:

### Eugene Water & Electric Board (EWEB)



### McKenzie Watershed Council (MWC)



### Northwest Center for Alternatives to Pesticides (NCAP)



### Oregon State University Extension Service (OSU Extension)



### Upper Willamette Soil & Water Conservation District (SWCD)



**Special thanks to the *East Multnomah SWCD* for developing this concept and allowing us to present it to you!**

**Please note:** All information in this resource guide should be considered general guidance. Each property has unique features that will influence the success of any project. Some properties have complicating factors that may require hiring a professional. EWEB, project partners, its staff and advisors are not responsible for any property damage or loss, or any other damages resulting from the education and guidance we provide. Please check with your local jurisdiction to determine if permits are required, or any restrictions exist for activities associated with any landscape installation.

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# **1. Introduction to Naturescaping**

Naturescaping is a term that generally refers to the practice of designing (or redesigning) a landscape so that it reduces water use, stormwater runoff and chemicals while allowing people and nature to co-exist. It focuses primarily on incorporating the best native plants into a landscape based upon your particular setting and needs. In addition to providing an aesthetically-pleasing environment and functional habitat for wildlife, naturescaping often saves you time, money, and energy.

## **Naturescaping helps to protect streams, rivers, and your watershed.**

You may have heard the expressions “we all live in a watershed” or “we all live downstream.” Chemicals that we apply to our yards such as herbicides and fertilizers, sediment from construction sites, eroding streambanks and logging operations, and oils and fuels from our cars are all potential threats to water quality. Many of these substances eventually soak into the groundwater or flow off of the land and into streams and rivers during rain events. In order to protect water quality and address issues such as climate change, it is important to be good stewards of our watersheds and adopt the practices that pose the least harm to the environment.

## **Why would I want to naturescape my yard?**

Naturescaping can be an enjoyable and simple way for you to help improve the health of your watershed while creating a beautiful environment for you and your family. Naturescaped areas generally require less water, fewer (or no) chemical fertilizers or pesticides and less maintenance than other types of landscaping. Using primarily native plants is particularly beneficial because they often do not require additional fertilizers or chemical weed control since they are well adapted to the Pacific Northwest environment. In addition, they are attractive to native birds, butterflies, and other animals. Non-native plants can be much more difficult to maintain because they are more susceptible to pests, diseases, and summer drought-like conditions.

## **How will this resource guide help me?**

This resource guide will help you get started naturescaping by offering ideas and tips for designing and implementing your naturescaping project, whether it is your entire property or just a small corner of your yard. By taking into account environmental conditions such as light, wind, soils, water and the needs of native plants along with the desired functions of your landscape, you can create a space that will work for you with minimal maintenance. The guide also provides you with an abundance of resources including lists of native trees, shrubs and grasses; annual plant sales, suggestions for controlling invasive species and organizations that can assist you with planning and implementing a project.

### **Benefits of Naturescaping**

- Reduces stormwater runoff
- Reduce water pollution
- Reduce air pollution
- Reduce solid waste
- Reduce water use
- Reduce energy use
- Improve the health of the Watershed
- Increase and improve wildlife habitat
- Increase residential security
- Increase community livability

## 2. Getting Started

### Care of New and Existing Landscapes

The first step in this process is to assess your current landscape. Many landscapes contain mainly lawn, a small number of shrubs and perhaps some large trees. This chapter address two subjects that may influence the size and extent of your project: 1) the management of lawns, which are notorious users of energy, water and chemicals and 2) use of trees, which are important resources that have many benefits.

#### Lawn Care

Homeowners apply more chemicals per acre than do large agricultural operations. Much of this residential use is directed at keeping lawns rich and green throughout the long, dry summers of the Pacific Northwest. Many millions of gallons of increasingly precious water are spread on those same lawns. Excess water washes pesticides and fertilizers onto driveways and streets and eventually into streams and rivers.

These chemicals harm fish and upset the ecological balance of streams. These chemicals also harm people and pets. Don't spoil your play or relaxation by exposing yourself, your children, or your pets to dangerous chemicals.

Lawns need about one inch of water each week. See *Chapter 4* for ways you can conserve this precious resource.

This is not to say that all lawns should be eliminated! They should be used where necessary and appropriate, reduced where possible, and maintained naturally. Some ways to limit the damage caused by excessive lawn maintenance are listed below. Remember, every little bit helps, and any efforts to reduce water use and chemical runoff are valuable.

#### Reduce Lawn Area

Do you really need a lawn? Is it the best choice for your landscape? Consider using ground cover vegetation in areas where grass is not necessary or is difficult to maintain, such as on steep slopes and under trees or replace part of your lawn with native shrubs, flowers, and grasses. Consider using other materials such as mulch, gravel, or porous paving blocks in high-traffic areas. Or replace your lawn and use a non-turf ground cover like clover, wildflowers, and eco-lawn seed mixes. This alternative takes advantage of native grasses and requires little management and water once established.

**Watershed:** The land, ridgetop to ridgetop, from which rain collects and flows to a specific body of water. The health of that water is affected by everything that happens within the watershed.

## Lawn and Weed Removal

Existing grasses and invasive plants may need to be removed and/or controlled in the areas you are planning to plant. In many cases, this can be done without the use of toxic chemicals or a lot of back-breaking digging. For example, one way to convert a lawn or weed patch into a planting bed is to place a thick layer (10 - 15 sheets) of newspapers or a single layer of cardboard over the area in the fall, thoroughly dampen the newspapers, then put a 3-6 inch layer of soil or organic material (compost, leaves, mulch etc.) over the newspaper and let it sit 4-6 weeks or over the winter. This process is sometimes referred to as 'lasagna composting.' You can also plant through the newspapers. For best results, overlap the newspaper edges by at least 6 inches for complete coverage.

Try experimenting with different groundcovers, mulch, and grass alternatives. Some examples include: moss, Oregon oxalis, kinnikinnick, strawberries, creeping thyme, clover, sedums, etc.

The best time to do this is in the fall or early spring. However, it takes a minimum of four weeks, sometimes 6-8 weeks, and occasionally even longer to kill the existing lawn. This process sun-starves the grass. Worms and other micro-organisms will break down the newspaper and dead grass and mix all this new organic matter into your soil creating food for the incoming new plants.

Other options for getting rid of lawn or weeds include: 1) placing a shade tarp over the area to kill existing weeds (note that this will not kill seeds) and 2) solarization; using clear plastic sheeting to heat up and kill vegetation beneath it (this method will kill seeds, pathogens and fungi, but may also kill beneficial organisms).

Some invasive plants like Himalayan blackberries, English ivy, and reed canary grass are stubborn and may require more aggressive tactics including digging them out or removing them by the roots. Removal of these plants requires diligence over a period of time. (Please see *Chapter 8: Alternatives to Chemicals* and *Appendix C: Invasive Species Control* for more information on this topic.)

## Water Carefully

Water only in the early morning (best) or late in the evening when evaporation is less. Water only as much as the soil can absorb at one time. Observe watering restrictions during times of drought. (Please see *Chapter 4: Water Conservation* for more information)

### Leaf Blower Facts

Leaf blowers that use gasoline create more air pollution than cars. A standard residential leaf blower emits 145 times more hydrocarbons and 7.5 times more carbon monoxide than a car driving at 30 miles an hour! What's worse is that the powerful engine jets of leaf blowers disturb dust and debris which might include pesticides, fungi, chemicals, fecal matter and street dirt, including lead.

## **Mow Thoughtfully and Avoid Using Leaf Blowers**

Reduce air pollution; gas powered mowers, blowers, and trimmers pollute our air, water, and ears. Use reel (push) or electric mowers where possible, practice grass cycling, and avoid using leaf blowers.

## **Allow Dormancy**

The natural cycle for grass in the Pacific Northwest includes a period of dormancy in the summer. Let it gradually dry up and turn brown. You might want to tell your neighbors what you are doing and why. It will grow thick and green again with the fall rains.

### **Grass Cycling**

Grass cycling is the natural practice of leaving clippings on the lawn when mowing. This can save time, money and other resources like landfill space. The clippings quickly decompose, returning nutrients to the soil.

## **Weeding**

Manually remove weeds before they set seed. There are many new and handy tools available these days that will make your job easier than you could have imagined. Before turning to chemical solutions, please see *Chapter 8: Alternatives to Chemicals* for more information on this topic. These chemicals, even if labelled “natural,” can be harmful to you, your family, your pets and the environment.

## **Trees**

Trees are one of our greatest Northwest natural resources, having aesthetic appeal as well as practical value. Treat them with care to achieve the maximum benefit for your home, yard, and you. Take a class on pruning to keep your trees and shrubs in tip-top shape.

The first rule for existing trees according to the Oregon State Department of Forestry is “Do Not Top Them!” Topping, or any excessive trimming, makes a tree more susceptible to storm damage, insects, and disease. A topped tree regrows in unusual ways from damaged branches causing the tree to become weakened and unbalanced. If you have a problem tree, consult a certified arborist. An arborist may be able to help a sick or damaged tree or carefully prune one that has developed an undesirable form.

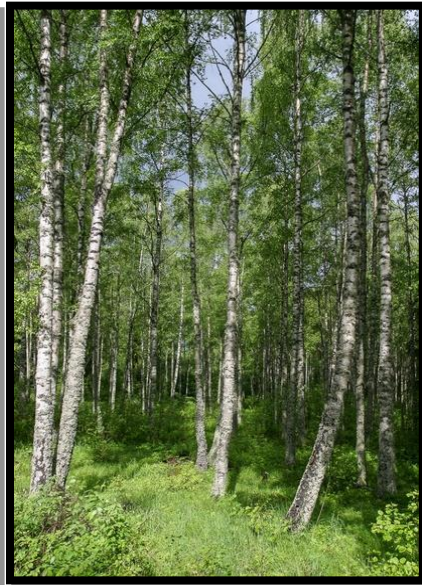
It is also a good idea to keep your lawn away from the tree trunk. Create a mulch circle at least three feet wide around the tree. This keeps grass from competing with the tree for water and also protects the bark from mowers and power trimmers. Do not pile the mulch, soil, or compost against the trunk as it could promote fungal disease in the tree or shrub.

## The Good Work of Trees

- Shade your house in summer
- Shade your yard to protect delicate plants and retain soil moisture
- Provide windbreaks
- Act as sound barriers
- Clean and filter the air
- Clean and filter water (with their leaves and roots)
- Shade streams and reduce water temperatures for healthier riparian (streamside) environments
- Catch and use rain, reducing runoff
- Hold soils and slopes with their root systems, reducing erosion
- Provide food, nesting, and resting areas for wildlife
- Increase your property value



**Madrone**



**Alder**



### **3. Healthy Soil & Composting**

*To have healthy plants, you must have healthy soil!*

Soil is more than a structural element that holds your plants upright. Healthy soil is a complex, living layer. When properly cared for, it provides water, food, air, and stability in the right amounts to your plants. Soil consists of four major components: minerals, organic matter, water, and air. Soil's organic matter also contains a multitude of living organisms that assist with the breakdown of the mineral and organic elements of the soil, thus providing important nutrients to your plants.

The structure of soil is determined by how soil granules bind together and are arranged with aggregate to create pores. This has a major influence on water and air movement, biological activity, root growth and seedling emergence.

Soil is generally made up of some combination of sand, silt and clay. Sandy soil contains large pores spaces and water tends to infiltrate easily. On the other end of the spectrum, clay contains very small fine grain particles that limit water and air movement through the soil, creating poor drainage conditions. Land near streams and in floodplains tends to be loam, or a beneficial mixture of sand, silt, clay and organic matter that makes it well-suited for agriculture.

To find your soil type, use the NRCS Web Soil Survey at <http://websoilsurvey.nrcs.usda.gov>. To improve your soil, get it tested and add the correct nutrients for optimum production. Contact the Upper Willamette Soil & Water Conservation District (SWCD) at 541-465-6443 x 102 for help with this process.

#### **Creating and Maintaining Healthy Soil**

All soils benefit when organic matter is added, but especially those which have been abused and degraded from years of compaction, intensive chemical applications, or from having the topsoil removed or washed away. Add organic matter by applying a mulch and letting it decompose over time, or by using a soil amendment (such as compost) on top or mixed into the soil. It is also beneficial to use organic matter as a soil additive for new areas being planted.

Compost and the soil life it contains (bacteria, fungi, worms) keep your soil and plants healthy by:

- Storing natural fertilizers and nutrients for gradual release – which prevents them from washing off into our streams
- Storing water, which reduces both run-off and your irrigation needs
- Supplying balanced nutrients to plants
- Fighting plant diseases and pests
- Increasing water infiltration in clay soils
- Reducing compaction in clay soils
- Increasing water retention in sandy soils
- Reducing erosion of valuable topsoil

Add compost/organic material to your soil in the fall to allow beneficial microorganisms enough time to multiply so that when it warms up in the Spring, they will be actively providing nutrients for your plants.

## Compost

Composting is the natural process of decomposition and recycling of organic material (plant or animal) into what is called *humus*. Composting reduces yard debris and other solid waste in landfills. It is also an excellent way to recycle your kitchen scraps and yard “debris” right back into your own yard. It can be used to improve both sandy and clay soils. It helps fill up pore spaces in sandy soil and open up pore spaces in clay soil. Because organic matter decomposes (into beneficial nutrients for your plants), it needs to be added periodically.

### Apply Compost:

- To entire planting beds prior to planting annual flowers or vegetables
- To new lawn, prior to seeding or as a thin layer to existing lawn as a fertilizer (but, think about whether or not you really need a lawn in the first place!)
- To raised beds in the vegetable garden when constructed and each year prior to planting
- Before putting in perennial beds, or when perennials are divided
- When shrubs are transplanted, or new shrubs are added
- To the spaces between plants for erosion and weed control, soil amendment, and added nutrients

**Cold Composting:** (minimum effort) Place your yard waste clippings, leaves, weeds into a pile let stand for 6-24 months to allow worms and other organisms to work down the decaying debris. Your compost will be ready when the original ingredients are unrecognizable. *This process does not kill pathogens or weed seeds.*

**Hot Composting:** (maximum effort) Determine your bin needs. You will need a minimum capacity of 27 cubic feet. Start with browns 6 inches deep, add a layer of greens, then add soil on top. Water until moist (like a wrung out sponge). Mix your pile once every two weeks for even heating, and add ingredients to maintain. You may produce a finished product in as little as two months.

### Examples of Compost Materials

- Grass clippings
- Leaves
- Flowers
- Twigs
- Old plants
- Old potting soil
- Annual weeds (no seed heads)
- Vegetable scraps
- Coffee, filters & tea bags
- Yard debris
- Sawdust
- Manure

### Composting Tips:

- **Brown Green Ratio:** A mixture of dry leaves, sawdust, or other sources of carbon combined with manure or green plants (approximately 4:1 by volume).
- **Microorganisms:** A few shovels full of rich garden soil or compost will supply these.
- **Air:** A compost pile should be turned periodically to promote decay of its contents. Turning the pile adds oxygen, so the more you turn it, the faster it breaks down.
- **Water:** The pile should have the moisture of a well-squeezed sponge. Add water as needed.
- **Time:** The finer the particle size, the more surface there is for microorganisms to work. Shredding leaves and larger materials generates compost faster.

## Composting Bins

There are a variety of composting bins available commercially to assist in managing home compost, depending on your needs and space requirements. They include plastic, wooden and chicken wire bins, and covered bins for livestock waste composting. You can have single bin or multiple bin systems.



### Things to Consider

- If you have a lawn, do you use a push or mulching mower?
- Do you compost your excess clippings?
- How do you encourage and protect the beneficial microorganisms in your soil?
- Do you use chemical pesticides, herbicides, or fertilizers on your soil or landscape?
- Do you compost your kitchen scraps?
- Do you add compost to your soil to aid in water infiltration?

If you can't use all of your yard debris as compost, make sure it gets recycled instead of going to the landfill. For more information visit <http://www.extension.oregonstate.edu/lane/gardens/compost>, or visit the City of Eugene website at <http://www.eugene-or.gov> and search for 'Composting.'

Acidic soils are more prevalent in the Pacific Northwest, so lime may need to be added to raise pH (sulfur is used to lower pH). Acidic soils are often deficient in calcium and magnesium.

## **4. Water Conservation**

The Pacific Northwest is well known for its abundant rainfall, so why do gardeners need to be concerned with water conservation? Unfortunately, during the wet months, some of the bountiful rainfall we receive is not absorbed into the soil where it lands. Instead, it falls onto our houses, sidewalks, and streets and eventually flows into our rivers and streams. In the summer when rainfall is low or non-existent, we use water from our taps (suitable for drinking!) outdoors on our landscapes. In this region, summertime water use is often two to three times greater than our winter water use.

This water use pattern is a problem when you think about how it affects the watershed and/or aquifer from which we receive the water during these dry months. Both rivers and aquifers (groundwater) can dry up as a result of increased water use. In addition, it takes time to water yards and gardens and using native plants can greatly decrease this maintenance time.

### **STEPS FOR CONSERVATION**

When you naturescape, the ultimate goal is to create a landscape that sustains itself – needing little to no maintenance, water for irrigation or chemical pesticides and fertilizers – by using nature as a template.

The six steps listed below can help you create a water efficient landscape. Individually none of these steps is new or revolutionary, but when these basic steps are incorporated into one holistic method, the result is a unique landscaping approach that combines the necessary elements to achieve a beautiful and water efficient landscape.

#### **1. Make a plan for your yard**

Your yard is made up of numerous microclimates – areas that have specific growing conditions – such as sun exposure, humidity, soil type, and wind direction. Different plants need different amounts of water, sun, shade, soil types, and nutrients to survive. Use the plant list in *Appendix A: Native Plant Selection Guide* to help you select plants that are appropriate for your space. Understanding and designing your garden with these microclimates in mind will affect how well your plants grow and will help you save water. This way you can plant the “Right Plant in the Right Place”. (See *Chapter 9: A Plan of Action*, for more detail on how to create a landscape plan for your yard.)

#### **2. Understand and nurture your soil**

Understanding the basic characteristics of your soil is important for determining what plants will grow best where and how often to water your landscape. Soils in this region are primarily clay loam or sandy loam.

Clay soils are sticky when wet and can be made into a ball in your hand. Clay absorbs water so slowly that water typically flows off the surface if it is applied too quickly. Clay soils need water added slowly in short stints over a longer period of time. Adding organic soil amendments, such as compost, will help clay soils absorb more water, allowing you to shorten your irrigation time. They also remain wet longer after being soaked. This can cause rotting problems for some plants if the soil is kept too wet.

Sandy soils have large air spaces and they do not hold water or nutrients as well. Water soaks in quickly, but the soil dries out faster. You may need to water plants in these soils for shorter periods of time but somewhat more frequently – depending on the plants’ moisture needs of course. Adding organic soil amendments, like compost, will improve the water-holding capacity of sandy soils so that you can water less frequently.

### **3. Use mulches to make your soil more water efficient**

Mulches come in two forms – organic and inorganic. Organic mulches include: aged manure, compost, bark or wood chips, hazelnut shells, etc. Organic mulches increase the soils ability to store water by covering and cooling the soil thereby minimizing evaporation. Mulching also reduces erosion, helps with weed control, and some mulches even provide nutrients.

Inorganic mulches include rocks and gravel products and can provide interesting landscape textures. Be aware that mulches such as gravel and river rock absorb the sun’s heat and re-radiate it. This can increase the amount of water that surrounding plants will need to survive.

### **4. Use rainfall to water your landscape**

We can use the abundant rainfall to our advantage and have a stunning landscape using (almost exclusively) the water that falls from the sky. Create a rain garden in your landscape. Visit the Upper Willamette SWCD website for more information at [www.uwswcd.org](http://www.uwswcd.org).

### **5. Water Wisely**

If you choose to water your garden, a well-planned watering system can help you avoid over-watering, which not only wastes water but can be a cause of plant death and disease. Knowing how much water your plants need and periodic monitoring and maintenance of your irrigation system are key to saving both water and money.

*Don't water your sidewalk or driveway – they won't grow - no matter how much you water them!*



## Water-Wise Rules of Thumb

- Look at creating watering zones in your landscape. Within each watering zone, all of the plants should have the same general watering needs, allowing you to give each plant the water it needs – not too much or too little. Watering zones help you avoid wasting water while reducing the amount of time and effort needed to maintain your garden. Place plants that need to be watered close to your living areas, and keep these areas small and manageable. Place the plants that can fend for themselves (after establishment of course) on the outer edges.
- The amount you water should be based on soil conditions and plant needs. Watering thoroughly, but infrequently, will help roots go deeper, resulting in more water-efficient, drought-tolerant plants.
- You can test whether your plants need water by checking the soil on the surface and in the root zones of your plants. Push a screwdriver into the soil, dig a small hole, or use a soil-core sampler to determine if the soil is moist enough near the plant roots.
- Water applied by sprinkling or hand-spraying may never reach the plants' roots. Usually it is applied faster than the soil can absorb it, and it flows off or is lost to evaporation. This causes shallow-rooted plants that are less drought-resistant. If you choose to use a sprinkler, select one that sends large drops of water close to the ground, instead of one that sprays a fine mist and loses a lot of water through evaporation.
- Use a timer – they are inexpensive and easy to use. They can also save you time and money by allowing you to do something else while you are watering, and they will help you avoid accidentally leaving the water running.
- Drip systems or soaker hoses are great alternatives for trees, shrubs, perennials, and ground covers. Little or no water is lost to evaporation as the water is applied at ground level, near the plants' roots. There is some maintenance involved with drip systems, but overall they are much more efficient.

## 6. Keep up on Maintenance

Water efficient landscaping means paying attention. Routine maintenance such as pruning and pest management will keep your plants healthy and your landscape at its peak while saving water. If you have lawn, de-thatch (if needed) and aerate it annually to ensure that the roots are receiving the right amount of water. Weeds compete with plants for nutrients, light, and water. Weed frequently by hoeing or pulling them by hand. A good layer of mulch, or planting more densely will help with weed suppression. Water and fertilize plants only as needed. If using an irrigation system, check it regularly to make sure it is providing the right amount of water at the right place and at the right time, and always inspect for leaks and broken sprinkler heads.

## 7. Grow a Smarter Lawn

Grass requires more water and maintenance than many other plants. In your landscape plan you will want to evaluate your need for lawn areas to ensure these areas are practical and functional. If you must have some lawn, consider letting your turf “brown out” in the summer. Lawn goes into a natural

dormancy during the hot months of summer and will return lush and green again with the fall rains. You will be surprised at the water, time and money savings! Investigate some of the new grass varieties that require less upkeep and watering than standard varieties. Turf areas need to be watered separately from other plant areas. An established lawn needs about 1 inch of water a week and more during hot, dry spells (see inset). Don't forget to adjust your watering schedule to compensate for changing weather conditions (rain, temperature, cloud cover, etc.).

### One Inch Exercise

To figure out how to measure 1 inch of water, follow these steps:

1. Place 5 empty tuna or pet food cans (all the same size) at various spots, halfway between the sprinkler and the parts of the lawn that get the *least* amount of water from the sprinkler.
2. Turn on the sprinkler for exactly 15 minutes.
3. Measure the depth of the water in each can.
4. Add up the numbers and divide by 5.
5. The result tells you the average water depth of all the cans.

Find your average water depth on the chart below, the column to the right of that number is the total weekly watering time needed from your sprinkler.

#### Average Water Depth

##### 15 Minutes:

1/8"  
3/16"  
1/4"  
5/16"  
3/8"  
1/2"  
5/8"  
3/4"  
1"  
1 1/4"

#### Number of minutes to water each week:

120  
80  
60  
46  
40  
30  
24  
20  
15  
12

**Water Usage:** Shaded lawns use 60%, of 'normal' lawn watering amounts; shrubs and perennials use 50% and water-wise plants use 25%.

### Water Wise/Sprinkler Options



#### EWEB – Water Wise Information:

[www.eweb.org/waterconservation](http://www.eweb.org/waterconservation) & [www.eweb.org/public/plants/index.htm](http://www.eweb.org/public/plants/index.htm)

## 5. Rain Gardens

Oregon's forests and soil play an important role in filtering and slowly releasing cool, clean water into streams, rivers and wetlands. The rich diversity of life in our waters and on land depends on clean water to thrive. In addition, our forestlands provide drinking water to many Oregonians. To keep our waterways clean, we need to keep stormwater clean. Most storm drains flow into water bodies without treatment. Stormwater runoff can include a number of contaminants such as heavy metals, nutrients, bacteria and motor oil.

As our region grows, native forest and soils are replaced with impervious, or hard, surfaces such as roads, rooftops and driveways. These surfaces do not let water infiltrate into the soil. When it rains or snows, more water flows off of these surfaces, transporting sediment and other pollutants into our waterways. Increased development is a real threat to maintaining good water quality.

**What is a Rain Garden?** A rain garden is a shallow depression in the ground that captures rainwater and/or stormwater runoff from your roof, sidewalk and driveway. Rain gardens help water soak into the ground, rather than flowing off of your property and into a storm drain system. As mentioned above, stormwater runoff creates problems for local creeks and lakes when it picks up contaminants, such as metals, nutrients and bacteria, and washes them into our storm drain systems.

By increasing infiltration, rain gardens not only improve the quality of storm water, they reduce the potential for local flooding of streets, sidewalks and yards. In the long run, rain gardens will not only help prevent landscape and stream bank erosion, but also help to maintain base flows in streams during dry weather and aid in the recharge of our aquifers.

Rain gardens work by using a series of filtration mechanisms. Physically, the plants and soils within the gardens act to trap potential pollutants. In slow moving water, pollutants have time to stick to roots and soil particles. Chemically, some of the pollutants and water are absorbed by the plants and used in their energy cycles. Beneficial bacteria and other microorganisms in the plant rooting zone can break down many of the pollutants and render them harmless. Harmful bacteria from pet waste are digested by soil organisms or killed when the rain garden rooting zone goes into a rapid drying cycle (usually within 48 hours). Lastly, the porous nature of the soil in a rain garden will allow most of the water from the first inch of rainfall to soak deeper into the ground. The biologically active zone of soil below the rain garden will provide further water treatment as the percolating water moves downward, and eventually into the groundwater.

**Where should a Rain Garden be located?** Generally speaking, rain gardens can be planted just about anywhere in your landscape. However, there are a few guidelines for choosing a preferred location that will make a rain garden more effective, easier to build and safer for small children and pets.





## **Rain gardens should:**

- Be located on a relatively flat section of your yard that has well-drained soil. This will make digging and constructing your garden easier.
- Be located where they catch the desired runoff and maximize infiltration.
- Be placed at least **10 feet** from any building foundation to prevent potential structure damage due to wetness or flooding.
- **NOT** be placed over septic systems, this may overwhelm the system and cause an unsightly and smelly mess.
- **NOT** be placed in areas in your yard where water puddles long enough to form small ponds. Infiltration and soil permeability are already low in these areas and a rain garden will only make matters worse.
- Be placed in full or intermediate sunlight. Exposure to some direct sunlight will speed up the drying cycle, assist in killing pathogens, and promote better plant growth.

You will want to perform a percolation test to determine if the soil at your site is suitable for a rain garden. The soil should allow water to infiltrate and slowly drain through the soil. All soils are a mixture of sand (large particles), silt (intermediate size particles), and clay (very tiny particles). Decomposing organic matter on the soil allows these particles to form stable aggregates that can enhance water movement through the soil (percolation) regardless of the amount of sand, silt and clay present.

### **How to Do a Percolation Test:**

- Call 811 (underground utility locator) before you dig
- Dig a hole at least 12” deep x 12” wide
- Fill with water and let it drain
- Fill with water a second time. If the water drains at least 1/2” in an hour the second time you fill it, your soil has adequate drainage for a rain garden.

Contact the staff at Upper Willamette Soil & Water Conservation District at 541-465-6443 for more information on performing a percolation test, or to have your soil tested.

**Planting and Caring for your Rain Garden:** Now is the time to use your imagination and plant your rain garden. Here are some guidelines for selecting plants:

- Consider all of the physical site restrictions and limitations and choose plants that are appropriate for the sunlight exposure and soil conditions of your garden.
- Choose plants that can tolerate standing water for up to 48 hours and plants that can tolerate some periods of drought.
- If you enjoy watching hummingbirds or butterflies, research plants that are attractive to them.
- Try to use native plants as much as possible. They are more disease resistant and tolerant to local conditions.

After planting your rain garden it is a good idea to mulch the entire garden with hardwood shavings. The mulch aids in the cleansing properties of the garden, and hardwood mulch does not float away. Remember that it will take time for the plants to become established and the rain garden will need to be watered periodically and weeded. You may also need to add more mulch every couple of years.

There are three levels for plants in your rain garden; bottom plants (hydrophilic), middle plants (can stand both wet and dry conditions), and top plants (plants that thrive in well-drained soil).

**Native Plants for Rain Gardens:** Listed below are some good suggestions for native plants in your rain garden:

- Wildflowers can add variety, color, and pollinator food sources to your rain garden. Try Camas, Grendillia, Madia, Rannunculus, Beckmania, Potentilla, Lotus, Columbine, Fringecup, Stream Violet, Lupine, Milkweed, Trillium, Oregon Iris, Wood Violet, Wild Strawberry or Oxalis.
- Grasses, sedges, and rushes are a wonderful addition to any rain garden. Use natives like Tufted Hairgrass, Romers Fescus, California Brome, Slough Sedge, Pacific Rush, and Spike Rush (Eliocharis).
- Shrubs to consider include: Douglas Spirea, Twinberry, Salmonberry, Red Currant, Red Osier Dogwood, Salix species and ferns.
- Trees such as Red Alder, Pacific Dogwood, Pacific Crabapple, Vine Maple, Cascara and Chinquapin can be used as focal points. On larger sites try Big Leaf Maple and Douglas Fir around the edges of your rain garden to pull up some of that stored moisture.

Remember, don't plant weeds! For a list of invasive species and weeds visit the Oregon Department of Agriculture's website at [www.oregon.gov/ODA/Plant/Weeds](http://www.oregon.gov/ODA/Plant/Weeds). Visit your local plant nursery, or some of the websites listed below when considering types of plants and where to place them in your rain garden. Look for plants that can tolerate "wet feet" and native plants that are adapted to our dry summers and wet winters:

- <http://raingardenalliance.org/planting/plantlist>
- [www.uwswcd.org](http://www.uwswcd.org)
- [www.emswcd.org](http://www.emswcd.org)

### Frequently Asked Questions

- *Do rain gardens breed mosquitos?* No, rain gardens are designed to dry out in about 1 day.
- *How can I test my soil?* Perform a percolation test.
- *What if I have a sloped yard?* Steeply-sloped properties are not recommended for rain gardens because they are prone to erosion.
- *When should I build my rain garden?* Fall is the ideal time to install your rain garden.
- *What are the benefits of a rain garden?* Rain gardens increase the amount of water that infiltrates into the ground, which recharges local and regional aquifers. They provide valuable habitat for birds, butterflies and many beneficial insects, and protect our local streams.

Contact the Upper Willamette Soil & Water Conservation District for more information on soil and water questions, and educational workshops at 541-465-6443.

## Other Water Features to Consider:

### **Ponds**

Ponds work best in clay soils, but they can be installed in sandy areas if you install a PVC or rubber liner. A pond must be down-slope from the house, at least six feet from a house with a basement, and have an overflow point which will not endanger the house or neighboring property. Ponds should have a fountain or other device that keeps the water agitated enough to inhibit the breeding of mosquitoes. If you plan to have fish in the pond, you will likely want to line the pond with a rubber liner. Fish prefer ponds that are at least one to two feet deep with steep walls. They need shade and oxygen, as well as a hideaway hole to avoid predators such as raccoons and cats.

### **Rain Barrels and Cisterns**

Rain barrels are relatively simple to install. Construction standards address concerns about public safety and mosquito breeding. A rain barrel should be constructed of a sturdy 55-250 gallon plastic or polyethylene container; garbage cans are not acceptable. The lid must be firmly sealed to prevent access by children and mosquitos. A rain barrel must have a piped overflow, and that overflow must discharge at an appropriate place (six feet from the edge of a house with a basement). To prohibit access by mosquitos, the inlet pipe and overflow pipes on the barrel must be either sealed from the air or screened. The inflow and overflow points in a sealed system should include at least six feet of sealed pipe. Screened systems should include 100 gage mesh (standard window gage metal or fiberglass) which is self-cleaning or allows manual cleaning. Rain barrels should not rest on a pedestal because they can fall or present a hazard.

**Please note:** A rain barrel may satisfy some of your watering needs, but a single 55 gallon barrel fills quickly (a half inch of rain on a 1,500 square foot roof produces almost 500 gallons of water!) and you may empty one during a single watering. In the winter, our community receives rainfall so regularly that most people do not need to water their yards. In the summer, when our community experiences extended dry periods, 55 gallons of stored water will not be a significant contribution to your watering requirements. If you are interested in some sort of water catchment, it is worth your while to consider a larger cistern-style catchment system.



## 6. Wildlife Habitat

Creating wildlife habitats can be one of the most enjoyable benefits of any naturescaping project. A yard full of birds, butterflies, and other busy insects is a pleasant place to be or just to watch through your window. Certain species can help keep your yard and garden healthy by preying on harmful pests. To create or enhance habitat, you must make sure that your naturescaped area contains all of the features required by wildlife: water, food, shelter, and space.

### Water

Of all the features of naturescaping, the one that most reliably attracts wildlife is water. Something as simple as a plant saucer, refreshed every 3-5 days with clean water, will attract a variety of birds. More sophisticated water sources can also be constructed, including ponds and recirculating streams. Be sure to provide shallow areas with nonslip bottoms for birds to bathe and drink. Mosquitoes can complete their life-cycle from egg to adult in 7-10 days! Minimize mosquitoes and prevent the spread of diseases such as West Nile Virus; keep water moving, or replace the water every 3-5 days.

### Food

Bird feeders and hummingbird feeders are good ways to attract birds to your naturescaped yard, but it is better to provide wildlife with natural, growing sources of seeds, berries, and nectar. Plants that attract the insects that birds like to eat are also a good way to provide food.

### Examples of Wildlife Food Source Plants \*

<b>TREES</b>	Cascara	Western Red Cedar	Black Hawthorne	Elderberry	Western White Pine
	Noble Fir	Incense Cedar	Pacific Crabapple	Big Leaf Maple	Shore Pine
	Grand Fir	Hemlock	Kousa Dogwood	White Oak	Red Alder
	Douglas Fir	Brewer's Spruce	Red-Osier Dogwood	Birch	Hazelnut
<b>SHRUBS</b>	Oceanspray	Wild Roses	Mock Orange	Japanese Pieris	Lilac
	Blueberry	(Baldhip, Nootka, and	Oregon Grape	Serviceberry	Salal
	Huckleberry	Woods' rose)	Snowberry	Douglas Spirea	Red-Flowering Currant
<b>GROUND COVER</b>	Kinnikinnick	Bunchberry	Wild Strawberry	Oregon Oxalis	
<b>FLOWERS</b>	Daisy	Sweet Alyssum	Yarrow	Black-eyed Susan	Bleeding Heart
	Penstemon	Fuchsia	Lupine	Cardinal Flower	
	Columbine	Poppy	Sunflower	Iris	
<b>HERBS</b>	Thyme	Rosemary	Sage	Chives	Lavender

\* Native and appropriate non-native species

## Cover and Shelter

Birds and other creatures require protection from predators and the weather, and places to nest and raise their young. Options include dense evergreen trees, native shrubs, and nesting boxes designed for particular species. It is also important to provide nesting materials such as soft, dried plant material and even bits of string and hair. (Interestingly, it has been noted that birds prefer dog or human hair over cat hair!) It can be very entertaining to watch birds gather nesting material from around your naturoscaped yard.

## Space

In addition to a place to hide and nest, animals need space to live undisturbed. Hunting and foraging areas are important as well as places to raise young. At the end of the growing season, don't be too thorough about cleaning up flower beds (unless you have disease or pest problems). Leave some soft, dried plant stalks for birds to use as nesting materials in the spring.

## Other Visitors

Birds are the creatures you are most likely to see in your yard, but other wild creatures can also be attracted to a naturoscaped area. Bats are useful neighbors to have; most eat insects and one bat can consume as many as 2,000 mosquito-sized insects in one night (and they won't bite you or get tangled in your hair). Bat boxes can be constructed or purchased to provide roosting and rearing space for bats. Detailed information on bats and bat boxes can be obtained from the Audubon Society or Bat Conservation International (see *Appendix D: Resources*). Amphibians, such as salamanders, newts and frogs are declining in numbers worldwide, so providing pond or marsh habitat for them in your naturoscaping plan can be very important.

The National Wildlife Federation has the Backyard Habitat Program that can help you plan your project and then certify your results. They are listed under *Organizations* in *Appendix D*. You will find additional local sources of information on providing wildlife habitat in this appendix.

Surround your birdbath with Oregon Grape – cats will avoid the prickly leaves on this plant.



## Providing Wildlife Habitat

- Are you interested in creating backyard wildlife habitat?
- Are your neighbors interested in wildlife habitat?
- What wildlife have you seen in your yard?
- Are you aware of any wildlife that already nests in your yard?
- What shrubs, trees, flowers, birds, mammals, or insects do you want in your yard?
- What shrubs, trees, flowers, birds, mammals, or insects do you not want in your yard?
- Are there any water features in your yard?
- Is there any dead woody material for shelter (logs, snags, or stumps)?
- Are there any rock walls or brush piles for shelter?
- Are there any trees?
- Are there existing plants that produce seeds and berries?
- Are there existing plants that provide year-round shelter?
- Is there a diversity of plant species?
- Is there a diversity of plant heights and textures?
- What plants and habitats are available on adjacent property?
- Do you have supplemental feeders or nesting boxes for wildlife?
- How often do you change stagnant water of a pond or bird bath?



# **7. Riparian Landscapes and Controlling Invasives**

## **Riparian Enhancement**

A riparian area is the zone of land adjacent to a river, stream or lake, which is directly influenced by the water body, and in turn, impacts the quality and habitat of the aquatic system. The presence of water, periodic overland water flow, relatively high water tables and wet soils give the riparian areas distinct vegetation and microclimates. Riparian areas directly influence the quality of the adjacent waterway by providing shade, filtering nutrients, bacteria and chemical pollutants, controlling erosion, and storing and releasing water. Streamside vegetation also provides critical fish and wildlife habitat. Large wood that falls into the water creates stream habitat for fish. Leaf matter and small detritus provide organic material essential to the base of the aquatic food chain. Riparian areas also provide vital corridors for the movement of wildlife.

Taking steps to enhance riparian areas through the management of streamside vegetation can enhance property values and improve function. This section broadly outlines some steps to consider prior to starting a riparian enhancement project on your property. Because of the value of riparian areas to the overall community, in many cases there are grants and programs available to private landowners to help with conservation and enhancement projects. In the McKenzie River Watershed, a partnership of local agencies and organizations is developing a program to encourage long term stewardship of riparian areas. The Voluntary Incentive Program (VIP) will pay landowners to conserve high-quality riparian habitat and help enhance degraded habitat (see page 30). To learn more, contact one of the VIP partners; EWEB, the McKenzie Watershed Council or the Upper Willamette Soil and Water Conservation District.

### **Step 1: Assessing Your Riparian Area**

A simple walk along the stream bank can reveal important clues about the health and function of the riparian area. To start, assess the type and condition of the vegetation, or plant community. Is it primarily native or non-native? Is there a diversity of trees, shrubs, grasses, and forb species (herbaceous plants) present? Are there multiple canopy layers providing shade to both the river and the riparian area soil? Examine the stream bank itself. Is the bank at a low risk of erosion with a low bank angle (typically below 60-80°)? Is it covered with dense native vegetation and root systems? Other important habitat features to look for include downed wood, snags, and seasonally wet areas. Soil assessment is also important. Are the soils moist and full of decomposing organic material? Are there signs of wildlife?

General characteristics of impacted riparian areas include:

- Lack of vegetation cover or dominance of invasive plants
- Stream banks with bank angles approaching or exceeding 90°
- Exposed stream banks or soil with little or no vegetation or root structure
- Lack of special features such as downed wood, snags, seasonal wet areas
- Human development or bank stabilization (rip rap, levees)

If your stream bank area has one or more of these general characteristics it would likely benefit from enhancement actions.

## **Step 2: Planning**

Once you have decided to engage in a riparian enhancement project, the first step that should be taken is planning. Taking the time to plan will save time, effort, and money, as well as increase the project's chances of success. Writing a plan, even if it is just a series of lists and timelines, is extremely important. In the McKenzie River Watershed, the VIP partners can often help with this process.

When planning a riparian enhancement project, it is important to:

1. Define current conditions
2. Identify desired future conditions and
3. Understand logistical constraints (time, budget, physical habitat features, flow conditions)

Riparian characteristics to assess and consider when developing a planning document include:

- What types and how much invasive vegetation is present? You will have to be able to identify invasive vegetation species in order to research and plan appropriate treatments.
- Is there currently any native vegetation present? Learn to identify native plants and plan to keep and work around them during site preparation. Marking them with flagging can help.
- Does the area flood and if so how often? This knowledge will help to determine appropriate species of plants to use and will influence project timing and methods.
- Can planting conditions be classified as shady, partially shady or full exposed? This will also help to determine the types of species to plant.
- Are wildlife such as deer and beaver present? If so, you may have to either plan for the placement of some sort of browse protection or plant extra stock.
- What are the soil conditions and water table depth? You may need to irrigate your plants to some degree during the first summer or two. This will also inform you about the types of species you plant. Most well planned projects using native plants will need little to no watering.

Carefully think about desired future conditions and interaction with other uses of the property:

- Think about what type of physical and visual access you would like to maintain. For example, planting dense shrubs along a pathway could limit access to the river and planting trees in the line of sight from a deck or living room window will impact your view over time.
- What is your tolerance for invasive vegetation? In nearly all cases it is unrealistic to expect full eradication of invasive plants and a complete return to natural conditions.
- What is the desired composition and density of native plant species? Do you want to plant only trees, or are you looking for a more holistic project that attempts to follow



natural conditions and incorporates a greater diversity of native plants? Do you want a dense stand or more open spaces similar to a park-like area?

- What is the desired scope and size of the project? Do you wish to return the entire property to more native state, or only a portion? Think about this in terms of both linear feet along the river and set-back distance perpendicular to the river.

There are many logistical questions to consider before embarking on a riparian enhancement project. Several key considerations include:

- Consider the present land use, as well as the anticipated future land use in adjacent areas, including both your property and neighboring properties. Does either the type or size of the proposed project interfere with surrounding land uses?
- Do you have the proper equipment (mower, weed eater, hand tools, etc.) needed for implementation?
- Do you realistically have the time to devote to the necessary maintenance?
- Do you have sufficient financial resources to secure plant materials, supplies and potential contract labor to make the project a success? There may be multiple grants, conservation easements and programs such as VIP available through local non-profits (watershed councils or land trusts) or government agencies (EWEB or the SWCD).

### **Step 3: Site Preparation**

The major consideration for site preparation in western Oregon involves the control and management of invasive vegetation. Good site preparation takes time, effort and planning. Know the conditions of your site, research options and seek out help. The McKenzie River Watershed Voluntary Incentive Program is being designed to help private landowners develop and implement riparian restoration projects. Inadequate site preparation is a major reason for failure of riparian enhancement projects. It is generally much more efficient and cost effective to control invasive vegetation prior to establishing the desired native plant community. Preparing an area for a riparian restoration project includes:

1. Identifying invasive vegetation species present and researching control and management options
2. Developing a timeline and a plan for site preparation
3. Marking existing native vegetation that needs to be preserved

Why is invasive vegetation a problem? An invasive plant is a non-native plant that grows and expands aggressively, out-competing native vegetation for available light, water and nutrients. Native vegetation is often displaced and a monoculture habitat is created. Invasive vegetation in riparian areas may:

- Reduce available habitat for native wildlife
- Reduce inputs of leaf litter and small detritus inputs to streams, rivers, and lakes
- Limit long-term recruitment of large woody material into rivers
- Limit shade potential of riparian area
- Contribute to increased erosion
- Reduce water storage capacity and filtering capacity

The first step in management of invasive vegetation is identification. Once identified, various treatment options can be researched online or in consultation with your local watershed council or SWCD. A short list of common invasive vegetation species found in the McKenzie River Watershed includes:

1. Reed canary grass
2. Himalayan blackberry
3. English ivy
4. Scotch broom
5. Japanese knotweed
6. Clematis or old man's beard
7. False brome
8. Herb Roberts and shining geranium
9. Spotted knapweed
10. Butterfly bush

*Appendix C: Invasives Control* outlines some common methods for controlling and managing invasive plants. There are also multiple sites online that describe treatment options for invasive vegetation. A short list of websites is also included in the *Appendix C*. Effective control often will require both multiple years and methods including manual, mechanical and possibly chemical treatments. However, it is important to remember that for many invasive species, complete eradication is not a realistic goal. High water, wildlife and human activity will continually reseed riparian areas.

Once you have researched options for invasive vegetation control, or other scenarios like lawn conversion, it is critical to establish and follow a plan. A site preparation plan can be as simple as a timeline, but knowing what to do and the right time to do it will again save time, effort, money and increase chances of success. Local partners are likely available to help with development of a site plan.

Taking the time to identify, mark and preserve existing native vegetation is also well worth the effort. Maintaining established native plant communities within your project area will help retain some measure of riparian function during the project, as well as provide a source for seeds utilized in natural propagation, all while reducing plant material expenses. Certain tree species like big leaf maple and Oregon ash readily establish numerous seedlings. Nurturing natural regeneration during site preparation and throughout the project can greatly increase the project's chance of success.



## Step 4: Planting

Once initial site preparation is complete, the next step in the riparian enhancement process is planting. It is critical to develop a planting list and place an order for your plants well in advance of planting season. The best time to plant riparian enhancement projects is during the plant dormancy period from late October through mid-to-late March. Ordering your plants the preceding spring, or even winter, will ensure that the species you want are available and it will likely result in a lower price. Other timing considerations for planting include the susceptibility of the area to flooding (you may want to wait until late February or early March to plant), as well as avoiding periods of prolonged cold (below 20°F).

Several factors to consider when developing a planting list include the species' water and drought tolerance, soils preference, and exposure range (shade tolerant, partial shade, full sun). Other considerations include companion planting and the vegetation's size at maturity. Use existing lists (see *Appendix A: Native Plant Selection Guide*, or lists available online (Native Plant Society of Oregon, Emerald Chapter website <http://emerald.npsoregon.org>), as a starting point for developing a planting list. Watershed councils, SWCDs or OSU Extension can also be good resources.

Native plants are available in a variety of different stock types (containers, bare root, plugs, cuttings). Each type has its own merits. One-gallon containers are more expensive, but are typically larger and may establish themselves more quickly. They can also be installed by inexperienced planters and can be planted anytime from late fall through the spring. On the downside, they can be difficult to move to remote areas, as well as over long distances. Bare root plants generally do very well in areas that have had good site preparation and they are inexpensive compared to container stock. However, they are easy to mis-plant and must be handled properly prior to planting. If you use bare root stock make sure you understand how to plant them correctly. Additionally, bare root is available only during the winter, and can sometimes be difficult for a retail consumer to find. Utilizing a variety of nurseries can be an excellent option if you are willing to buy in bulk and order early. For instance, plugs, typically conifers, are often available from local forestry nurseries. Generally they must be purchased in bulk, are only available during the winter and must be ordered ahead of time. Hardwood cuttings for certain species like willow can be an effective and inexpensive option. Research how to take hardwood cuttings from established plants as well as other methods of propagating your own plants.

One final consideration before planting is the planting layout and design. Your planting plan should take into account your desired future conditions as well as any logistical or geographical constraints. Basic considerations for a planting design include:

- ***Species composition***: Think about size at maturity and proximity to other plants. Place species according to appropriate light and water requirements. Ideally species planting within an enhancement project should mimic natural and historic composition to the degree possible.
- ***Plant density***: This can be highly variable. Past riparian restoration projects in the McKenzie River watershed have ranged from spacing plantings as far as 10-12 feet apart from each other to as little as 3 feet apart. Typically, projects with a lot of shrubs are planted at a higher density than projects dominated by tree plantings. Many shrubs

like to grow in dense clumps and should be planted in this manner. Dense plantings, if done correctly, will compete well and eventually help manage invasive vegetation through increased shade.

- **Planting layout:** General approaches include straight rows, clumps, “island” plantings and random placement. Oftentimes, rows are easiest to maintain and allow for the highest plant density. Clump or island planting can be very attractive and allow for companion planting opportunities. Random planting may be attractive if you wish to emulate a more native aesthetic. However, a random placement layout is much more difficult to maintain.
- **Maintenance plans:** Think about the easiest way to maintain the project when creating your planting plans. If the maintenance plan relies on mowing, straight rows are often best.
- **Natural constraints:** steep slopes, wetlands, or gravel bars
- **Land use constraints:** This may include desired physical or visual access through the project site, proximity to buildings, roads, agricultural fields, lawns or neighboring properties.
- **Natural occurrence:** Wherever possible, try to mimic the natural occurrence of individual species already present. If historic or reference site conditions are known and available, this information can also provide excellent guidance.

## Step 5: Maintenance

Riparian plantings will typically require at least three to five years of active maintenance before they can be considered established. Many will require more time. Therefore, it is important to plan and be prepared for this level of maintenance. Below are some considerations for several major aspects of maintenance including mowing, mulching, wildlife browse and irrigation. Note: In areas dominated by reed canary grass, recruitment of new plants will continue to be suppressed. To maintain native succession, new trees and shrubs should be added periodically as part of a long-term maintenance strategy. With most riparian enhancement projects, adding additional plants to make up for mortality during the first several years will be necessary.

Depending on your planting plan, mowing using either mechanical equipment and/or hand-held weed-whackers will likely be necessary over the first 3-5 years. Designing the planting layout with mowing in mind will help to reduce time, effort and cost. In general, the less mowing required, the better. Mowing timing is critical. In most cases mowing can be started in mid-spring, before grasses or weeds get high enough to overtop native plantings. Mowing on a 2-3 week cycle is typically enough to ensure proper maintenance. Wait until the end of June if you know, or suspect, that you have ground nesting birds. Ensure that mowing is done before problem plants go to seed. Using weed-whackers with either string or metal blade attachments will likely be necessary in areas inaccessible to mowing equipment. This is often difficult and time-consuming work. Use your planting design to help minimize the amount of space that needs to be maintained with this equipment if at all possible.

Mulching is a great option for reducing competition with surrounding vegetation while still retaining soil moisture. Use bark chips to mulch around the base of plantings. Larger grade material like walk-on or hog fuel mulch is usually the cheapest option and lasts a relatively long time. Spread bark 2-4 inches deep in a 2-3 foot radius around each planting. Using cardboard or newspaper as

an underlining sheet to help smother weeds is also an option. Considerations for placing mulch include the susceptibility of the area to high water, as well as the ease of placement. Moving a large amount of mulch a long distance can be a difficult and labor-intensive task. Mulch can also provide cover and lead to increased browse pressure from voles and other rodents.

It is likely that new plantings will have to be protected from wildlife (beaver, deer, elk). There are several options including plastic tubes, mesh, welded wire cages, chicken wire cages. These are typically held in place with bamboo or a metal T-post. An alternative to using any browse protection is to plant at a higher density and live with the loss of a certain percentage of the plantings. Another option is to wait and see where the browse pressure is and then selectively apply appropriate protection. If installed correctly, browse protection should work for the first couple of seasons until the plants are big enough to withstand most browse pressure. Nonetheless, there are several problems with using browse protection like plastic tubes or wire cages. It can be expensive to obtain, as well as labor intensive to install and maintain. Materials will be susceptible to high flows if left in place in low-lying areas over the winter. Certain animals like elk, and in some cases beaver, are extremely difficult to keep out of planted areas. Other options like spray-on blood-based repellents can be effective for short time periods against deer. Weigh your options carefully when managing wildlife browse pressure. Many larger scale riparian enhancement projects have moved away from installing browse protection, relying on higher density planting and re-planting instead.

Irrigation may or may not be necessary depending on your site conditions, planting plant and desired outcomes. See *Chapter 4: Water Conservation* for more detailed information on irrigation and water conservation. General irrigation considerations include;

- Try to minimize watering needs. Choosing native species suited to the local environment and planting densely will help mitigate any loss of stock due to summer drought or heat stress.
- If you are irrigating, water less frequently, but increase the amounts used per watering event. Typically plants can absorb approximately 5 gallons of water at time. Several “deep” waterings will be more effective and efficient than continual irrigation. Irrigating riparian plantings every 2-3 weeks during late June through late August should be sufficient.
- Pay close attention to rainfall and soil conditions. Many riparian soils will retain moisture even through most of the summer. In the event of a summer rain event, skip an irrigation cycle.
- “Harden” plants off at the end of the summer. Northwest summers are typically very dry, sometimes even into October. Encourage plant vigor by forcing plants roots to seek out water by stopping irrigation at the end of August or early September.

We would like to encourage maintenance of riparian projects without or with limited use of herbicides. A number of alternatives to chemical use are included in this guide (see *Chapter 8*). However, we also realize that some people do and will continue to use chemicals in maintaining their properties, and in some cases, it is the most realistic option for managing certain invasive plants. In that respect, we hope that you will consider chemical use to be a last resort and as a tool to be used with other methods such as mechanical and manual efforts over a limited time period. If and when you decide to use herbicides, please be sure to follow the label and application directions

carefully. Applying more herbicides than needed will not work ‘better’ and the excess can potentially run into a water body during a rain event. In *Appendix C: Invasive Species Control*, we have included some direction of how herbicides might be used to eradicate particularly difficult invasive species, but again, we prefer to promote non-chemical alternatives when appropriate.

### **Voluntary Incentives Program (VIP)**

The Eugene Water & Electric Board (EWEB) is developing a new drinking water source protection strategy that will reward rural landowners who help to protect the water quality in the McKenzie watershed by maintaining high quality riparian forests along the river.

Under the Voluntary Incentive Program (VIP), landowners with properties that meet specific standards will qualify to receive annual payments or other financial incentives when they agrees to long term protection of these areas. The payments will reward outstanding land stewardship that benefits the residents of Eugene, whose sole source of drinking water is the McKenzie River.

Landowners with riparian properties that do not qualify for receiving payments may enter into a restoration agreement where they will receive access to technical assistance, funding, assistance with plantings and maintenance for working to remove invasives while also restoring native vegetation on their properties.

For more information, visit [www.eweb.org/sourceprotection/vip](http://www.eweb.org/sourceprotection/vip)

## **8. Alternatives to Chemicals**

Gardens and lawns can be successfully maintained without the use of pesticides and other chemicals. Keeping these products off of our lawns and out of our gardens helps to keep rivers, streams, people, pets, fish and other wildlife healthy. This section provides a number of alternatives to using conventional pesticides to control unwanted weeds and other pests. Listed below is a 3-step approach to solving pest and disease problems:

### **Step 1. Prevention**

Create a healthy soil environment for your plants. Pests and diseases often attack stressed or unhealthy plants. Planting the right plant in the right place and caring for it properly will often prevent problems from the start. In addition, consider having your soil tested and add only what you need to create a healthy balance. (For instance, turf grass should be within the pH range of 6-6.5). Other actions that may help to keep your soil healthy include: aeration (relieves soil compaction, allows water, air and nutrients to better reach the roots); proper mowing (cut high, cut often, and leave clippings) and proper watering (water deeply, infrequently and early in the morning). Shade tolerant grasses such as fine fescue, Kentucky Bluegrass, and perennial ryegrass.

### **Step 2. Problem Identification**

If pests or diseases crop up, identify them. Most insects are harmless and many are beneficial. Don't make a mistake and kill or injure a friend. For help with identification, contact Oregon State University Extension Service, Northwest Center for Alternatives to Pesticides, the Upper Willamette Soil & Water Conservation District, or a local garden store. Once you have determined that you indeed have a pest, you should next determine your tolerance level. Even "pest" species can be relatively harmless in small numbers. How many and what kind of pests will you tolerate? Keep in mind that small populations of pests in our landscapes or neighboring landscapes help us build populations of the beneficial insects that eat them. You may consider planting a sacrifice plant or area that you "let go" to the pests.

### **Step 3. Controlling Populations**

Try the safest methods first. See if you can use traps or barriers to discourage the pests. Sometimes even physical removal (handpicking) is possible and can be effective.

**Biological helpers:** The next step is to take advantage of bacteria, parasites, or other natural predators such as nematodes or parasitic wasps to control the pests. Examples of this would be using ladybugs to control aphids. Spiders are also useful for pest control, as are birds, bats, and dragonflies.

**Organic Pest Controls:** Sometimes, similar things like vinegar (acetic acid) applied directly to weeds can be very effective. There are a variety of new products out on the market today. Examples include BurnOut II (a natural herbicide with vinegar base), Green Match, and Matratec (a botanical herbicide). Common active ingredients for botanical herbicides are clove oil, citrus oil, lemongrass oil, cedar oil, cinnamon oil, neem oil, and mint oil.

The Organic Materials Review Institute (OMRI) is a nonprofit organization based in Eugene that reviews products for use in organic crop and horticultural production (<http://www.omri.org>). In addition, the Northwest Center for Alternatives to Pesticides (NCAP) is also a great resource for assistance with alternative methods of control ([www.pesticide.org](http://www.pesticide.org)).

**Heat treatment:** Heat can also be an effective way to get rid of weeds. There are some flame weeder tools and steam wands available that can do the job; though they sometimes require multiple treatments and, of course, must be used with care due to fire safety risk.

**Least-toxic chemical controls:** If none of the above methods work, find the least-toxic product available for the specific problem that will reduce the unwanted insects, plants, or diseases to acceptable levels. It is also important to apply the product at the right time in the pest's life cycle. Apply it carefully, following the directions to the letter. *More does not equal better.*

### Vinegar (Acetic Acid)

Pros	Cons
Affordable	Is caustic, can damage skin or eyes
Is an effective natural herbicide, especially at higher concentrations	Does not kill root directly
Non-toxic	Can raise acidity of soil
	Legal 'gray area' – vinegar herbicide products must be registered for use as a pesticide in order to be sold legally as pesticides.

### Botanicals

Pros	Cons
Can be effective herbicides/insecticides	Can be expensive
Environmentally benign	Results are more varied based on conditions
Many are certified for use on organic crops	Strong odor



## Heat Treatments

PROS	CONS
Great for paved/gravel surfaces	Fire safety risk
Slow kill, doesn't signal roots to regrow	Uses fossil fuels (propane)
Most effective on younger plants and annuals	Can require multiple treatments
Minimal fire risk in NW climate (most of the year)	

## Invasive Plants

Invasive plants pose a serious threat here in northwest Oregon. Our mild climate enables plants from throughout the world to thrive. Unfortunately, aggressive plants, without the checks and balances they would encounter in their native ecosystems, thrive, and do so at the expense of everything around them.

A single species can take over and alter an entire forest, wetland, or grassland. Infestations can alter the ecosystem by:

- Allowing erosion and/or flooding - some invasive plants have fewer or more shallow root systems that don't hold onto soils as well
- Increasing the amount and/or temperature of fires – some plants contain oils that cause them to burn hotter and catch fire more easily
- Changing soil chemistry – some invasive plants release chemicals from their roots that inhibit the growth of other plants
- Reducing wildlife – migratory birds recognize the flowering and fruiting cycles of many native trees and shrubs

Some plants do so well here that they threaten to overrun many of our gardens and natural spaces. As a result, some individual homeowners, non-profit groups and government agencies have turned to toxic chemicals in an attempt to slow their rapid spread in our natural areas.

## Hints to Avoid Planting Potential Weeds

Help minimize this serious problem by refusing to purchase and plant those species of plants known to be aggressive. Know before you go – find out what species are known to be weedy or aggressive before you go to the nursery to pick out plants. Choosing plants that are aggressive or weedy means you have to work harder in your garden, and it may put you in a position where you are contributing to this growing problem within our communities. Weed lists and additional information are available in the appendices.

Take particular care when buying or planting mixtures of seeds, especially wild flowers mixes (even those distributed by nonprofit groups as thank-you gifts). Many mixes contain seeds of invasive plants and many are mislabeled or too poorly labeled to tell.

Be particularly careful if you live near wild areas, parks, open spaces, streams, or bodies of water that could be invaded by things you plant in your garden or fish pond. Identify any “volunteer” plants that “show up” in your yard. When getting a plant from a friend or plant swap, be sure to positively identify it and make sure it is not on the nuisance plant list (see *Appendix B*). Unfortunately, many plants received in this manner are plants that spread quickly or “just appeared” in the gift givers’ yard.

***Don’t let people pass their problems on to you even if they are beautiful at first glance!***



St. John’s Wort



Vinca

### Will it Become Invasive?

With the variety of plants available and continually changing, it’s difficult for any agency to be aware of the numerous plants that could become invasive in our area. Here are some tips to help you. If there is a particular non-native plant you’re interested in growing, be wary of the plant if it:

1. Produces very large amounts of water or wind-borne seeds
2. Provides berries for wildlife, which might spread the plant to other areas
3. Is unusually pest and weather resistant
4. Tends to shade out neighboring plants or out-compete them for food and water; or
5. Spreads quickly by runners, underground roots, or plant fragments

## 9. A Plan of Action

### **Right Plant, Right Place**

One of the most important considerations for developing a landscape using naturoscaping principles is the concept of ‘right plant, right place.’ Plants that are native to the Pacific Northwest are naturally adapted to our unusual climate of wet, mild winters and dry summers. When placed in an appropriate location, they will be healthy enough to resist pests and diseases that would attack a stressed plant. This natural adaptation allows you to use much less supplemental water (once the plant is established) during the warmer, dryer months and helps you to eliminate your use of chemical pesticides and fertilizers.

In addition to the regional climate, native plants have characteristics that make them well-adapted to micro-climate differences. For example, some plants thrive in shade, while others grow best in full sun. Big leaf maple trees can provide substantial shade in the summer, so you might want to plant them on the south or west side of your home so that they provide shade in the hottest part of the day. It is critical to pay attention to where a particular plant will grow best. Even a native plant will do poorly in a wet, shady spot if it has adapted to a sunny, wet meadow. Examine your own space and identify areas that are sunny or shady and wet or dry, and then determine which plants will do well in those areas.

### **Six Steps to a Naturoscaped yard**

#### **1. Map the Area to be Naturoscaped**

Make this map as detailed and accurate as you can, but don’t get lost in the inches. Take note of all of the features of your property that will affect your plan, such as your house and garage, driveway, windows, doors, walks and decks, walls, fences, trash and recycling containers, faucets, electrical outlets, and utilities. Mark the slopes, open sunny areas, wet areas where water collects, dry areas under dense trees, and areas of unusual soil or rocks and other features that might affect your plan. Watch your yard through a sunny day and make note of areas that are in full or partial sun all day, or in perpetual shade. Keep in mind the season and try to imagine what it would look like in the light of a different season, with or without leaves on the trees, for example. Finally, don’t forget to indicate north on the map to help determine the path of the sun and the direction of the prevailing winds.

In the McKenzie River area, the average elevation is 500-1500 ft. There is a shorter growing season and plants are generally about a week or so slower to bloom or develop than the Eugene and Springfield metro areas. Many parts of the McKenzie Watershed are fairly shady – consider growing plants that require less sun to ripen or bloom. Grow vegetables that require fewer ripening days.

#### **2. Sketch your Ideas**

Here’s the fun part! Let your imagination run wild with what your ideal naturoscaped yard would be, then temper it by figuring out what will work (right plant, right place) and what you can afford in time and money. Use tracing paper on top of your map of existing conditions, and place your features and plants based on what you have learned through researching the needs, benefits, eventual sizes, and availability of different species (see ). Think about what your purpose for naturoscaping is: do you want wildlife, a flower garden, a forest scene, fall color, a low-maintenance yard, or some of each? Don’t be afraid to try different ideas.

## Examples of Native Plants for Specific Micro-Climates

<b>Wetlands or Riparian</b>	<b>HERBS:</b>	<b>SHRUBS:</b>	<b>TREES:</b>
	Blue-Eyed Grass Camas Tufted hairgrass Sedge species Rush species Western Coltsfoot Wapato	Red-Osier Dogwood Pacific Ninebark Twinberry Douglas Spirea	Bigleaf Maple Red Alder Oregon Ash Cottonwood Columbia Willow Red Cedar Red Elderberry Birch
<b>Prairie or Meadow</b>	<b>HERBS:</b>  Pearly Everlasting Balsamroot Blue Wild Rye Camas Clarkia species	Shooting Star Idaho Fescue Red Fescue Oregon Iris	Lupine species Cinquefoil Self-Heal
<b>Sunny Border or Rock Garden</b>	<b>HERBS:</b>  Red Columbine Kinnikinnick Oregon Sunshine	Broad leaf Penstemon Rock Penstemon Penstemon	Black-Eyed Susan Sedum
<b>Shade Garden</b>	<b>HERBS:</b>  Vanilla Leaf Goat's Beard Wild Ginger Deer Fern Goldthread Oxalis Sword Fern False Solomon Seal Piggyback Plant Inside-Out Flower	<b>SHRUBS:</b>  Serviceberry Salal Indian Plum Pacific Ninebark Red Flowering Currant Baldhip Rose Blue Elderberry Evergreen Huckleberry Bleeding Heart	<b>TREES:</b>  Vine Maple Douglas Fir Oregon White Oak Cascara Western Hemlock Pacific Yew Madrone Big Leaf Maple Red Alder Birch
<b>Hedgerow or Shrub Borders</b>	<b>SHRUBS:</b>  Serviceberry Oceanspray Oregon Grape Indian Plum Black Hawthorn	Pacific Ninebark Red Flowering Currant Western Azalea Baldhip Rose Nootka Rose	Blue Elderberry Snowberry Salal Mock Orange

## Consider the following features:

**Bio-Swales:** These are rocky, grassy, or otherwise vegetated ditches that are constructed to move water from one place to another. Swales can flow to ponds, wet areas or rain gardens.

**Snags, logs, and downed woody material:** This material is very useful to wildlife for nesting, roosting, and foraging for insects. Large decaying logs retain moisture through dry periods for creatures that need it. Carefully placed logs and sticks can also prevent erosion. Keep woody debris at least 20 feet from your house to keep ants away.

**Ground cover:** This can be a low-maintenance alternative to lawn in many places.

**Rock gardens, walls, or terraces:** These can be beautiful ways to reduce runoff and erosion from a sloped area.

**Ponds:** Lined or unlined areas where there is standing water. Make sure the surface of the water is flowing or agitated, or replace the water every 3-5 days so mosquitoes won't breed in the pond.

**Rain gardens:** These are unlined, vegetated depressions used to collect rainwater. The water soaks into the ground within one or two days after a rainstorm.

**Water features:** Birdbaths, ponds, wetlands, or recirculating streams can be the focal point of your yard, for you and wildlife.

**Water zoning:** This is a way to group plants together that need similar amounts of water. You can water more precisely and reduce waste and runoff.

**Rain Barrels:** Consider re-use of stormwater. Rain barrels or larger cisterns allow you to capture and use roof stormwater in your yard.

If you will be planting new trees, plan carefully where they should be placed. Again, native species planted in areas similar to their natural sites (for example: willows in wet areas, firs and hemlocks in drier areas, and pines in the driest, well-drained soils) will do well after they are established without much additional care. For example, fir trees, once established, almost never need additional water, even in our driest summers. You might also consider choosing trees that produce seeds or berries attractive to wildlife, such as crabapple and elderberry. Use the following guidelines to place your new trees in the most advantageous locations:

- Use deciduous trees on south and west sides of your home. They will shade your house in the summer, and then lose their leaves to let the warming sun through in the winter.
- Place evergreen trees on the north or east side, to act as a wind break in the winter.
- Consider the size of the mature tree or shrub and plant it a sufficient distance away from any overhead wires, structure, or paved area.
- Consider your view and the views of your neighbors.
- Consider security: don't place trees or shrubs where they provide hiding places for burglars, provide access to windows, or obscure the view of your windows and doors.
- Do your research. Read the plant's label when buying or ask for help from nursery staff.

### **3. Consider the law**

Just a word about legal regulation: If you plan to make any major changes to your property (construct a large building, build a retaining wall, change the fencing, or plant tall hedges), check with your local zoning or building authorities. (Lane County Planning and Zoning:

<http://www.lanecounty.org/Departments/PW/LMD/LandUse/Pages>). Be sure to check with your neighbors too, if they will be affected by your naturescaping activities.

### **4. Create your naturescape**

Now it's time to turn your dreams into reality, but before you get your hands dirty it's a good idea to do some planning at this stage too. Don't forget that this can be a big project, and it will probably turn out to be bigger than you expect. If you decide not to do this project yourself, there are many qualified landscape architects, designers, and contractors who can help with all or part of your project.

- Plan the job in stages so that you can get one satisfying part of it done before starting on the next phase. Do a little bit at a time. Consider the best time of year to do different aspects of the project.
- Prioritize each stage. Start with large features such as paths, ponds, and streams. Next, complete the ground preparation, then plant large trees and shrubs, followed by flowers and smaller plants.
- Try to imagine what your landscape will look like in a year, five years, even twenty years and plan accordingly.
- Prepare your soil carefully. Determine your soil type and add the appropriate organic amendments (such as compost or mulch) to give your plants a healthy start.
- Before you begin to dig large holes for trees or ponds, check with your utility companies. They will come to your home free of charge to locate underground lines. Call 811.
- Erosion prevention is another important reason to construct your naturescape a little bit at a time. Take precautions like covering soil piles with a tarp to prevent and control erosion during construction.
- Carefully choose environmentally-friendly products and methods.
- Even with all of this planning, don't be afraid to change your mind and try something a little different. This is an organic, natural landscape that will develop over time. Many shrubs and flowers are easy to transplant to new locations while still young (< 3 years).
- Make a chart of your progress and plans so you can keep track of what you have accomplished as well as what you have yet to do. Before and after photographs are also a satisfying way to record and share your accomplishments.

### **5. Nurture your Naturescape**

There will be a fair amount of work to do, especially at first. Watering, mulching, and weeding will need to be done until the naturescape is well established. Continued maintenance will be required to repel invaders and nourish soil. Water features such as ponds and streams will have to be maintained and cleaned. Feeders will need to be filled and cleaned, and nest boxes need to be cleared out for the next tenant. However, these activities require you to be out in your naturescape – where you want to be – so they should probably be included in the next section.

## 6. Enjoy!

Watch the butterflies, listen to the birds, and mark the passage of the seasons through your slice of nature. Watch the flowers open and the leaves turn. Keep a chart of birds that you see; tape it to the wall or keep it on a clipboard near your binoculars.

Another source of pleasure is the thought of how your backyard is helping reach the environmental goals we all share. Your naturescape is reducing energy use, water use and runoff, erosion, solid waste, and air pollution, as well as providing space for living things of all kinds. You have become a participant in the stewardship of your watershed.

As part of this stewardship, it is hoped that you will share your naturescaped yard with your friends and neighbors, and encourage them to turn at least a corner of their yard into another small haven for wild things. Provide them with information about how to attend a Naturescaping workshop.



## Checklist for Planning your Naturescaping Project:

Gathering this information beforehand will help you plan your project.

- How large is your lot? Your house?
- Are there other existing fences, buildings or structures?
- Where are the utilities?
  - Electric / Gas / Telephone / Water / Cable / Oil Tank / Septic System
- If you are not on the sewer, where is the septic tank and drain field?
- Are there any easements across your property?
- Is there an existing irrigation system? Where?
- Which part of the yard gets the most sun? How many hours?
- Which part of the yard gets the most shade? How many hours?
- Are there areas that are exceptionally dry?
- Are there areas that tend to stay wet?
- Are there areas where water tends to puddle up and drain slowly?
- Are there areas of bare soil?
- Are there any steep slopes?
- Do you have any problems with erosion?
- What is the direction of the prevailing winds?
- Are there any windbreaks (trees, walls, hedges)?
- Where do you store your garbage cans and recycling bins?
- Do you have children or grandchildren that will visit?
- Do you have pets that will use the yard?
- Will anyone with limited ability be using the yard?
- What do you like best about your yard now?
- What do you like least about your yard now?
- What are your goals for your naturescaping?
  - More shade
  - More color
  - More wildlife
  - Less maintenance
  - More native plants
  - Fewer chemicals
  - Other goals: \_\_\_\_\_  
\_\_\_\_\_



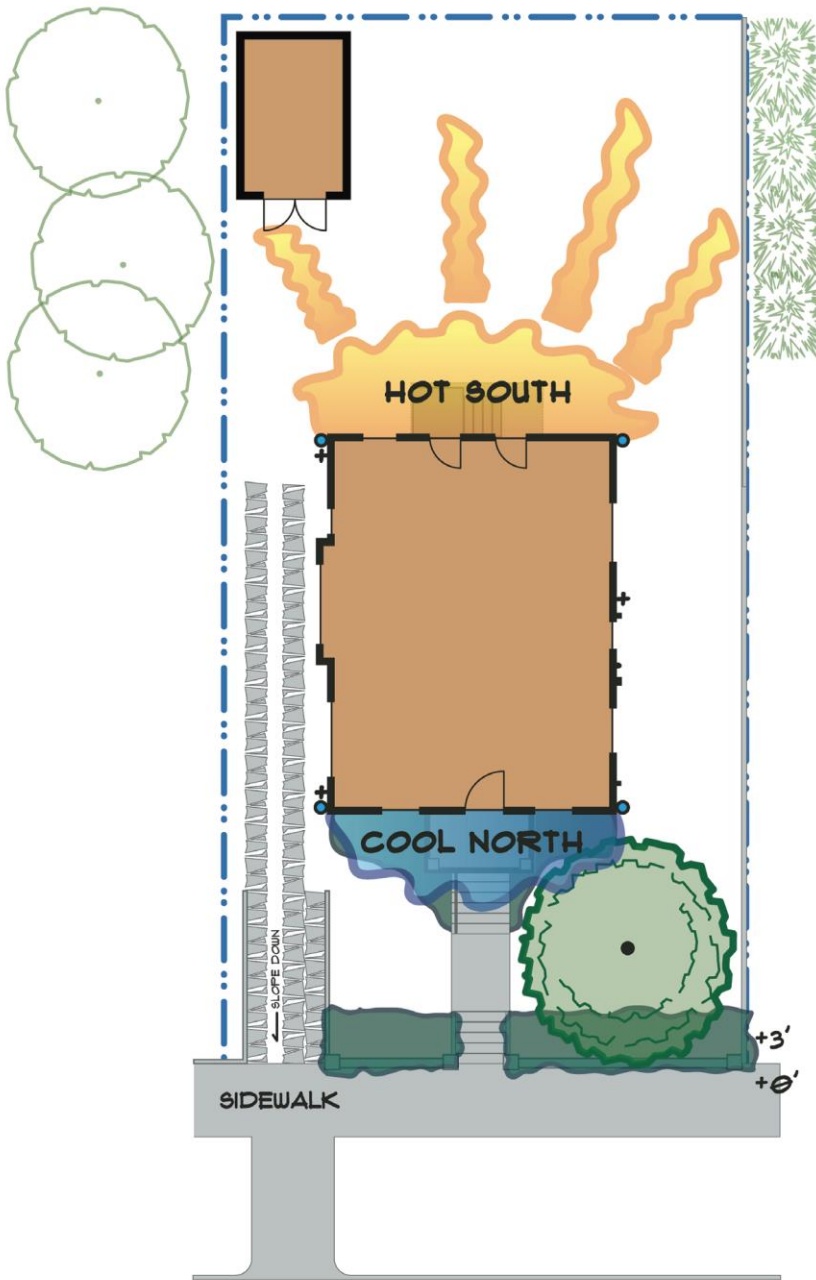
### Checklist (continued)

- Does anyone in the household have allergies to consider?
- How many hours per week would you like to work in your yard?
- How many hours per week do you work in your yard now?
- How much money do you want to spend on your yard (including maintenance)?
- Are you home year-round?
- Do you want to use the yard year-round or only in one season?
- Do you, or do you want to, use your yard for entertaining?
- Do you have, or do you want, a vegetable garden?
- Do you need storage structures or space?
- Do you need a noise barrier?
- Is there an unpleasant view you'd like to block?
- Does your property include a river, lake or stream?
- Are there neighborhood restrictions or covenants to follow?
- Are there barrier plants to deter burglars from entering windows?
- Are there plants that could conceal burglars while entering doors or windows?
- Are there trees or trellises that could provide access to upstairs windows?
- Are there plants or materials near the house that could be a fire danger?
- Are pools and ponds adequately fenced for safety?





ALLEY

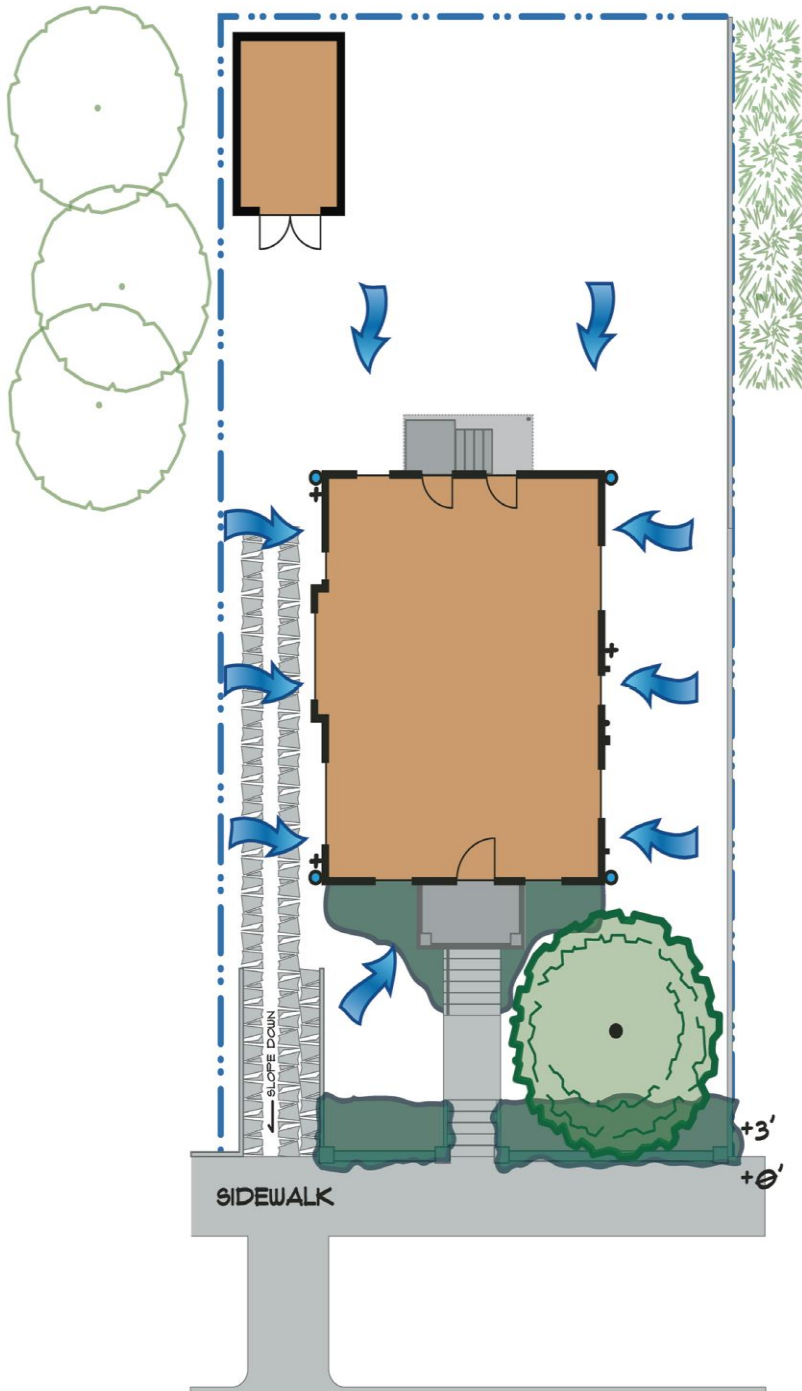


SITE ASSESSMENT: EXPOSURE

1' 5' 10'



ALLEY

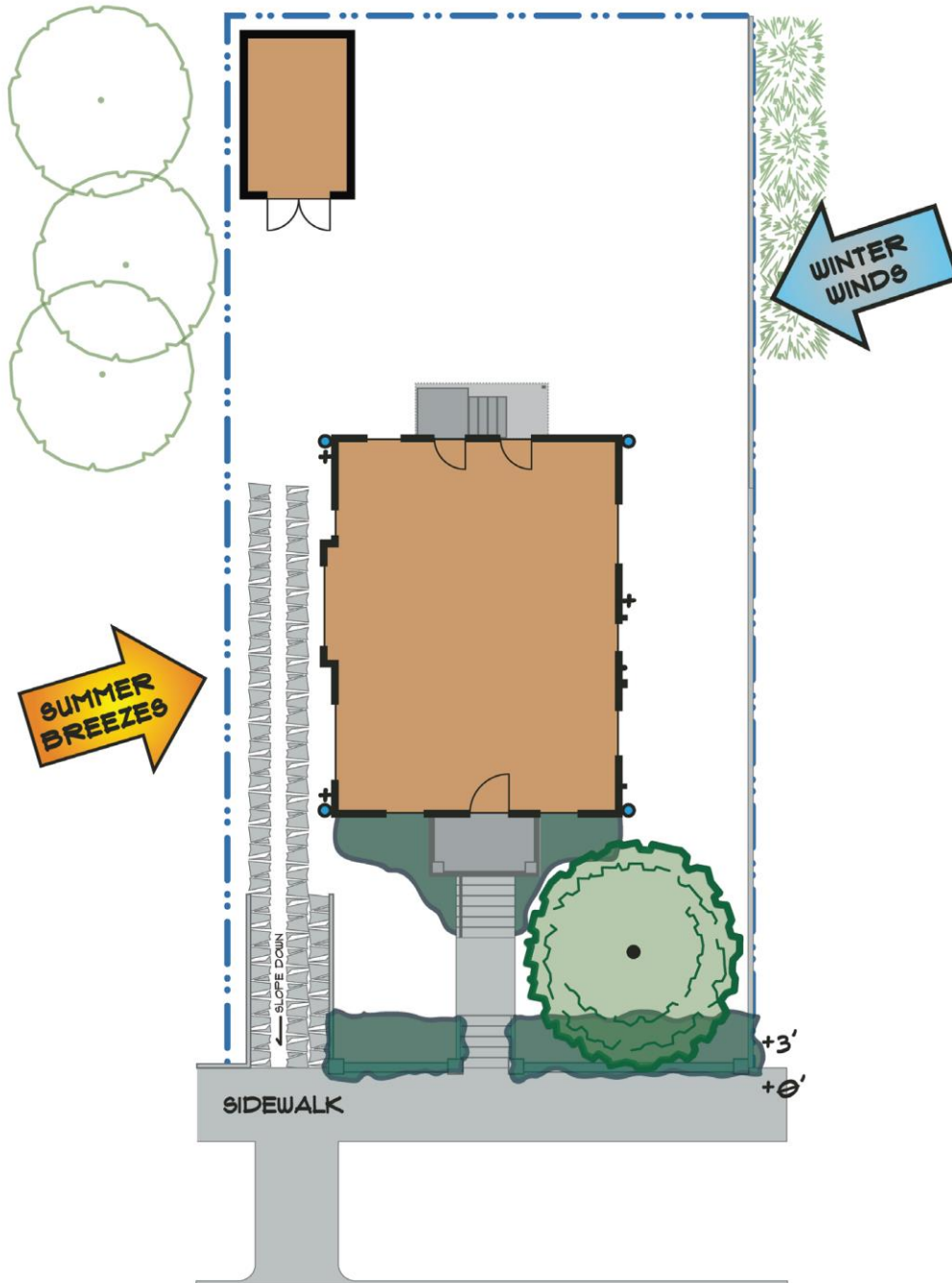


SITE ASSESSMENT: DRAINAGE

1' 5' 10'



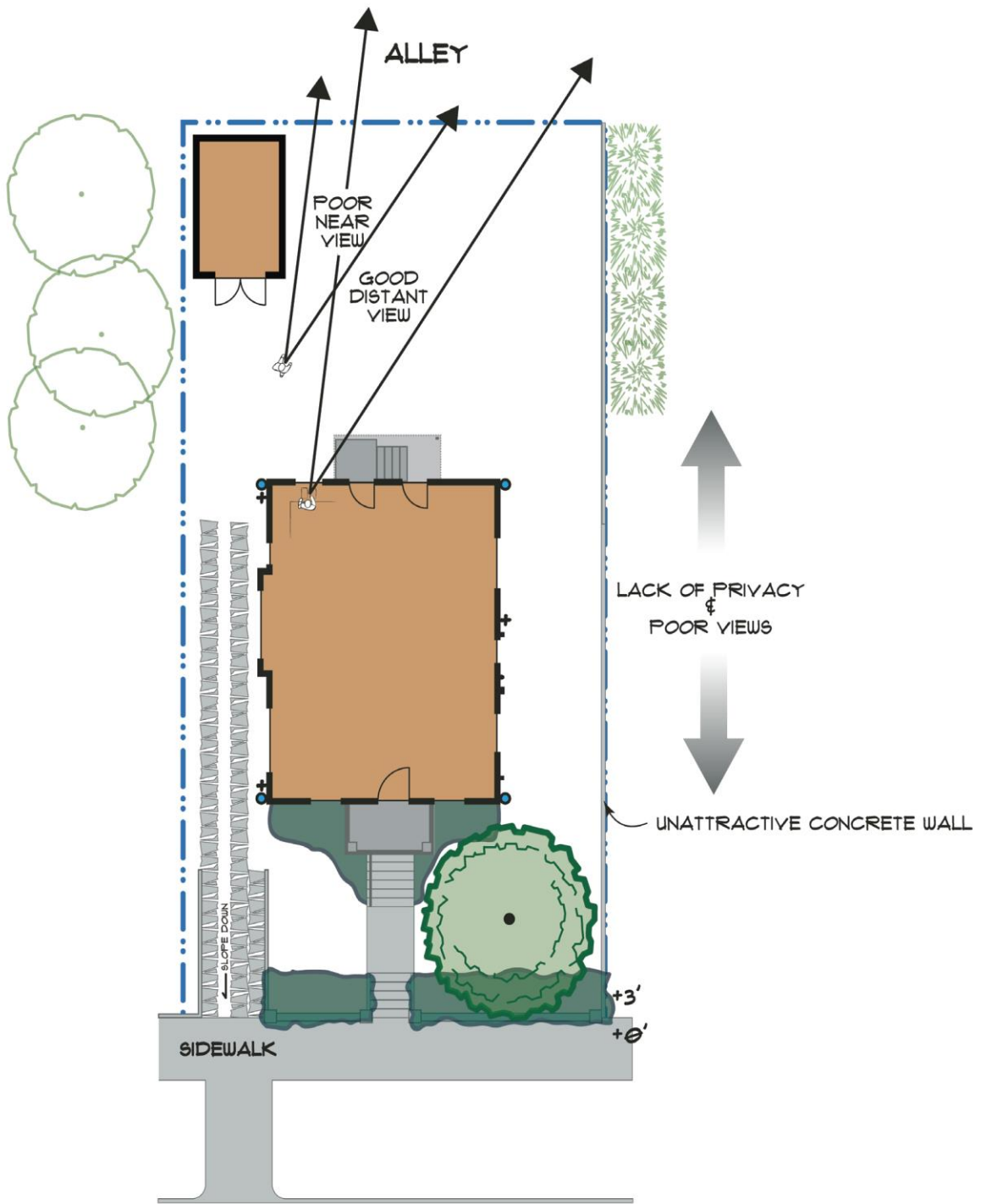
ALLEY



SITE ASSESSMENT: WIND

1' 5' 10'

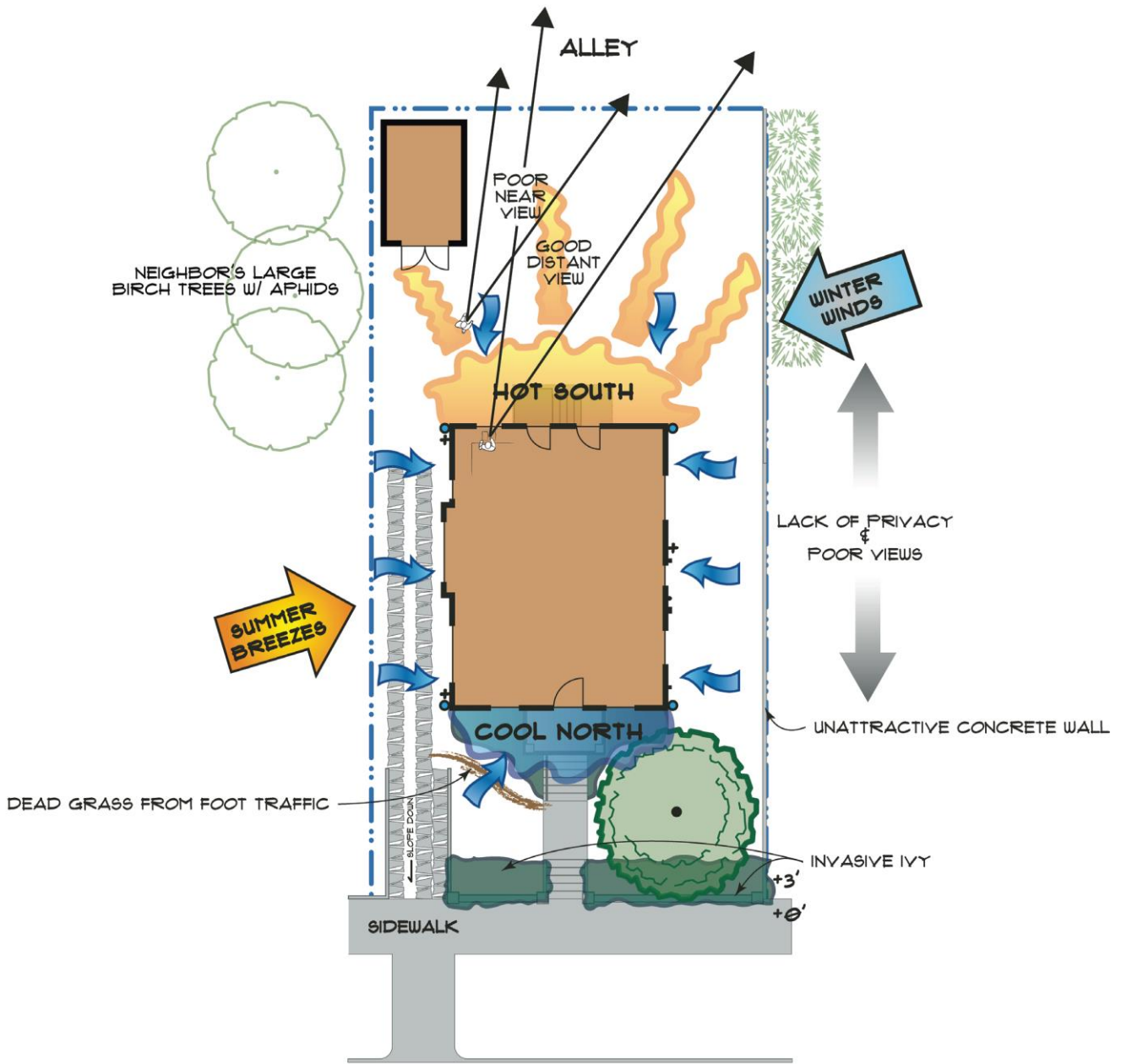




**SITE ASSESSMENT: VIEWS**

1' 5' 10'





**SITE ASSESSMENT: ALL FACTORS**

1' 5' 10'



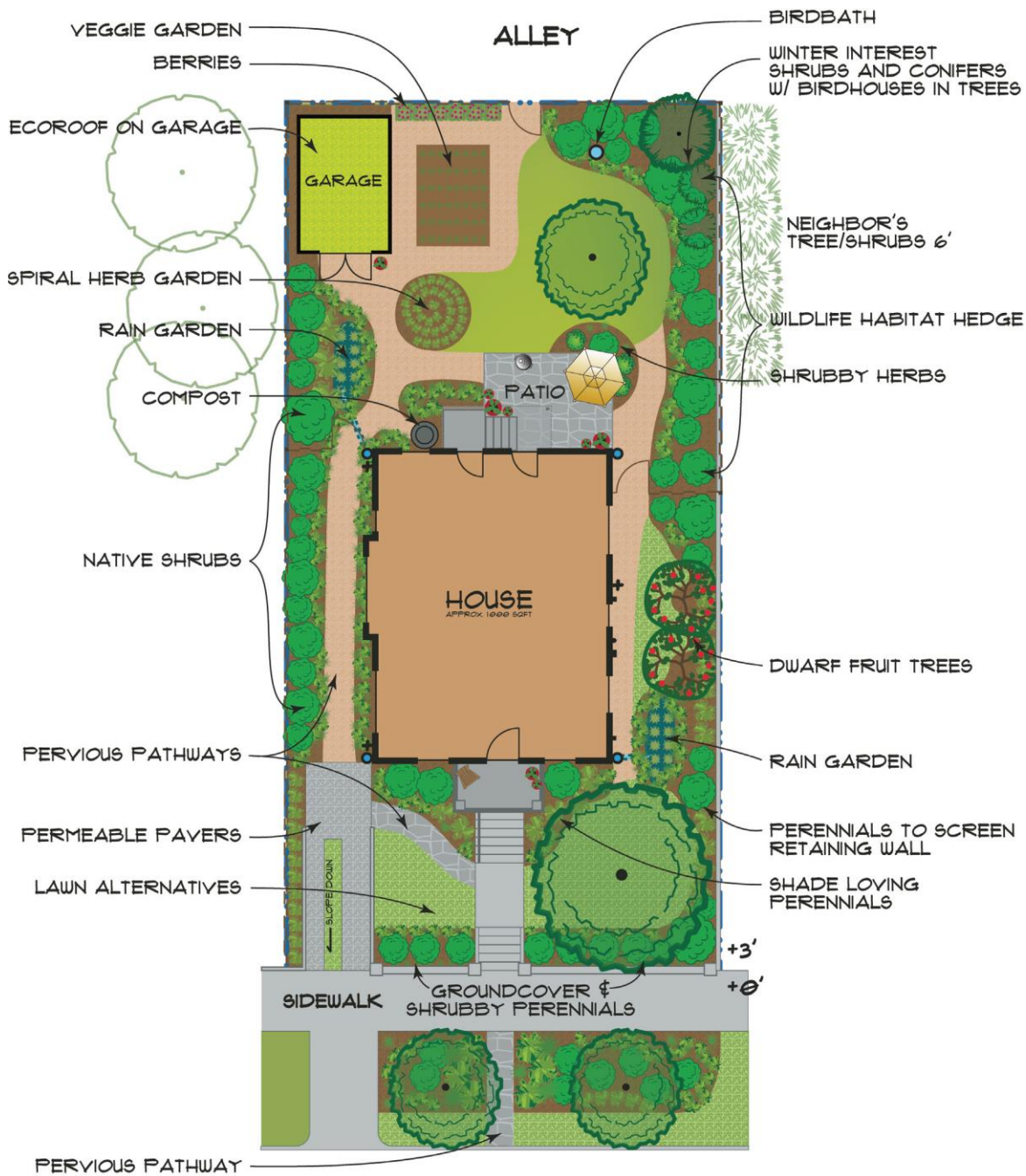


**DESIGN OPPORTUNITIES**

1' 5' 10'







**MASTER PLAN**

1' 5' 10'



## **10. Watershed Stewardship**

Living along a stream or river is rewarding on many levels; however, it also comes with a high level of responsibility on your part as a steward of that water source. Your activities near or along the banks affect not only your stretch of water but everyone and everything downstream. Your responsibilities are opportunities to protect and enhance the quality of the water in the stream or river.

### **Protect Water Quality**

All of the guidelines about stormwater runoff discussed in this book also apply to streamside property.

- Keep garbage, yard debris, and compost piles well away from streambanks.
- If you have a septic system, be sure it works properly, and have it inspected on a regular basis. See [www.eweb.org/septic/assistance](http://www.eweb.org/septic/assistance) for information on EWEB's Septic System Assistance Program.
- Clean up after your animals. Do not allow dog, cat, horse, chicken, and other animal manure to wash into the stream. Place animal wastes in a manure composting system or the trash.
- Avoid using chemical pesticides, fertilizers, or other chemicals near a water body. They are detrimental to both aquatic and human health. If you feel that you absolutely have to use chemicals, carefully follow the directions on the label and take precautions to protect humans and animals.

### **Enhance the Streambank**

The riparian zone, the narrow border of moist soils and plants, is the most delicate and most important area in the stream ecosystem. Overhanging plants help shade and cool the water and provide food and habitat for aquatic creatures. The thick vegetation also filters out pollutants and helps prevent erosion. As a stream steward, you can help protect and enhance this critical part of the stream ecosystem.

- Do not plant lawn all the way to the stream's edge. If you already have lawn, consider removing some or all of it and planting native trees, shrubs or grasses.
- Keep animals (and humans) from trampling the vegetation in the riparian (streamside) zone. Check with the McKenzie Watershed Council or Upper Willamette Soil & Water Conservation District for technical assistance on fencing projects to keep animals out of the riparian area.
- Avoid using pesticides or fertilizers in the riparian zone.
- Do not remove native vegetation from the riparian zone. This vegetation has many beneficial purposes such as shading the stream, filtering pollutants and preventing erosion.
- Carefully remove non-native plants and replace with appropriate native species. To identify and select plants, contact the McKenzie Watershed Council, Soil & Water Conservation District, or Oregon State University Extension Service, or see *Appendix A*.

- Do not divert water from the stream. Do not hold back the stream to make a dam. It is illegal to take water from a stream without a permit from the Oregon Department of Water Resources.
- Maintain the stream bank, and repair when necessary. Use caution: many well intentioned stream bank repairs end in disaster. Seek expert help (and a permit) from the Division of State Lands before attempting any stream bank restoration project.
- Find out about EWEB's Voluntary Incentives Program (VIP) which rewards landowners who keep their riparian area in good health ([www.eweb.org/sourceprotection/vip](http://www.eweb.org/sourceprotection/vip)).
- Join a "friends group" for your stream. Most major waterways in this region have existing citizen action committees working on their protection. If your stream does not have such a group, start one!

## Stewardship

The responsibility of stream stewardship, like Earth stewardship, belongs to every one of us. If you have a stream, river, or other body of water in your own backyard, you have a special opportunity to take the lead in the protection and restoration of our precious natural waterways.

### Stormwater Runoff

- Where does the water from your roof drains go?
  - Yard?
  - Street?
  - Dry Well?
  - Other?
- What kind of driveway do you have? How long and wide is it?
- Where does the runoff from the driveway go?
- Do you have a system to store stormwater for reuse?
- Do you have patios, decks, sidewalks or other impervious (water runs off rather than soaking in) areas? Where does the runoff from these areas go?
- Does your yard have slopes or varying elevations? Where does the runoff from the yard go?
- What do you do with pet waste?
- What are your soil types?
- Do you have existing problems with erosion?
- Does a stream run through or adjacent to your property?
- Where, and how often, do you wash your vehicles? Where does the soapy water go?
- Does your yard receive runoff from an adjacent yard, driveway, or street?

# 11. Living Lightly on the Land

## *Your Low-impact Lifestyle*

We can all multiply the benefits of our naturescaped yards, based on the principle of “if we each do a little, together we can do a lot.” We can all do some things to make our lifestyles even more sustainable. Look at the following list to find ideas for things that you are not already doing.

### *Ten ways you can start living a low impact lifestyle:*

**1. Use alternative pest control methods.** As discussed in the section on alternatives to pesticides, determine your tolerance level for creatures that want to share your house and yard. A few ants or spiders do not warrant wholesale chemical spraying, and there are some less-toxic approaches to controlling fleas and other pests. Do some research (see *Appendix D: Resources* or [www.pesticide.org](http://www.pesticide.org)) and experiment with the least-toxic methods of dealing with household and garden pests.

**2. Reduce/eliminate hazardous chemical use.** Choose products carefully, avoiding oil-based paints, solvents, and aerosol containers whenever possible. Buy and use small amounts, store carefully, and dispose of waste and containers properly. Alternative cleaners that you can make yourself are often as effective as more hazardous commercial ones and are usually less expensive.

**3. Dispose of hazardous chemicals properly.** Many materials, especially pesticides, oil-based paints, organic solvents, and motor oil, are extremely toxic to the environment and should not be disposed of in our soils, street drains, sewers, or landfills. Recycle motor oil and take the other products to the facility near you that handles household hazardous waste (call Lane County Waste Management 541-682-4120 for information on how to freely dispose of these chemicals or go to <http://www.lanecounty.org/Departments/PW/WMD/HazWaste/Pages/hhwcc.aspx>). Consider the extra effort to be part of the cost of using these products.

**4. Reduce in-home water use.** Even in the Pacific Northwest, the increasing population is putting stress on our water supply, especially in the dry summer months. Water is not an infinite resource. Reducing water use also reduces wastewater volumes.

**5. Reduce energy use.** Producing energy always has negative environmental consequences. Using less electricity means that Northwest dams can produce less, allowing more water to spill over for the benefit of salmon and other fish. Remember to turn off lights and switch to energy-efficient compact fluorescent bulbs. Think of other ways to save a few more watts. Natural gas and fuel oil are both nonrenewable and contribute to air pollution. Improve the insulation and weatherization of your home to save on these fuels.

**6. Use alternative energy sources.** Solar energy works, even here in cloudy western Oregon. Solar hot water systems and solar-cell electrical generating systems can be installed on your roof. If you are planning to build or remodel, consider incorporating passive solar designs. Research and experiment with other alternative energy ideas. Consider converting to biofuel if you heat your home with oil.

## **7. Buy locally grown food or grow some of your own**

Many foods travel over 1,500 miles to make it into our stores. Consider joining a CSA farm (Community Supported Agriculture). Farm produce comes to you fresh and in season. What could be better than eating organic produce and getting to know the individuals who actually grow it?

## **8. Consume less and recycle even more**

Buy less STUFF. Try not to be an impulse shopper. When you do need something, ask yourself: “Do I need this object more than once per month?” If not, try borrowing first. Sometimes a friend or neighbor has just what you need. Create a community trade within your neighborhood where you supply what other neighbors don’t have and vice-versa. Things such as lawn mowers, saws, chippers, trimmers, drills, and other equipment can be successfully shared.

Reduce the amount of packaging you buy. Reuse what you can rather than throwing it away. Many of us are already doing a pretty good job of recycling and making it part of our lifestyles. More materials are becoming recyclable, and more products are being made of recycled materials. Find out about both and see if you can recycle more and create less waste.

## **9. Reduce automobile produced pollution**

Driving cars is still one of the worst things that we do to the environment, and it is not just the air pollution from the exhaust. A study of the Columbia Slough in northeast Portland has shown that even in this relatively industrial area, the majority of the heavy metal pollution in the water comes not from industry, but from the runoff from streets and roads. Exhaust washed from the air by rain; fuel, oil, and other fluid leaked from engines, transmissions, and brake systems; and even rubber and metal particles from tires and brakes accumulates in amazing quantities in the gutters, storm drains, and finally streams and rivers. This kind of pollution can be deadly to the aquatic and riparian ecosystems.

## **10. Keep your car well maintained**

If you must drive, it is important to keep your car in the best condition possible. It is clear from the information above that it is important to keep leaks to a minimum. Also, a vehicle with a well-tuned engine and properly inflated tires burns fuel more efficiently reducing the amount of pollution released into the air and your fuel bill at the same time.

### **Tips for a “Low-impact Lifestyle:”**

- Do you use curb-side recycling? What types of things do you recycle?
- Do you buy goods made from recycled materials?
- Do you reduce the amount of packaging you buy?
- Do you take chemical waste (paint, antifreeze, solvents, batteries, etc.) to hazardous waste drop-off sites?
- Do you change your vehicle oil at home? What do you do with the used oil?
- Where do you park your vehicles? Do any of your vehicles leak fluids?
- Are there any hazardous materials in your home or yard?
- Have you tried non-chemical alternatives to control unwanted plants or insects?
- Have you tried safe alternatives to household chemicals?
- What do you do to conserve water?
- Do you have water-efficient shower nozzles?
- What do you do to conserve energy?
- Are there shade trees to the south or west of the house?
- Does the house have air conditioning or a heat pump? Is the air conditioner shaded in the afternoon?
- Is the roof color light or dark? Is the house color light or dark?
- What type of heating do you have? Have you considered solar heating?
- Do you have storm windows or double glazing?
- Do you have insulation? Have you added extra insulation?
- Have you ever done an energy audit for your home? Business?
- Do you use fluorescent fixtures or low-energy bulbs instead of halogen or incandescent?
- Do you have an attic air fan? Attic air vents?
- Does anyone in your household carpool or use public transportation? Occasionally? Regularly?
- Does anyone in your household ever walk or bike to work, school, shopping, etc.?

# A: Native Plant Selection Guide

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This table is a compilation of information from several sources. It is designed to help select the “right plant for the right place.” It does not include the complete list of plants native to western Oregon. It does include those most commonly used in residential settings, most readily available at retail nurseries, and plants suited to a wide range of growing conditions. Where data were inconsistent, the information provided by the preponderance of sources was used. The following definitions are provided as assistance in using the table:

## Name

The common name is listed first, followed by the botanical name (in italics). Where the plant is known by more than one common name, other names are included in the comment column. Plants with an asterisk (\*) have soil-binding characteristics that are good for erosion control.

## Form and Habit

The plants are divided into six groups: Trees, Tree-like Shrubs, Shrubs, Ferns, Vines, and Forbs (herbs, annuals, flowers, etc.) Each of these groups may be either:

**Deciduous:** Lose their leaves or needles but retain their woody structure during winter.

**Evergreen:** Retain their leaves or needles and their woody structure through the winter.

**Annual:** Dies to the ground during winter; may grow back from seed in the spring.

**Perennial:** Dies to the ground; grow back from roots, bulb, or rhizomes in the spring.

## Mature Size

These are estimates only. Actual size at maturity (and rate of growth) can vary significantly, based on a combination of many factors at the planting site. Where available, the spread of the plant is also included. (H= height S= spread)

## Light Needs

S: Full Sun

PS: Partial Sun

Sh: Full Shade

S-PS: Full Sun to Partial Shade

Sh-PS: Full Shade to Partial Sun

S-Sh: Sun to Shade (prefers sun)

Sh-S: Shade to Sun (prefers shade)

## Water Needs

SW: Seasonally Wet

PW: Perennially Wet

M: Moist

D: Dry

## Setting

**Wetland:** Includes all forms of wetlands found in our community.

**Riparian:** Includes the riparian areas along the rivers and streams in our community.

**Forest:** Refers to upland forested areas with little or no slope.

## Setting (cont.)

**Forest Slopes:** Refers to steeply sloping upland forests such as the west hills and various buttes in Lane County.

**Thicket:** Refers to edges of forests and meadows, including hedgerows and clumps of vegetation that may be found in meadows.

**Grassland:** Refers to open areas of forests and meadows; may include clearings in forested areas.

**Rocky:** Refers to rocky upland areas; may include cliffs.

## Comments

Additional comments have been added to assist in plant selection. These comments are brief due to space considerations.

NAME	FORM & HABIT	MATURE SIZE	LIGHT	WATER	SETTING	COMMENTS
*Alder, Red <i>Alnus rubra</i>	Deciduous Tree seeds prolifically on bare soil	H: 80–120' S: 40'	S	M SW	Riparian Forest F. Slope	Aggressive seeder and fast grower, even in poor soil. Relatively short lifespan - 50 years. Provides food for birds.
Alumroot, Small-flowered <i>Heuchera micrantha</i>	Perennial Forb	H: 12–24"	S PS	M	Riparian Forest	Often found on stream banks and in rocky crevices. Numerous, very small flowers in open clusters, bloom May to July.
*Ash, Oregon <i>Fraxinus latifolia</i>	Deciduous Tree	H: 40–80' S: 25'	S	D SW	Wetland Riparian	Has winged fruit, not berries like other ashes. Often grow near streams or areas that flood.
Aster <i>Aster species</i>	Perennial Forb	H: 1–3'	S	D M	Varies	Late summer and fall bloom. There are several native asters; some prefer meadows or open slopes; one prefers wetlands; others like moist woods.
Azalea, Western <i>Rhododendron occidentale</i>	Deciduous Shrub	H: 14'	S PS	M	Forest	Often forms dense thicket. Most common on coast, where they grow only 2 – 3' tall.
Balsamroot <i>Balsamorhiza species</i>	Perennial Forb	H: 1–3'	S	D	Grassland Rocky	Spectacular bloom. Most common in the Columbia hills (The Dalles, Hood River, etc).
Bleeding Heart, Western <i>Dicentra formosa</i>	Perennial Forb spreads by rhizome	H: 6–12"	Sh PS	M	Wetland Forest F. Slope	Fernlike leaves. April to June bloom. Prefers rich soil. Does well along stream banks.
Blue-eyed Grass <i>Sisyrinchium angustifolium</i>	Perennial Forb	H: 8–12"	S PS	M SW	Wetland Grassland	Grass-like, sharp pointed leaves. Likes wet stream banks.
*Bulrush, Small-Fruited <i>Scirpus microcarpus</i>	Perennial Forb spreads by rhizome	H: 2–5'	S	PW M	Wetland Forest Grassland	Grass-like plant common in wetlands and roadside ditches. Good soil binding characteristics, spreads rapidly
Bunchberry <i>Cornus canadensis</i>	Perennial Forb	H: 6"	Sh PS	M	Forest	Also called dwarf dogwood. Very low growing ground cover, lush with no woodiness.
Camas, common <i>Camassia quamash</i> , <i>Camassia leightinii</i>	Perennial Forb Bulb	H: 1–2.5'	S PS	SW M	Wetland Grassland	Can be used in wet meadow or wetland. Late spring – early summer bloom. Tolerates heavy soil.
Cascara <i>Rhamnus purshiana</i>	Deciduous Tree	H: 30–40'	S PS	SW	Riparian Forest F. Slope	Also called chittim or buckthorn. Purplish black berries are bitter but edible; they-attract birds. Cannot tolerate deep shade. Seldom reach maturity.



NAME	FORM & HABIT	MATURE SIZE	LIGHT	WATER	SETTING	COMMENTS
<b>Cedar, Western Red</b> <i>Thuja plicata</i>	Evergreen Tree	H: to 200'	Sh PS	M SW	Wetland Riparian Forest	Found mostly in moist to wet soils, usually in shaded forests. Will grow in drier areas with rich soil. Probably most important tree to coastal Indians. Bark shreds easily.
<b>Cherry, Bitter</b> <i>Prunus emarginata</i>	Deciduous Tree	H: 30–50' S: 20'	S PS	M SW	Riparian F. Slope Thicket	Also called wild cherry. Grows in woods or along streams. Can succeed in sunny, dry sites. Produces bright red, bitter cherries.
<b>*Chokecherry, Common</b> <i>Prunus virginiana</i>	Deciduous Tree	H: 15–30' S: 15'	S PS	M SW	Riparian Forest Thicket	Prefers forest edges and clearings. Purple to black drupes (like cherries) grow in elongated clusters; edible but extremely sour; excellent in syrups and jellies.
<b>Clarkia</b> <i>Clarkia species</i>	Annual Forb	H: 10–24"	S	D M	Grassland Thicket	Summer bloom. Also called Farewell-to-Spring. Often found at forest edge or on open slopes.
<b>Coltsfoot, Sweet</b>	Perennial Forb	H: 1–2'	Sh PS	W	Wetland Riparian Forest Grassland	Needs large, moist, wild setting in wet meadow, bog or riparian area. One of earliest wildflowers to bloom.
<b>Columbine, Red</b> <i>Aquilegia formosa</i>	Perennial Forb	H: 12–18"	S PS	M	Riparian Forest Thickets Rocky Grassland	Can grow in wide variety of settings. Prefers light shade. Easy to start from seed. One of our most beautiful wild flowers; spring bloom. Flowers attract humming birds and butterflies.
<b>*Cottonwood, Northern Black</b> <i>Populus trichocarpa</i>	Deciduous Tree does not spread	H: 100–175' S: 25'	S	M SW	Wetland Riparian	Fast grower in moist to saturated soils; widely used for streambank stabilization
<b>Crabapple, Pacific</b> <i>Pyrus fusca</i> or <i>Malus fusca</i>	Deciduous, Tree-like Shrub	H: 10–30' S: 35'	S	M SW	Riparian Forest Thicket	Native to coastal bogs. Small clustered apples are tart but edible.
<b>*Currant, Red-Flowering</b> <i>Ribes sanguineum</i>	Deciduous Shrub	H: 3–9'	S Sh	D M	Riparian Forest F. Slope Thicket Grassland	Very attractive, erect shrub with red, tubular flowers that bloom early in the spring. Produces un-palatable berries that are quickly eaten by birds.
<b>Currant, Sticky</b> <i>Ribes viscosissimum</i>	Deciduous Shrub	H: 3–6'	S PS	D M	Riparian Forest	Medium-sized shrub with straggly but stiff branches. Soft sticky hairs cover the leaves and flowers.
<b>*Dogwood, Red-Osier</b> <i>Cornus sericea</i>	Deciduous Tree-like Shrub; spreads to form thicket	H: 6–18' S: 20'	S PS	M SW	Wetland Riparian Thicket	Attractive shrub that produces bright red stems. Makes good barrier hedge. Sometimes called <i>Cornus stolonifera</i> .
<b>Elderberry, Blue</b> <i>Sambucus mexicana</i>	Deciduous Tree-like Shrub	H: 4–30'	S PS	M SW	Riparian Forest Thicket	More common east of the Cascades. Berries edible; good food source for wildlife. Flower resembles that of red elderberry but is flat-topped, and fast growing.
<b>Elderberry, Red</b> <i>Sambucus racemosa</i>	Deciduous Tree-like Shrub	H: 4–30'	S Sh	M SW	Riparian Forest F. Slope	Fast growing, with weak, sprawling branches. Hollow stems. Berries are not edible, but birds love them. Bloom and ripen earlier than Blue Elderberry.
<b>Fairy-Bell, Hooker's</b> <i>Disporum hookeri</i>	Perennial Forb	H: 11–36"	PS Sh	M	Forest F. Slope	Creamy-white, nodding, bell-shaped flowers.

LIGHT S: Full Sun PS: Partial Sun Sh: Full Shade  
WATER SW: Seasonally Wet PW: Perennially Wet M: Moist D: Dry

\* Erosion control

NAME	FORM & HABIT	MATURE SIZE	LIGHT	WATER	SETTING	COMMENTS
<b>Fern, Lady</b> <i>Athyrium filix-femina</i>	Perennial Forb spreads by rhizomes	H: 2–4'	S P S	M	Riparian Forest Thicket	Often form dense populations in moist, wooded areas and along stream banks.
<b>Fern, Maidenhair</b> <i>Adiantum aleuticum</i>	Perennial Fern	H: 1–2'	PS Sh	M	Riparian Forest F. Slope Rocky	Delicate, black-stemmed fern. Unusual in appearance and very attractive.
<b>Fern, Sword</b> <i>Polystichum munitum</i>	Evergreen Forb	H: 2–4'	PS Sh	D M	Forest F. Slope Thicket	Grows in wide variety of conditions. Probably the best known fern in Pacific NW. Excellent plant for dry shade.
<b>Fescue, Idaho</b> <i>Festuca idahoensis</i>	Perennial Forb	H: 1–3.5"	S	D	Grassland	Densely tufted perennial grass with narrow leaves. Similar to Western Fescue but tolerates drier conditions.
<b>*Fescue, Red</b> <i>Festuca rubra</i>	Perennial Forb	H: 6–40"	S P S	D M	F. Slope Thicket Grassland Rocky	Tall, common grass species. Loosely tufted perennial.
<b>Fescue, Western</b> <i>Festuca occidentalis</i>	Perennial Forb	H: 6–40"	S P S	D M	Riparian Thicket	Tufted perennial grass with hair-like leaves. Common understory plant west of Cascades.
<b>Fir, Douglas</b> <i>Pseudotsuga menziesii</i>	Evergreen Tree	H: 200' + S: 50'	S P S	D M SW	Forest F. Slope	Fast-growing. Grows in all but the wettest and driest sites. Shallow rooting, potential for wind throw in thin or disturbed soils; good wind break in groupings & good wildlife nest potential.
<b>Fir, Grand</b> <i>Abies grandis</i>	Evergreen Tree	H: 150–250' S: 40'	S Sh	M SW	Wetland Riparian Forest F. Slope	Largest true fir. Tall, straight and stately. Cones sit upright on the branches.
<b>Fir, Pacific Silver</b> <i>Abies amabilis</i>	Evergreen Tree	H: 200'	S	M	Forest F. Slope	Tall, straight symmetrical tree. Grows in variety of conditions but most common in moist forests with deep, well-drained soil.
<b>Foamflower</b> <i>Tiarella trifoliata</i>	Perennial Forb	H: 6–15"	Sh	M	Riparian Forest	Also called lace flower. Tiny delicate white flowers at the end of short wire stalk. Dense patches look like foam on forest floor.
<b>Fringecup</b> <i>Tellima grandiflora</i>	Perennial Forb	H: 1–3'	Sh S	M	Forest F. Slope	Basal leaves with long, hairy stalks. Leaves similar to piggy-back but flowers are distinctively different.
<b>Ginger, Wild</b> <i>Asarum caudatum</i>	Evergreen Forb	H: 3–6"	Sh	M	Forest F. Slope	Heart-shaped, smooth, dark green leaves. Grows freely in damp soil of woodlands. Trailing stems root at nodes. Beautiful ground cover. Inconspicuous flowers.
<b>Goat's Beard</b> <i>Aruncus sylvestris</i>	Perennial Forb	H: 3–6'	Sh PS	M	Riparian Forest F. Slope	Also known as Sea Foam. Commonly found in 'edge' habitats (edges of roadsides, forests and streams).
<b>Hazelnut, Western</b> <i>Corylus cornuta</i>	Deciduous small Tree spreads by suckers	H: 5–18' S:	S P S	M	Forest F. Slope Thicket	Good hedgerow shrub. Produces edible nut. Also called hazelnut or filbert. Male catkins are attractive.
<b>Hemlock, Western</b> <i>Tsuga heterophylla</i> <i>Evergreen tree</i>	Evergreen Tree	H: 125' + S: 40'	S P S	M	Riparian Forest F. Slope	Can be used as hedge. Needs space. Fairly fast growth. Prefers moist, acid soil.

LIGHT S: Full Sun PS: Partial Sun Sh: Full Shade  
WATER SW: Seasonally Wet PW: Perennially Wet M: Moist D: Dry

\* Erosion control

NAME	FORM & HABIT	MATURE SIZE	LIGHT	WATER	SETTING	COMMENTS
<b>Honeysuckle, Hairy</b> <i>Lonicera hispidula</i>	Deciduous Vine	H: 6-18'	S P S	D	Forest Thicket	Sometimes called California honeysuckle. Usually trailing or crawling vine; sometimes climbing vine. Berries not edible; may be somewhat poisonous.
<b>Honeysuckle, Orange</b> <i>Lonicera ciliosa</i>	Deciduous Vine	H: 15-20'	S P S	D M	Forest Thicket	Also called trumpet vine. Found on margins of wooded areas. Attracts hummingbirds & Swallowtail butterflies.
<b>Huckleberry, Evergreen</b> <i>Vaccinium ovatum</i>	Evergreen Shrub	H: 3-12'	Sh PS	M	Forest	Attractive ornamental with shiny, leathery leaves. Shiny purple-black berries are edible. Grows taller in shade.
<b>Huckleberry, Red</b> <i>Vaccinium parvifolium</i>	Deciduous Shrub	H: 3-12'	S P S	D M	Forest F. Slope	Usually grows beneath conifers west of Cascades, often on nurse logs/stumps. Can be difficult to establish.
<b>Indian Paintbrush</b> <i>Castilleja miniata</i>	Perennial Forb	H: 1-2'	S	M	Grassland	Summer bloom. Difficult to grow. Most common of several Paintbrush varieties.
<b>Indian Plum</b> <i>Oemleria cerasiformis</i>	Deciduous Shrub	H: 8-5'	S Sh	D M	Riparian Grassland	Also called osoberry. Fruit resembles small plums, edible but bitter. One of first to flower in spring. Open woods, stream-banks, roadside. Need both male and female.
<b>Inside-out Flower</b> <i>Vancouveria hexandra</i>	Perennial Forb spreads widely by rhizomes	H: 8"	S h S	D M	Riparian Forest F. Slope	Also called ducks foot, because of the shape of the leaf. Common plant along stream sides. Dainty, unusual white flower.
<b>Iris, Oregon</b> <i>Iris tenax</i>	Perennial Forb	H: 10-20"	S	M	Forest Thicket Grassland	Showy, clumped perennial with narrow, grass-like leaves.
<b>Kinnikinnick</b> <i>Arctostaphylos uva-ursi</i>	Evergreen Shrub	H: 2-8" S: to 15'	S P S	D M	Grassland Rocky	Also called Bearberry. Prostate spreading woody ground cover; roots as it creeps. Excellent on steep. Slow to start; mulch to keep down weeds until established. Drought tolerant once established. Has red berries in fall.
<b>Lily, Tiger</b> <i>Lilium columbianum</i>	Perennial Forb bulb	H: 1-4'	S Sh	M	Forest F. Slope	Also called Columbia lily and Oregon lily. Spectacular wildflower; orange blossoms with purplish spots. Grows in broad variety of habitats.
<b>Lily-of-the-Valley, False</b> <i>Maianthemum dilatatum</i>	Perennial Forb rhizomes	H: 3-15"	Sh PS	M SW	Forest F. Slope	Also called wild lily-of-the-valley or deer berry. Grows near shaded or moist stream banks, in woods where ground is moist. Forms dense ground cover and good for ornamental as well as restoration purposes. Edible fruit.
<b>Lupine, Large-Leaved</b> <i>Lupinus polyphyllus</i>	Perennial Forb	H: 2'-5'	S Sh	D M	Grassland	Short-lived perennial that sometimes reseeds itself. Tolerates broad range of conditions.
<b>Maple, Big Leaf</b> <i>Acer macrophyllum</i>	<b>Deciduous Tree</b>	<b>H: 50'-100' S: 50'-75'</b>	<b>S P S</b>	<b>D M</b>	<b>Forest</b>	Abundant west of the Cascades. Excellent shade tree. Best in a large yard. Often mixed with Douglas Fir. Very large leaves. Typically these trees are laden with mosses, lichens & ferns.

LIGHT S: Full Sun PS: Partial Sun Sh: Full Shade  
WATER SW: Seasonally Wet PW: Perennially Wet M: Moist D: Dry

NAME	FORM & HABIT	MATURE SIZE	LIGHT	WATER	SETTING	COMMENTS
<b>Maple, Vine</b> <i>Acer circinatum</i>	Deciduous Tree	H: 5–35' S: 20'	Sh PS	M	Forest F. Slope Grassland	Often grows in conifer forest understory. Very shade tolerant, but can be sprawling in the shade; excellent fall color.
<b>Milkweed, Showy</b> <i>Asclepias speciosa</i>	Perennial Forb rhizomes	H: 2–5'	S	M	Grassland	Often seen along roadsides, ditches and moist waste areas. Important food source for caterpillar stage of Monarch butterfly. Often confused with prickly lettuce, a non-native weed.
<b>Mock Orange, Western</b> <i>Philadelphus lewisii</i>	Deciduous Shrub	H: 4–12'	S PS	D M	Forest F. Slope	Erect, loosely branched shrub. May–June bloom, very fragrant. Tolerates a wide range of soil conditions.
<b>Mountain Balm</b> <i>Ceanothus velutinus var. Laevigatus</i>	Evergreen Tree-like Shrub	H: 20'	S	D	Forest Thicket Grassland	Also called sticky laurel, buck brush, and cinnamon bush. Once established, resents watering. Found on dry, open sites. Has a sticky leaf.
<b>*Ninebark, Pacific</b> <i>Physocarpus capitatus</i>	Deciduous Shrub	H: 15' S: 10'	PS S	M SW	Forest Riparian	Maple-like leaves; shredding bark. Produces masses of tiny white flowers which change to reddish seed clumps. Excellent soil-binding characteristics.
<b>Oak, Oregon White</b> <i>Quercus garryana</i>	Deciduous Tree	H; 30' +	S	D	Forest	Also called Garry Oak. Often found on dry, rocky slopes at low elevations. Important food source for wildlife. Slow to moderate growth. Deep, non-aggressive roots.
<b>Oceanspray</b> <i>Holodiscus discolor</i>	Deciduous Shrub	H: 6–20' S: 8–12'	S PS	D	Forest F. Slope Thicket	Good background plant. Water until established. Does well in most soils. Blooms May–June.
<b>Onion, Wild</b> <i>Allium specios</i>	Perennial Forb bulb	H: 6–18"	S	M	Grassland Rocky	Native species usually grow in rocky, exposed sites; need ample water when growing, but not when dormant. Usually blooms in May or June.
<b>Oregon Grape, Creeping</b> <i>Mahonia repens</i>	Evergreen Shrub	H: 1–3'	Sh S	D M	Forest F. Slope	Also called Low Oregon grape. One of the best groundcovers for dry shade. Good barrier plant. Tolerates dry, sunny (Berbis repens) sites best. Sometimes classified in Berbis family instead of Mahonia.
<b>Oregon Grape, Dull</b> <i>Mahonia nervosa or Berbis nervosa</i>	Evergreen Shrub	H: 1–3'	S PS	D M	Forest F. Slope	Also called Cascade Oregon grape. One of the best groundcovers for dry shade. Good barrier plant. Sometimes classified in Berbis family instead of Mahonia.
<b>Oregon Grape, Tall</b> <i>Mahonia aquifolium or Berbis aquifolium</i>	Evergreen Shrub	H: 5–8'	S PS	M	Riparian Forest F. Slope	Needs well-drained soil. Good in hedge, good barrier plant. Not as tolerant of dry conditions as the two low-growing varieties. Sometime classified in Berbis family instead of Mahonia.
<b>Oxalis, Oregon</b> <i>Oxalis oregana</i>	Perennial Forb spreads rapidly by underground stems	H: 2–6"	Sh	M	Forest F. Slope	Also called redwood sorrel or wood sorrel. Ground-hugging plant with clover-shaped leaves. Leaves fold at night or cloudy weather. Edible leaves.
<b>Penstemon, Cascade</b> <i>Penstemon serrulatus</i>	Perennial Forb	H: 10"–24"	S PS	M	Wetland Grassland Rocky	Sometimes called Coast Penstemon. Dark blue to purple flowers in large clusters at end of stem.

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WATER SW: Seasonally Wet PW: Perennially Wet M: Moist D: Dry

\* Erosion control

NAME	FORM & HABIT	MATURE SIZE	LIGHT	WATER	SETTING	COMMENTS
<b>Piggyback Plant</b> <i>Tolmiea menziesii</i>	Perennial Forb rhizomes	H: 1-2'	S h	M SW	Riparian Forest F. Slope	Good along stream banks. Sometimes called youth-on-age. Buds form at base of leaves, making the leaf appear to carry a second, smaller leaf. Often used as houseplant.
<b>Poppy, California</b> <i>Eschscholzia californica</i>	Perennial Forb spreads by seed	H: 12"	S	D M	Grassland	Also called Gold Poppy. Widely cultivated as an ornamental. Parsley-like leaves. Sun-loving flowers close at night or during cloudy weather. Sprouts easily from seed.
<b>Rhododendron, Pacific</b> <i>Rhododendron macrophyllum</i>	Evergreen Shrub	H: 4-15' S: 4-10'	S h P S	M	F. Slope	Flowers very showy. Blooms most profuse in clearings or forest edge. Slow growing; can be difficult to establish.
<b>Rose, Baldhip</b> <i>Rosa gymnocarpa</i>	Deciduous Shrub	H: 3'-8'	S P S	D M SW	Forest F. Slope	Grows in wide variety of habitats, from open to wooded, dry to wet. Summer bloom, produces large hips. Good barrier plant. Can be distinguished from introduced species by presence of curved prickles.
<b>*Rose, Nootka</b> <i>Rosa nutkana var. Nutkana</i> *	Deciduous Shrub	H: 3-10'	S	D M	F. Slope	Grows in a variety of open habitats. Pair of large spines at base of each leaf. Can be spindly. Attractive flower.
<b>Rose, Swamp</b> <i>Rosa pisocarpa</i>	Deciduous Shrub	H: 3-10'	S	D M	Riparian F. Slope	Also called Clustered Rose because the pink flowers usually occur in groups of 3 - 20.
<b>*Rush species</b> <i>Juncus ensifolius, and other Juncus species</i>	Perennial Forb	H: varies	S	M	Wetland Riparian	They provide excellent soil-binding for erosion control. The most common rush ( <i>Juncus effusus</i> ) can be invasive but is good in poor soils.
<b>Salal</b> <i>Gaultheria shallon</i>  Ecologically, an important shrub	Evergreen Shrub spreads by layering, suckering and sprouting	H: 1-6'	S S h	D M	Forest F. Slope Rocky	Common in a variety of habitats, from bogs to dry, well-drained slopes. Most abundant in Evergreen forests. Makes an excellent ground cover. Pinkish bell flowers, Fruit edible. Low-growing in dry, sunny conditions; much taller in moist, shady conditions.
<b>*Sedge</b> <i>Carex obnupta and other Carex species</i>	Perennial Forb	H: varies (8"-46")	S P S	M SW PW	Wetland	An important family of wetland plants with many native species. Grass like with triangular stems. All possess excellent soil-binding characteristics. <i>Carex obnupta</i> , especially good for swales.
<b>Serviceberry, Western</b> <i>Amelanchier alnifolia</i>	Deciduous Shrub	H: 4-15'	S P S	M SW	Forest F. Slope Thicket	Also called Saskatoon berry or shadbush. Can grow up to 30 ft in ideal conditions. Edible fruit. Good spring flowers and fall color. Prefers good soil and moderate water.
<b>Shooting Star, Few-flowered-</b> <i>Dodecatheon pulchellum</i>	Perennial Forb	H: 6-12"	S P S	M W	Wetland	Needs rich, well-drained soil during spring growing/blooming season; needs dry soil after bloom.
<b>Shooting Star, White</b> <i>Dodecatheon dentatum</i>	Perennial Forb	H: 5-16"	S	M W	Riparian Rocky	Needs rich, well-drained soil during spring growing/blooming season; needs dry soil after bloom.
<b>Skunk Cabbage</b> <i>Lysichiton americanum</i>	Perennial Forb spreads by stems underground	H: 1-5'	S  P S	M SW PW	Forest F. Slope Thicket	Swampy ground or slow streams. Large, shiny cabbage-like leaves. Bright yellow sheath surrounds the flower in early spring.

LIGHT S: Full Sun PS: Partial Sun Sh: Full Shade  
WATER SW: Seasonally Wet PW: Perennially Wet M: Moist D: Dry

\* Erosion control

NAME	FORM & HABIT	MATURE SIZE	LIGHT	WATER	SETTING	COMMENTS
<b>*Snowberry, Common</b> <i>Symphoricarpos albus</i>	Deciduous Shrub spreads by rhizomes	H: 2–6’	S Sh	DM SW	Forest F. Slope Thicket	Erect form of snowberry. White berries not palatable. Important wildlife food because berries persist into winter. Excellent soil-binding characteristics.
<b>*Snowberry, Creeping</b> <i>Symphoricarpos mollis</i> ,	Deciduous Shrub- spreads above ground stems	H: 12–18”	Sh S	D	Forest	Trailing form of snowberry. White berries not palatable. Important wildlife food because berries persist into winter. Excellent soil-binding characteristics.
<b>Solomon’s Seal, Star- Flowered</b> <i>Smilacina stellata</i>	Perennial Forb	H: 1–2’	Sh PS	M D	Forest	Small perennial, usually found in rocky but moist soil. Small, delicate flower clusters.
<b>Solomon’s Seal, False</b> <i>Smilacina racemosa</i>	Perennial Forb	H: 1–3’	Sh PS	M SW	Wetland Forest Riparian Thicket	Wetland Forest Similar to Star- Flowered Solomon’s Seal; more robust; leaves are larger, flowers more fragrant. Good ornamental in shady gardens. Large, many-branched flower clusters
<b>Stonecrop, Oregon</b> <i>Sedum oregonum</i>	Perennial Forb	H: 2–4”	S	D M	Rocky	Bright yellow flowers becoming pinkish with age. Needs well-drained site.
<b>Stonecrop, Spatula-leaf</b> <i>Sedum spathulifolium</i>	Perennial Forb	H: 3–8”	S PS	D M	Rocky	Pale yellow flowers. Leaves vary in color from gray-green to deep red, becoming more reddish in full sun.
<b>Strawberry, Broadpetal</b> <i>Fragaria virginiana</i> var.	Perennial Forb spreads rapidly by stolons	H: 4”	S PS	M	Riparian Forest Grassland	Also called wild strawberry. Leaves are often bluish-green on top. Berries are usually smaller than the flower.
<b>Strawberry, Coastal</b> <i>Fragaria chiloensis</i>	Evergreen perennial Forb spreads rapidly by stolons	H: 3”	S PS	M	Grassland	Sometimes called Beach Strawberry. Shiny dark green leaves with prominent veins. Runners (stolons) are reddish & hairy.
<b>Strawberry, Wood</b> <i>Fragaria vesca</i> var. <i>Bracteata</i> or <i>crinita</i>	Perennial Forb spreads rapidly by stolons	H: 3–8”	S PS	M	Riparian Forest Grassland	Also called woodland strawberry. Often found in forest openings. Berries are usually smaller than the flower.
<b>*Thimbleberry</b> <i>Rubus parviflorus</i>	Deciduous Shrub spreads by rhizomes	H: 3–6’	S Sh	DM SW	Riparian Forest F. Slope	Large maple-like leaves with velvety texture. Berries edible, resemble raspberries. Stems lack thorns. Can spread to form dense thickets Drought tolerant.
<b>Trillium, Western</b> <i>Trillium Ovatum</i>	Perennial Forb rhizomes	H: 6–18”	Sh PS	M	Forest	Early spring bloom. Attractive flower. Prefer acidic soil. Usually found in moist to wet woods, stream banks or shaded open areas.
<b>Twinberry, Black</b> <i>Lonicera involucrata</i>	Deciduous Shrub; does not spread	H: 10’ S: 8’	S. PS	M SW	Wetland Riparian Grassland	Also called bearberry honeysuckle. Produces yellow twin flowers followed by black, unpalatable berries.
<b>Twinflower</b> <i>Linnaea borealis</i>	Evergreen Shrub Recumbent	H: 6” S:	S PS	M SW	Forest F. Slope	Creeping, semi-woody evergreen shrub with delicate, fragrant flowers.
<b>Twisted-stalk, Claspig Leaved, Streptopus amplexifolius</b>	Perennial Forb	H: 18–36” S:	Sh PS	M	Riparian Forest F. Slope	Single, greenish-white bell-shaped flowers hang from thread-like stem on underside of leaf.
<b>Vanilla Leaf</b> <i>Achlys triphylla</i>	Perennial Forb	H: 8–12”	Sh PS	M	Riparian Forest F. Slope	Sometimes called Deer foot, because of the shape of the leaf. Sends up single, 3-lobed leaf, with showy spike of small white flowers above the leaf.
<b>Violet, Evergreen</b> <i>Viola sempervirens</i>	Perennial Forb runners & rhizomes	H: 2–5”	PS Sh	M	Forest F. Slope	Pale yellow flower. Shiny thick leaves with purple blotches.

LIGHT S: Full Sun PS: Partial Sun Sh: Full Shade

WATER SW: Seasonally Wet PW: Perennially Wet M: Moist D: Dry

\* Erosion control

## B: NUISANCE PLANT LIST

These plants may be native, naturalized, or exotic. These plants are considered a nuisance because of their tendency to dominate plant communities, and /or plants which are considered harmful to humans.

**BY COMMON NAME** \*except cultivars and varieties

Alsike Clover, <i>Trifolium hybridum</i>	European Avens, <i>Geum urbanum</i>
Annual Bluegrass, <i>Poa annua</i>	European Mountain Ash, <i>Sorbus aucuparia</i> *
Annual Ryegrass <i>Lolium multiflorum</i>	European Soft Rush, <i>Juncus effusus</i> v. <i>effusus</i>
Bamboo Sp., <i>various genera</i>	European Watercress, <i>Rorippa nasturtium-aquaticum</i>
Bird's Foot Trefoil, <i>Lotus corniculatus</i>	Evergreen Blackberry, <i>Rubus laciniatus</i>
Black Locust, <i>Robinia pseudoacacia</i> *	Fall Dandelion, <i>Leontodon autumnalis</i>
Blessed Milk Thistle, <i>Silybum marianum</i>	False Brome, <i>Brachypodium sylvaticum</i>
Blue Bindweed, <i>Solanum dulcamara</i>	Fennel, <i>Foeniculum vulgare</i>
Brown Knapweed, <i>Centaurea jacea</i>	Field Morning-Glory, <i>Convolvulus arvensis</i>
Butterfly Bush, <i>Buddleia davidii</i>	Fragrant Water Lily, <i>Nymphaea odorata</i>
Canada Thistle, <i>Cirsium arvense</i>	Garden Nightshade, <i>Solanum nigrum</i>
Chameleon Plant, <i>Houttuynia cordata</i>	Garlic Mustard, <i>Alliaria officinalis</i>
Cheatgrass, <i>Bromus tectorum</i>	Giant Hogweed, <i>Heracleum mantegazzianum</i>
Chicory, <i>Chicorium intybus</i>	Giant Horsetail, <i>Equisetum telemateia</i>
Climbing Bindweed, <i>Polygonum convolvulus</i>	Giant Knotweed, <i>Polygonum sachalinense</i>
Common Bladderwort, <i>Utricularia vulgaris</i>	Golden Chain Tree, <i>Laburnum watereri</i>
Common Burdock, <i>Arctium minus</i>	Gorse, <i>Ulex europaeus</i>
Common Dandelion, <i>Taraxacum officinale</i>	Goutweed, <i>Aegopodium podagraria</i> and <i>variegated varieties</i>
Common Horsetail, <i>Equisetum arvense</i>	Hairy Nightshade, <i>Solanum sarrachoides</i>
Common Reed, <i>Phragmites australis</i>	Hairy Vetch, <i>Vicia villosa</i>
Common Tansy, <i>Tanacetum vulgare</i>	Harding Grass, <i>Phalaris aquatica</i>
Common Teasel, <i>Dipsaucus fullonum</i>	Hare's Foot Clover, <i>Trifolium arvense</i>
Common Thistle, <i>Cirsium vulgare</i>	Hawthorn (except native species), <i>Crataegus</i> sp. <i>except suksdorfii</i>
Common Vetch, <i>Vicia sativa</i>	Hedge Mustard, <i>Sisyrimbium officinale</i>
Crane's Bill, <i>Erodium cicutarium</i>	Himalayan Knotweed, <i>Polygonum polystachyum</i>
Creeping Buttercup, <i>Ranunculus repens</i>	Hoary Cress, <i>Cardaria draba</i>
Creeping Jenny <i>Lysimachia nummularia</i>	Hydrilla, <i>Hydrilla verticillata</i>
Cultivated Rye, <i>Secale cereale</i>	Italian Thistle, <i>Carduus pycnocephalus</i>
Curly Dock, <i>Rumex crispus</i>	Japanese Brome-Grass, <i>Bromus japonicus</i>
Curly Leaf Pondweed, <i>Potamogeton crispus</i>	Japanese Knotweed, <i>Polygonum cuspidatum</i>
Cutleaf Birch, <i>Betula pendula lacinata</i>	Johnson Grass, <i>Sorghum halepense</i>
Dalmation Toadflax <i>Linaria dalmatica</i> sp. <i>dalmatica</i>	Kudzu, <i>Pueraria lobata</i>
Diffuse Knapweed, <i>Centaurea diffusa</i>	Lady's-Nightcap, <i>Convolvulus seppium</i>
Doorweed, <i>Polygonum aviculare</i>	Lemon Balm <i>Melissa officianalis</i>
Duckweed, Water Lentil <i>Lemna minor</i>	Lesser Celandine, <i>Chelidonium majou</i>
English Holly, <i>Ilex aquafolium</i>	Lesser Celandine, <i>Ranunculus ficaria</i>
English, Portugese Laurel, <i>Prunus laurocerasus</i>	
Eurasian Watermilfoil, <i>Myriophyllum spicatum</i>	

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Meadow Foxtail, *Alopecurus pratensis*  
Meadow Knapweed, *Centaurea pratensis*  
Medusahead, *Taeniatherum caput-medusa*  
Mole Plant, *Euphorbia lathyris*  
Money Plant *Lunaria annua*  
Moth Mullein, *Verbascum blattaria*  
Mouse-Ear Hawkweed, *Hieracium pilosella*  
Mullein, *Verbascum thapsus*  
Multiflora Rose, *Rosa multiflora*  
Musk Thistle, *Carduus nutans*  
Nipplewort *Lapsana communis*  
Norway Maple, *Acer platanoides*  
Orange Hawkweed, *Hieracium aurantiacum*  
Oxeye Daisy *Leucanthemum vulgare*  
Pampas Grass, *Cortaderia selloana*  
Parentucellia *Parentucellia viscosa*  
Parrots Feather *Myriophyllum aquaticum*  
Penny Royal *Mentha pulegium*  
Perennial Sowthistle, *Sonchus arvensis* sp.  
*arvensis*  
Periwinkle (Large Leaf ), *Vinca major*  
Periwinkle (Small Leaf ), *Vinca minor*  
Plumeless Thistle, *Carduus acanthoides*  
Poison Oak, *Rhus diversiloba*  
Poison-Hemlock, *Conium maculatum*  
Pokeweed, *Phytolacca americana*  
Policemen's Helmet, *Impatiens glandulifera*  
Pond Water Starwort, *Callitriche stagnalis*  
Poverty Grass, *Bromus sterilis*  
Prickly Lettuce *Lactuca serriola*  
Princess Tree *Paulownia tomentosa*  
Privet *Ligustrum vulgare*  
Quack Grass, *Agropyron repens*  
Queen Anne's Lace, *Daucus carota*  
Rat-Tailed Fescue, *Vulpia myuros* [*Festuca myuros*]  
Red Sorrel, *Rumex acetosella*  
Ripgut, *Bromus diandrus*  
Robert Geranium, *Geranium robertianum*  
Rush Skeletonweed, *Chondrilla juncea*  
Russian Knapweed, *Acroptilon repens*  
Scotch Thistle, *Onopordum acanthium*  
Shining Geranium, *Geranium lucidum*  
Siberian Elm, *Ulmus pumila*

Slender Flowered Thistle, *Carduus tenuifolius*  
Smooth Brome-Grasses, *Bromus inermis*  
Smooth Hawkweed, *Hieracium laevigatum*  
Soft Brome, *Bromus hordeaceus*  
South American Waterweed, *Egeria densa*  
South American Waterweed, *Elodea densa*  
Spatula Leaf Purslane *Lythrum portula*  
Spiny Cocklebur, *Xanthium spinosum*  
Spotted Cat's Ear, *Hypochaeris radicata*  
Spotted Knapweed, *Centaurea biebersteinii*  
St. John's Wort, *Hypericum perforatum*  
Subterranean Clover, *Trifolium subterraneum*  
Sweet Briar, *Rosa eglanteria*  
Sweet Cherry, *Prunus avium*\*  
Sweet Vernal grass, *Anthoxanthum odoratum*  
Sweet Woodruff, *Galium odoratum*  
Sweetclover, *Melilotus alba*  
Swollen Bladderwort, *Utricularia inflata*  
Tall Fescue, *Festuca arundinacea*  
Tall Oatgrass, *Arrhenatherum elatius*  
Tall Verbena, *Verbena bonariensis*  
Tansy Ragwort, *Senecio jacobaea*  
Timothy Grass, *Phleum pratensis*  
Traveler's Joy, *Clematis vitalba*  
Tree-Of-Heaven, *Ailanthus altissima*  
Tufted Vetch, *Vicia cracca*  
Velvet Grass, *Holcus lanatus*  
Wall Lettuce *Lactuca muralis*  
Water Primrose *Ludwigia hexapetala*  
Water Smartweed, *Polygonum coccineum*  
Western Clematis, *Clematis ligusticifolia*  
White Campion, *Lychnis alba*  
White Campion, *Silene alba*  
White Clover, *Trifolium repens*  
White Nancy *Lamium maculatum*  
White Poplar, *Populus alba*  
Witchgrass, *Panicum capillare*  
Yellow Flag, *Iris pseudacorus*  
Yellow Hawkweed, *Hieracium cespitosum*  
Yellow Sweetclover, *Melilotus officinalis*  
Yellow Toadflax, *Linaria vulgaris*



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**BY SCIENTIFIC NAME** \*except cultivars and varieties

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*Acer platanoides*, Norway Maple  
*Acroptilon repens*, Russian Knapweed  
*Aegopodium podagraria*, Goutweed and variegated varieties  
*Agropyron repens*, Quack Grass  
*Ailanthus altissima*, Tree-Of-Heaven  
*Alliaria officinalis*, Garlic Mustard  
*Alopecurus pratensis*, Meadow Foxtail  
*Anthoxanthum odoratum*, Sweet Vernalgrass  
*Arctium minus*, Common Burdock  
*Arrhenatherum elatius*, Tall Oatgrass  
*Bamboo various genera*, Bamboo Sp.  
*Betula pendula lacinata*, Cutleaf Birch  
*Brachypodium sylvaticum*, False Brome  
*Bromus diandrus*, Ripgut  
*Bromus hordeaceus*, Soft Brome  
*Bromus inermis*, Smooth Brome-Grasses  
*Bromus japonicus* Japanese Brome-Grass  
*Bromus sterilis*, Poverty Grass  
*Bromus tectorum*, Cheatgrass  
*Buddleia davidii*, Butterfly Bush  
*Callitriche stagnalis*, Pond Water Starwort  
*Cardaria draba*, Hoary Cress  
*Carduus acanthoides*, Plumeless Thistle  
*Carduus nutans*, Musk Thistle  
*Carduus pycnocephalus*, Italian Thistle  
*Carduus tenuifolius*, Slender Flowered Thistle  
*Centaurea biebersteinii*, Spotted Knapweed  
*Centaurea diffusa*, Diffuse Knapweed  
*Centaurea jacea*, Brown Knapweed  
*Centaurea pratensis*, Meadow Knapweed  
*Chelidonium majou*, Lesser Celandine  
*Chicorium intybus*, Chicory  
*Chondrilla juncea*, Rush Skeletonweed  
*Cirsium arvense*, Canada Thistle  
*Cirsium vulgare*, Common Thistle  
*Clematis ligusticifolia*, Western Clematis  
*Clematis vitalba*, Traveler's Joy  
*Conium maculatum*, Poison-Hemlock  
*Convolvulus arvensis*, Field Morning-Glory  
*Convolvulus sepium*, Lady's-Nightcap  
*Cortaderia selloana*, Pampas Grass

*Crataegus sp. except suksdorfii*, Hawthorn (except native species)  
*Daucus carota*, Queen Anne's Lace  
*Dipsaucus fullonum*, Common Teasel  
*Elodea densa*, South American Waterweed  
*Equisetum arvense*, Common Horsetail  
*Equisetum telemateia*, Giant Horsetail  
*Erodium cicutarium*, Crane's Bill  
*Euphorbia lathyrus*, Mole Plant  
*Festuca arundinacea*, Tall Fescue  
*Festuca myuros*, Rat-Tailed Fescue  
*Foeniculum vulgare*, Fennel  
*Galium odoratum*, Sweet Woodruff  
*Geranium lucidum*, Shining Geranium  
*Geranium robertianum*, Robert Geranium  
*Geum urbanum*, European Avens  
*Heracleum mantegazzianum*, Giant Hogweed  
*Hieracium aurantiacum*, Orange Hawkweed  
*Hieracium cespitosum*, Yellow Hawkweed  
*Hieracium laevigatum*, Smooth Hawkweed  
*Hieracium pilosella*, Mouse-Ear Hawkweed  
*Holcus lanatus*, Velvet Grass  
*Houttuynia cordata*, Chameleon Plant  
*Hydrilla verticillata*, Hydrilla  
*Hypericum perforatum*, St. John's Wort  
*Hypochaeris radicata*, Spotted Cat's Ear  
*Ilex aquafolium*, English Holly  
*Impatiens glandulifera*, Policemen's Helmet  
*Iris pseudacorus*, Yellow Flag  
*Juncus effusus v. effusus*, European Soft Rush  
*Laburnum watereri*, Golden Chain Tree  
*Lactuca muralis*, Wall Lettuce  
*Lactuca serriola*, Prickly Lettuce  
*Lamium maculatum*, White Nancy  
*Lapsana communis*, Nipplewort  
*Lemna minor*, Duckweed Water Lentil  
*Leontodon autumnalis*, Fall Dandelion  
*Leucanthemum vulgare*, Oxeye Daisy  
*Ligustrum vulgare*, Privet  
*Linaria dalmatica sp.dalmatica*, Dalmation Toadflax  
*Linaria vulgaris*, Yellow Toadflax

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*Lolium multiflorum*, Annual Ryegrass  
*Lotus corniculatus* Bird's Foot Trefoil  
*Ludwigia hexapetala*, Water Primrose  
*Lunaria annua*, Money Plant  
*Lychnis alba*, White Campion  
*Lysimachia nummularia*, Creeping Jenny  
*Lythrum portula*, Spatula Leaf Purslane  
*Melilotus alba*, Sweetclover  
*Melilotus officinalis*, Yellow Sweetclover  
*Melissa officianalis*, Lemon Balm  
*Mentha pulegium*, Penny Royal  
*Myriophyllum aquaticum*, Parrots Feather  
*Myriophyllum spicatum*, Eurasian Watermilfoil  
*Nymphaea odorata*, Fragrant Water Lily  
*Onopordum acanthium*, Scotch Thistle  
*Panicum capillare*, Witchgrass  
*Parentucellia viscosa*, Parentucellia  
*Paulownia tomentosa*, Princess Tree  
*Phalaris aquatica*, Harding Grass  
*Phleum pratensis*, Timothy Grass  
*Phragmites australis*, Common Reed  
*Phytolacca americana*, Pokeweed  
*Poa annua*, Annual Bluegrass  
*Polygonum aviculare*, Doorweed  
*Polygonum coccineum*, Water Smartweed  
*Polygonum convolvulus*, Climbing Bindweed  
*Polygonum cuspidatum* Japanese Knotweed  
*Polygonum polystachyum*, Himalayan Knotweed  
*Polygonum sachalinense*, Giant Knotweed  
*Populus alba*, White Poplar  
*Potamogeton crispus*, Curly Leaf Pondweed  
*Prunus avium*, Sweet Cherry\*  
*Prunus laurocerasus*, EnglishPortugese Laurel  
*Pueraria lobata*, Kudzu  
*Ranunculus ficaria*, Lesser Celandine  
*Ranunculus repens*, Creeping Buttercup  
*Rhus diversiloba*, Poison Oak  
*Robinia pseudoacacia*, Black Locust\*  
*Rorippa nasturtium-aquaticum*, European Watercress  
*Rosa eglantheria*, Sweet Briar  
*Rosa multiflora*, Multiflora Rose  
*Rubus laciniatus*, Evergreen Blackberry  
*Rumex acetosella*, Red Sorrel  
*Rumex crispus*, Curly Dock  
*Secale cereale*, Cultivated Rye  
*Senecio jacobaea*, Tansy Ragwort  
*Silene alba*, White Campion  
*Silybum marianum*, Blessed Milk Thistle  
*Sisyrinchium officinale*, Hedge Mustard  
*Solanum dulcamara*, Blue Bindweed  
*Solanum nigrum*, Garden Nightshade  
*Solanum sarrachoides*, Hairy Nightshade  
*Sonchus arvensis sp. Arvensis*, Perennial Sowthistle  
*Sorbus aucuparia*, European Mountain Ash\*  
*Sorghum halepense*, Johnson Grass  
*Taeniatherum caput-medusa*, Medusahead  
*Tanacetum vulgare*, Common Tansy  
*Taraxacum officinale*, Common Dandelion  
*Trifolium arvense*, Hare's Foot Clover  
*Trifolium hybridum*, Alsike Clover  
*Trifolium repens*, White Clover  
*Trifolium subterraneum*, Subterraneum Clover  
*Ulex europaeus*, Gorse  
*Ulmus pumila*, Siberian Elm  
*Utricularia inflata*, Swollen Bladderwort  
*Utricularia vulgaris*, Common Bladderwort  
*Verbascum blattaria*, Moth Mullein  
*Verbascum thapsus*, Mullein  
*Verbena bonariensis*, Tall Verbena  
*Vicia cracca*, Tufted Vetch  
*Vicia sativa*, Common Vetch  
*Vicia villosa*, Hairy Vetch  
*Vinca major*, Periwinkle (Large Leaf )  
*Vinca minor*, Periwinkle (Small Leaf )  
*Vulpia myuros*, Rat-Tailed Fescue  
*Xanthium spinosum*, Spiny Cocklebur

## C: Invasive Species Control

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The following are some general best management practices suggestions for common invasive plants of the McKenzie River Watershed. Several resource options are provided for additional research. Most prescriptions described below follow integrated pest management (IMP) guidelines for common weeds established by the Western Invasive Network (May 2014).

Good resources include:

- OSU Extension Service publication, *Invasive Weed Identification and Management*: <https://catalog.extension.oregonstate.edu/ec1563>
- King County (WA) Noxious Weed Control: <http://www.kingcounty.gov/environment/animalsAndPlants/noxious-weeds/weed-identification.aspx> (follow links to Best Management Practices handouts for individual weeds).
- The Nature Conservancy, The Global Invasive Species Team website: <http://www.invasive.org/gist/esadocs.html>
- PNW Weed Management Handbook: <http://uspest.org/pnw/weeds/>

### **Himalayan Blackberry *Rubus armeniacus* (syn. *Rubus discolor*)**

Highly invasive and widespread in the McKenzie River sub-basin and Pacific Northwest. Forms dense thickets, displacing native vegetation and degrading habitat. Small infestations can typically be controlled through repeated mechanical and manual methods with limited or no chemical control. Larger patches will likely require an integrated pest management (IPM) approach.

Mechanical/Manual control:

- Mow or hand cut at least one to two times from late June through September
- If you only cut once, do so when plants begin to flower.
- Dig out the root ball in winter through spring when the ground is moist. This work is slow and labor-intensive but will be effective, especially in small areas. Large root fragments can re-sprout.
- Cultivation in agricultural areas can be effective. Mow first and then follow with multiple deep cultivations.
- Monitor closely. Repeat treatments will likely required for all methods.

Integrated Pest Management:

- Mow or hand cut by late June through July to concentrate new foliage for fall treatment
- Garlon 3A is effective in the fall, usually in September/October. Garlon 4/Escort combo offers a longer treatment window.
- Glyphosate at 2% is very effective in September through October while the canes are still growing and after berries have faded.
- All fall treatments should occur before the first frost.
- Monitor closely and be prepared for follow-up spot treatments or manual removal of regrowth.

All treated areas should be re-seeded with appropriate native grasses, trees, or shrubs. Shading is the best long-term non-chemical approach to blackberry control.

### **Scotch Broom (*Cytisus scoparius*)**

Introduced from Europe for erosion control and now widespread throughout the McKenzie River sub-basin and Pacific Northwest. Forms dense stands, displacing native vegetation and degrading wildlife habitat. The key to management of Scotch broom is consistent management over both the short and long-term. Scotch broom seeds are viable for up to 60 years and individual plants can live about 17 years. Incorporating consistent, annual maintenance of Scotch broom should yield positive results over time.

#### **Mechanical/Manual control:**

- Cutting older/large plants (stem greater than 1/2 inch) that are no longer green at the base of the stem can be effective. Time the cutting to occur during periods of water stress for the plant, typically mid-July through early September. Cut stems as close to ground as possible. One issue with this approach is that plants are typically in seed during this period and cutting and removing plant can spread seed.
- Pulling smaller plants (less than 1/2 inch in diameter) by hand or with a weed wrench when the soil is moist (fall through spring) can also be effective.
- Monitor closely and expect repeated treatments, especially during the first several years.
- Mowing, especially of young green plants is typically not effective as it can spread seeds and can lead to dense, multi-stemmed regrowth.
- Do not leave bare soil, leave mulch or replant with native ground cover to compete with Scotch broom seedlings.

#### **Chemical control:**

- Glyphosate (Aquamaster, Roundup) and Triclopyr (Garlon 3A, Crossbow) can effectively control when applied during active growth, typically in the spring.
- Herbicide treatment can also be done in the fall on re-growth of previously cut plants. Glyphosate may not be as effective in the fall.
- Smaller amounts of herbicides will be required if plants are cut first, as there will be less material to treat. Plant needs to be in active growth for herbicide treatment.
- Monitor closely and combine with manual methods described above.

All treated areas should be re-seeded with appropriate native grasses, trees, or shrubs.

### **English Ivy (*Hedera helix*)**

This evergreen ivy is common and widespread in landscaped areas and forests throughout the McKenzie River sub-basin and Pacific Northwest. Aggressive vine displaces native ground cover and impact native trees and shrubs through vertical growth. Though labor intensive, the most effective control is through manual methods. If nothing else at least keep English ivy from growing up trees. English ivy only sets seed when growing vertically. Keeping it off of trees with not only protect established trees but also help decrease seed production.

#### **Mechanical/Manual:**

- Protect trees and prevent seed production by cutting vines around tree trunks. Clear ivy three feet out from the base of the tree and up trunk to a height of 3 to 5 feet.
- Using rakes and shovels vines can be pulled and rolled down a slope like a carpet.

- Goats and sheep will eat English ivy and can be used to clear areas prior to pulling roots. Grazing animals are indiscriminate and will eat any native vegetation present.
- Regular and consistent mowing can be an effective control strategy.
- Remove cut and pulled vines from the site. If it is not possible to remove vines because of volume, distance or other circumstances, try piling vines on a pallet and/or downed logs keeping vines out of contact with the ground. Monitor pile closely for regrowth.

#### Integrated Pest Management:

- English ivy is considered tolerant of many commonly used herbicides. The waxy leaves inhibits absorption and increase run-off to surrounding plants and the soil.
- Combine any chemical application with a mowing or cutting and apply chemical on to newly formed leaves.
- If possible, apply during dry periods in late winter or early spring before native plants leaf out or emerge.
- Results will not be apparent for weeks, if not months, so be patient.

#### **False Brome (*Brachypodium sylvaticum*)**

False brome is a non-native bunchgrass that is rapidly expanding in the Pacific Northwest. This grass, native to Europe, Asia and North Africa, is capable of completely dominating both understory and open habitats to the near exclusion of native ground cover. Once established, control can be difficult and require long-term commitment. Prevention, early detection and active management of early stands is critical for long-term management.

#### Mechanical/Manual:

- Hand pulling can be effective on small patches when done in April or May prior to seed production. Take care to remove all roots fragments.
- Mowing can be used to remove/deplete annual seed production only. Optimal mowing timing for this purpose is June (plants will still flower when mowed earlier).

#### Chemical control:

- Broadcast application of a glyphosate-based herbicide is effective in mid-May through fall.
- Fall application should occur after first rains; that is when the plants start growing again.

#### **Japanese knotweed (*Polygonum cuspidatum*)**

Native to Asia, Japanese knotweed was originally imported and used in ornamental landscaping. There are multiple knotweed species as well as hybrids which can make identification difficult. The bamboo-like perennial readily spreads by long creeping rhizomes, particularly along disturbed areas like riverbanks or roadways. Dense thickets displace native vegetation and degrade habitat. Control can be challenging and require long-term management.

#### Mechanical/Manual control:

- Mowing or cutting alone is ineffective and typically encourages the knotweed roots to spread outward. Do not attempt unless the site is small and you are committed to an intensive control regimen. Research carefully before attempting.
- Digging is very labor intensive, generally causes more harm than good, and should only be reserved for very small patches in upland areas.

Chemical control:

- Foliar application in mid-August through September with Glyphosate, Triclopyr, or Habitat. Habitat offers a larger treatment window starting in mid-summer. Coverage is critical. Take care not to spray foliage of non-target shrubs and trees.
- Don't spray glyphosate in early summer. Spray from onset of flowering through September but before first frost!!
- Injection tools are effective and are most economical on larger diameter stems. This tool should be used in combination with foliar treatments to ensure treatment of small understory stems.
- If knotweed is found near water, use herbicides approved for riparian use, such as Aquamaster, Rodeo, Habitat, or Garlon 3A.

**Spotted Knapweed (*Centaurea stoebe* (syn. *C. biebersteinii*, *C. maculosa*)**

Native to Europe, this perennial with several branched upright stems growing from a stout taproot can be commonly found in gravel bars in the McKenzie River sub-basin. Spotted knapweed displaces native vegetation and threatens wildlife habitat and pastures. Depending on habitat conditions it can flower continually from early summer through fall, producing a large amount of seeds.

Mechanical/Manual control:

- Digging plants is effective for small areas and when soil is moist. Use a small hand digging tool.
- Make sure to get all of the root fragments.
- Plants that are pulled while in flower form may still set seed if left on the ground.
- Bag, remove and properly dispose of pulled plants.
- Mowing will not control spotted knapweed.

Chemical control:

- Spray, using glyphosate (2-5%) and a non-ionic surfactant (¼ -- ½ %)
- Spray from May until flowering (before seed set)
- For an IPM approach, try digging as many plants as possible and then follow with a careful spot application of any missed or regrown plants.

**Herb Robert (*Geranium robertianum*)**

Ornamental plant that is now widespread in forest habitats bordering residential areas and along roadways and river corridors. Once established, it displaces native understory and degrades wildlife habitat. Plant has a distinct odor, (sometimes known as "Stinky Bob"). Found throughout much of the McKenzie River sub-basin, particularly near roads and disturbed areas.

Mechanical/Manual control:

- Manual control is very effective and is often the best choice. Plants are relatively easy to grub out, provided the soil is not hard and compacted. Plants do not regenerate from roots or fragments.
- Stems are brittle, in order to get all of the plant, grab at the base.
- Repeated hand pulling will be required, but persistent efforts can be effective.
- Bag any flowering plants, remove and dispose of properly.
- Mowing or weed eating prevents plants from producing seed but will kill the plant.

Mowing to prevent seeding must be done frequently, as plants will continually produce flowers from early spring until late fall. Do not mow once seed is set.

Chemical control:

- Spot spraying with glyphosate during active growing season, but preferably before seed is set. Spray plants until they are wet, but not dripping, and not onto the surrounding soil or other vegetation.
- Herb Robert is a low-growing plant that is often growing among desirable vegetation. Applications of herbicide targeting Herb Roberts should be used only where there are large numbers of the plant, or in soil conditions that make manual control difficult.

### **Shining Geranium (*Geranium lucidum*)**

This ground cover from Europe was introduced as an ornamental and has since moved into forest and open habitats. It can spread quickly and form dense cover, displacing native vegetation. Control can be difficult and require long-term management. Well established in certain areas of the McKenzie River sub-basin, particularly within the lower portion of the basin near Springfield and Eugene.

Mechanical/Manual control:

- Hand-weed isolated plants or small populations before they are in seed.
- Take care to remove all the root in order to keep plant from re-sprouting.
- Burning with a propane-based flaming unit can be effective if done several times each growing season.

Chemical control:

- Plants can be sprayed before flowering (late March through April) with either a broadleaf herbicide (if growing with desirable grasses) or with a non-selective herbicide like glyphosate.

### **Clematis (Old Man's Beard) (*Clematis vitalba*)**

This woody vine is native to Europe and southwest Asia. It was originally imported as an ornamental and has since spread along streams, forest edges and hillsides into a variety of natural habitats. Populations in the McKenzie River sub-basin are largely concentrated along the main stem river. Vines can grow up to 100 feet long and can completely blanket trees and other plants. White flowers are visible through fall and late winter when much of the surrounding vegetation dies back. An IPM approach to control can work well with clematis.

Mechanical/Manual control:

- At a minimum cut vines from trunks of trees to minimize seeding. Cut vines at approximately should height and at ground level. Remove vines from trees as feasible.
- Cut vines that retain contact with the ground can re-sprout.
- Remove cut and pulled vines from the site. If it is not possible to remove vines because of volume, distance or other circumstances, try piling vines on a pallet and/or downed logs keeping vines out of contact with the ground. Monitor pile closely for regrowth.
- Smaller vines along the ground can be dug out – carefully follow vine along the ground digging it out as you go. Hand digging should occur when soil is moist in the winter when plants are dormant. Ideally, attempt on young plants only. Older vines tend to be very brittle. Very labor intensive.

- Mowing or cutting only is not effective, can stimulate growth and spread plant.

Chemical control:

- Follow cutting of vines with a chemical treatment after full leaf development in late spring or fall depending on the timing of manual treatment.
- If treating with herbicide in the spring (March or April) vines should be cut the preceding later summer or early fall in order to allow for sufficient re-growth.
- If treating with herbicide in the fall (September or October) ensure that treatment occurs prior to the first frost. Vines should be cut in mid-summer in order to allow for re-growth sufficient for herbicide treatment.
- Glyphosate is most effective in the spring. Apply directly to active re-growth of previously cut stem.
- Triclopyr can be applied to foliage anytime during active growth (spring through fall).
- Recommended prescription is a late summer or fall cut followed by a spring treatment with Glyphosate product. Hand dig young plants and seedlings in the winter and early spring.
- Monitor treated sites carefully for re-growth.

**Butterfly Bush (*Buddleia davidii*)**

Native to China, has been widely marketed and planted as an ornamental and attractant for butterflies. It can be invasive and is commonly found on gravel bars in the lower reaches of the McKenzie River and along roadways.

Mechanical/Manual control:

- Hand pulling and digging are effective on small plants and infestations.
- Mature plants are difficult to remove by hand.
- Cut stumps are likely to resprout.

Chemical control:

- Cut-stump application: Cut the plant and treat the stump surface with a glyphosate or triclopyr product in late summer or early fall.
- Foliar applications: apply triclopyr product in early to mid-summer or glyphosate product in late summer to early fall
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**Reed canary grass (*Phalaris arundinacea*)**

This tall wetland grass forms dense, monoculture stands along streams and other moist areas. It is common throughout the McKenzie River sub-basin and spreads by rhizomes, fragments and seeds. Its aggressive nature presents multiple challenges for management, particularly when trying to reestablish native vegetation within riparian areas. An IPM approach to control, with carefully planning and a long-term commitment can work well with reed canary grass.

Mechanical/Manual control:

- Difficult to control utilizing mechanical or manual methods only.
- Small and isolated patches can be removed by digging out and removing entire root mass. Any rhizomes left can re-sprout, so be careful to get them all.
- Cut by Mid-June to control seed production. Mowing or cutting only will not kill the grass and should be combined with additional methods in an IPM approach.



- Shade cloth can work on small scale, especially on a specific targeted area. Use heavy fabric secured with wooden stakes and landscape staple. Leave shade cloth for at least one growing season (late winter through late fall). It is likely that additional treatments (digging or spot herbicide treatment) will be need once the cloth is removed. The treated area should be immediately planted or seeded with native plants and/or seed. If shade cloth treated area in next to un-treated areas with reed canary grass, it will quickly spread back into cleared area.

Chemical control:

- Combining one or more mechanical or manual method with targeted application of herbicide can successful control reed canary grass.
- Mow or cut in late fall or winter to remove dead thatch from previous years growth.
- Allow new shoots to grow to about ankle height in the spring.
- Apply glyphosate product labeled for aquatic use (Aquamaster, Rodeo) in a 2% solution to new shoots in early to mid-spring.
- Be prepared to follow-up with additional treatment(s) following the same prescription in the early summer, fall or the next spring.
- Continue to cut residual reed canary grass to prevent it from going to seed.
- Monitor the project area closely.

All treated areas should be re-seeded with appropriate native grasses, trees, or shrubs.

## D: Resources

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This section contains a variety of resources to assist in learning more about naturescaping, native species, invasive species, and other useful information. Sections include: Annual Plant Sales, Books & Publications, Compost & Soil, Landscaping, Miscellaneous, Plants, Weeds & Other Pests, and Organizations.

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### Annual Plant Sales

#### **Food for Lane County Spring Plant Sale**

Grassroots Garden, Coburg Rd. 541-343-2822

#### **Healing Harvest Late-Season Plant & Garden Sale** 541-915-0599

**OSU Master Gardener's Plant Sale** Earth Day,  
EWEB River Plaza 541-344-5859

**Oregon Plant Fair, Avid Gardener's & Willamette District Garden Clubs** at Alton Baker Park

**Mt. Pisgah Arboretum Wildflower Festival & Plant Sale** 541-747-3817

### Books & Publications

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#### **A GUIDE TO BIRD BEHAVIOR**

Stokes, Donald and Lillian Stokes, 1979. Little, Brown and Company, Boston, MA

[Series of three; other guidebooks also available.]

#### **THE AUDUBON SOCIETY HANDBOOK FOR BUTTERFLY WATCHERS**

Pyle, Robert 1984. Charles Scribner's Sons, New York, NY [Pacific Northwest author.]

#### **THE BUTTERFLY BOOK**

Stokes, Donald, Lillian Stokes, and Ernest Williams 1991. Little, Brown and Company, Boston, MA

**AMPHIBIANS OF OREGON, WASHINGTON, AND BRITISH COLUMBIA: A FIELD IDENTIFICATION GUIDE** Corkran, Charlotte C. and Chris Thoms 1996. Lone Pine Publishing, Redmond, WA

#### **ATTRACTING BIRDS TO YOUR BACK YARD: 536 WAYS TO TURN YOUR YARD AND GARDEN INTO A HAVEN FOR YOUR FAVORITE BIRDS**

Roth, Sally 1998. Rodale Press, Emmaus, PA

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**NOTE:** These lists are not comprehensive, and are not intended as an endorsement.

**THE BACKYARD NATURALIST**

Tufts, Craig E. 1987. National Wildlife Federation, Washington, DC

**BIRDS OF THE PACIFIC NORTHWEST**

**MOUNTAINS**, Wassink, Jan L. 1995.

Mountain Press Publishing, Missoula, MT

**BUTTERFLIES AFIELD IN THE PACIFIC**

**NORTHWEST** Neill, W.A. and D.J. Hepburn

1976. Pacific Search Press, Seattle, WA

**FAMILIAR BIRDS OF THE NORTHWEST**

Nehls, Harry B. 1981. Portland Audubon Society, Portland, OR

**THE FORGOTTEN POLLINATORS**

Buchman, Stephen L. and Gary Paul Nabhan 1996.

Island Press, Washington, DC

**GARDENING WITH WILDLIFE KIT**

National Wildlife Federation, 1990. National

Wildlife Federation, Washington, DC

**HUMBLEBEE BUMBLEBEE: THE LIFE STORY OF THE FRIENDLY BUMBLEBEES AND THEIR USE BY THE BACKYARD GARDENER**

Griffin, Brian L. 1997. Knox Cellars Publishing,

Bellingham, WA

**HUMMINGBIRD GARDENS: ATTRACTING NATURE'S JEWELS TO YOUR BACKYARD**

Newfield, Nancy L. and Barbara Nielsen 1996.

Chapters Publishing, Shelburne, VT

**LITTLE MAMMALS OF THE PACIFIC**

**NORTHWEST** Kritzman, Ellen 1977. Pacific

Search Press, Seattle, WA

**THE ORCHARD MASON BEE: THE LIFE HISTORY, BIOLOGY, PROPAGATION AND USE OF A TRULY BENEVOLENT AND BENEFICIAL INSECT**

Griffin, Brian L. 1993. Knox Cellars

Publishing, Bellingham, WA

**PLANTS AND ANIMALS OF THE PACIFIC**

**NORTHWEST** Kozloff, Eugene N. 1976.

University of Washington Press, Seattle, WA

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**Compost & Soil**

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**GROUNDWORK: A GARDENER'S ECOLOGY**

Swaim, Roger 1994. Houghton Mifflin Company, Boston, MA

**IMPROVING THE SOIL** Hynes, Erin 1994.

Rodale Press, Emmaus, PA

**LET IT ROT: THE HOME GARDENER'S**

**GUIDE TO COMPOSTING** Campbell, Stu

1975. Storey Communications, Inc., Pownal, VT

**THE MULCH BOOK: A COMPLETE GUIDE FOR GARDENERS**

Campbell, Stu 1991. Storey Publishing, Pownal, VT

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**Landscaping**

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**THE BUTTERFLY GARDEN** Tekulsky, Mathew

1985. The Harvard Common Press, Boston, MA

**THE CHEMICAL-FREE LAWN**

Schultz, Warren 1989. Rodale Press, Emmaus, PA

**FERNS TO KNOW IN OREGON** Oregon State

University Extension Service, Corvallis, OR

**GARDENING FOR WILDLIFE**

Tufts, Craig E. and Peter Loewer 1995. Rodale

Press, Emmaus, PA

**GARDENING WITH NATIVE PLANTS OF THE**

**PACIFIC NORTHWEST** Kruckeberg, Arthur R.

1996. University of Washington Press, Seattle, WA

[Original edition published in 1982]

**GOING NATIVE: BIODIVERSITY IN OUR**

**OWN BACKYARDS** Marinelli, Janet 1994.

Brooklyn Botanical Garden, Brooklyn, New York

**GREAT GARDEN SOURCES: SOURCEBOOK OF DESIGN IDEAS AND GARDEN SUPPLIERS FOR BOTH NOVICE & EXPERIENCED**

**NORTHWEST GARDENERS** Simpson, Nan

Booth 1994. The Authors Communication Team,

Portland, OR

**GROW WILD**

Johnson, Lorraine 1998. Low-Maintenance, Sure-

Success, Distinctive Gardening with Native Plants

Fulcrum Pub, Golden, CO

**GROWING PLANTS FOR FREE** Bryant, Geoff  
1995. Cassell Publishers Limited, London

**MARIA RODALE'S ORGANIC GARDENING**  
Rodale, Maria 1998. Rodale Press Inc, Emmaus, PA

**MOSS GARDENING: INCLUDING LICHENS,  
LIVERWORTS AND OTHER MINIATURES**  
Schenk, George 1997. Timber Press, Portland, OR

**THE NATURAL GARDEN BOOK: A HOLISTIC  
APPROACH TO GARDENING** Harper, Peter  
1994. Simon & Schuster, New York, NY

**THE NATURAL WATER GARDEN: POOLS,  
PONDS, MARSHES & BOGS FOR BACKYARDS  
EVERYWHERE** Burrell, C. Colston (Ed.) 1997.  
Brooklyn Botanical Garden, Brooklyn, NY

**NATURALISTIC GARDENING: REFLECTING  
THE PLANTING PATTERNS OF NATURE**  
Lovejoy, Ann 1998. Sasquatch Books, Seattle, WA

**NATURESCAPING: A PLACE FOR WILDLIFE**  
Weston, Shann (Ed.) 1993. Oregon Department of  
Fish & Wildlife, Portland, OR

**NOAH'S GARDEN: RESTORING THE  
ECOLOGY OF OUR OWN BACKYARDS**  
Stein, Sara B 1993. Houghton Mifflin Co, NY, NY

**NORTHWEST GARDEN STYLE: IDEAS,  
DESIGNS, AND METHODS FOR THE  
CREATIVE GARDENER** Whitner, Jan  
Kowalczewski 1996. Sasquatch Books, Seattle, WA

**THE NORTHWEST GARDENERS' RESOURCE  
DIRECTORY, 7TH EDITION**  
Feeney, Stephanie (Ed.) 1997. Cedarcroft Press,  
Bellingham, WA [Updated frequently]

**NORTHWEST NATIVE PLANTS:  
IDENTIFICATION AND PROPAGATION FOR  
RE-VEGETATION AND RESTORATION  
PROJECTS**, King County Department of Natural  
Resources, Seattle, WA

**PRACTICAL WATER GARDENING**  
Rees, Yvonne 1994. Crowood Press, Wiltshire,  
England

**PROPAGATION OF PACIFIC NORTHWEST  
NATIVE PLANTS**  
Rose, Robin, Caryn Chachulski and Diane Haase  
1998. OSU Press, Corvallis, OR

**PLANTING NOAH'S GARDEN: FURTHER  
ADVENTURES IN BACKYARD ECOLOGY**  
Stein, Sara B 1997 Houghton Mifflin Co, New  
York, NY

**REDESIGNING THE AMERICAN LAWN: A  
SEARCH FOR ENVIRONMENTAL HARMONY**  
1993. BORMANN, F. HERBERT, ET AL 1992.  
Yale University Press, New Haven, CT

**SECOND NATURE: A GARDENER'S  
EDUCATION** Pollan, Michael 1991. Atlantic  
Monthly, New York, NY

**STEP-BY STEP PONDS, POOLS AND  
ROCKERIES**  
Swift, Penny and Janek Szymanowski 1995. New  
Holland Press, London

**SUCCESS WITH YOUR GARDEN POND**  
Stadelmann, Peter 1994. Merehurst Limited, London.

**SUNSET IDEAS FOR SMALL-SPACE GARDENS**  
Editors of Sunset Books 1978. Lane Publishing  
Company, Menlo Park, CA

**SUNSET WESTERN GARDEN BOOK**  
Editors of Sunset Magazine 1995. Lane Magazine and  
Book Company, Menlo Park, CA

**THE 20-MINUTE GARDENER: THE GARDEN  
OF YOUR DREAMS WITHOUT GIVING UP  
YOUR LIFE, YOUR JOB, OR YOUR SANITY**  
Christopher, Tom and Marty Asher 1997. Random  
House, New York, NY

**THE WILD LAWN HANDBOOK:  
ALTERNATIVES TO THE TRADITIONAL  
FRONT LAWN**  
Daniels, Stevie 1995. Macmillan, New York, NY

**YOUR GARDEN POND**

Wieser, K.H. and P.V. Loisell

**WATER-SAVING GARDENING**

Taylor's Guide 1990. Houghton Mifflin Company, Boston, MA

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**Miscellaneous**

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**RECYCLER'S GUIDE TO HOUSEHOLD HAZARDOUS WASTE COLLECTION**

**CENTER**, Published by Lane County Public Works Waste Management Division, Eugene, OR  
*<http://www.lanecounty.org/Departments/PW/WMD/Rcycle/Documents/HouseholdHazardousWaste.pdf>*

**HOUSEHOLD ECOTEAM WORKBOOK: A SIX-MONTH PROGRAM TO BRING YOUR HOUSEHOLD INTO ENVIRONMENTAL BALANCE** Gershon, David and Robert Gilman 1992. Global Action Plan for the Earth, Woodstock, NY.

**WHY WE GARDEN: CULTIVATING A SENSE OF PLACE** Nollman, Jim 1996. Henry Holt & Co.

**WATERSHEDS, WETLANDS, FORESTS, STREAMS: LEARNING OPPORTUNITIES NEXT DOOR, LINKING SCHOOLS WITH NATURAL RESOURCE AREAS** Cross, Susan and Patrick Willis Jackson Bottom Wetland Preserve, Hillsboro, OR.

**THE WETLANDS CONSERVANCY, TUALATIN, OR** Citizens' Regional Watershed Handbook 1995

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**Plants**

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**DISCOVERING WILD PLANTS: ALASKA, WESTERN CANADA, THE NORTHWEST** Schofield, Janice J. 1989. Alaska NW Books

**COASTAL WILDFLOWERS OF THE PACIFIC NORTHWEST: WILDFLOWERS AND FLOWERING SHRUBS FROM BRITISH COLUMBIA TO NORTHERN CALIFORNIA** Horn, Elizabeth L. 1993. Mountain Press, Missoula, MT

**FLORA OF THE PACIFIC NORTHWEST**

Hitchcock, Leo C. and Arthur Cronquist 1973. University of Washington Press, Seattle, WA

**HORTUS WEST: A WESTERN NORTH AMERICA NATIVE PLANT DIRECTORY & JOURNAL**

Shank, Dale (Ed.) Published semi-annually PO Box 2870, Wilsonville, OR 97070 [Single issues available]

**MOSSES, LICHENS & FERNS OF NORTHWEST NORTH AMERICA** Vitt, Dale H., et al 1988. Lone Pine Publishing, Redmond, WA

**MOUNTAIN PLANTS OF THE PACIFIC NORTHWEST** Taylor, Ronald J. and George W. Douglas 1995. Mountain Press Publishing Co, Missoula, MT

**MY WEEDS: A GARDENER'S BOTANY** Stein, Sara B 1988. Houghton Mifflin, New York, NY

**NATIVE PLANTS IN THE COASTAL GARDEN** Pettinger, April 1996. Whitecap Books, Vancouver, BC

**PACIFIC COAST TREE FINDER** Watts, Tom 1973. Nature Study Guild, Berkeley, CA

**PACIFIC COAST BERRY FINDER** Keator, Glenn 1978. Nature Study Guild, Berkeley, CA

**PACIFIC COAST FERN FINDER** Keator, Glenn & Ruth Atkinson 1981. Nature Study Guild, Berkeley, CA

**FAMILIAR FRIENDS: NORTHWEST PLANTS** Whittlesey, Rhoda 1985. Rose Press, Portland, OR

**PLANTS OF THE PACIFIC NORTHWEST COAST: WASHINGTON, OREGON, BRITISH COLUMBIA & ALASKA** Pojar, Jim and Andy MacKinnon (Ed.) 1994. Lone Pine Publishing, Redmond, WA

**TREES & SHRUBS FOR PACIFIC NORTHWEST GARDENS, 2ND EDITION**  
Grant, John A. and Carol L. Grant 1990. Timber Press, Portland, OR

**TREES TO KNOW IN OREGON**  
Jensen, Edward C. and Charles R. Ross 1950. Oregon State University Extension Service and the Oregon State Forestry Department, Corvallis, OR [OSU Extension Circular No 1450; reprinted 1995]

**WAYSIDE WILDFLOWERS OF THE PACIFIC NORTHWEST**  
Strickler, Dee 1993. The Flower Press, Columbia Falls, MT

**WILDFLOWERS 1: THE CASCADES**  
Horn, Elizabeth L. 1972. Touchstone Press, Beaverton, OR

**WILDFLOWERS OF THE OLYMPICS AND CASCADES**  
Stewart, Charles 1994. Nature Education Enterprises, Port Angeles, WA

**WILDFLOWERS OF THE WESTERN CASCADES**  
Ross, Robert A. and Henrietta L. Hambers 1988. Timber Press, Portland, OR

**WETLAND PLANTS OF OREGON & WASHINGTON** Guard, B. Jennifer 1995. Lone Pine Publishing, Redmond, WA

**INVASIVE PLANTS: WEEDS OF THE GLOBAL GARDEN**  
Randall, John M. & Janet Marinelli 1996. Brooklyn Botanical Garden, Brooklyn, New York.

**LEAST TOXIC PEST MANAGEMENT FOR LAWNS**  
Daar, Sheila (Ed) 1992. Bio-Integral Resource Center, Berkeley, CA

**NORTHWEST WEEDS: THE UGLY AND BEAUTIFUL VILLAINS OF FIELDS, GARDENS, AND ROADSIDES**  
Taylor, Ronald J. 1990. Mountain Press Publishing Co, Missoula, MT

**ORGANIC PEST & DISEASE CONTROL: HOW TO GROW A HEALTHY, PROBLEM-FREE GARDEN** Ellis, Barbara 1997. Houghton Mifflin Co, New York

**WEEDS OF THE PACIFIC NORTHWEST**  
Gilkey, Helen M. 1975. Oregon State University, Corvallis, OR

**WEEDS OF THE WEST, 5<sup>TH</sup> EDITION**  
Whitson, Tom D. (Ed.) 1996. The Western Society of Weed Science, Newark, CA [in cooperation with the Western U.S. Land Grant Universities Cooperative Extension Services]

## **Weeds & Other Pests**

## **Organizations**

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### **NON-HERBICIDAL WEED CONTROL STRATEGIES SERIES**

Chirillo, Samantha, 2008. NW Center for Alternatives to Pesticides, [www.pesticide.org](http://www.pesticide.org)

### **COMMON SENSE PEST CONTROL QUARTERLY**

Olkowski, William (Ed.) Published quarterly

### **COMMON-SENSE PEST CONTROL**

Olkowski, William, Sheila Daar, Helga Olkowski 1991. The Taunton Press, Newtown, CT

### **AUDUBON SOCIETY of LANE COUNTY**

PO Box 5086, Eugene, OR 97405 (541) 485-2473  
<http://www.laneaudubon.org/>

### **UPPER WILLAMETTE SOIL & WATER CONSERVATION DISTRICT**

780 Bailey Hill Rd., Ste 5, Eugene, OR 97402 (541) 465-6443 x 102 [www.uwswcd.org](http://www.uwswcd.org)

### **BAT CONSERVATION INTERNATIONAL**

PO Box 162603, Austin, TX 78716  
(512) 327-9721 <http://www.batcon.org>

**FRIENDS OF TREES**

338 W. 11<sup>th</sup> Ave., Ste #103, Eugene, OR 97401  
(541) 632-3683  
<http://www.friendsoftrees.org/meet-us/tree-advocacy/eugene>

**LADY BIRD JOHNSON WILDFLOWER CENTER**

2600 FM 973 North  
Austin, TX 78725 (512) 929-3600  
<http://www.wildflower.org>

**LEACH BOTANICAL GARDEN**

6704 SE 122nd Ave.  
Portland, OR 97236  
(503) 761-9503 <http://www.leachgarden.org>

**NATIONAL WILDLIFE FEDERATION**

Backyard Habitat Program Hampden Station  
Box 50281 Baltimore, MD 21211-4281  
(703) 438-6000 <http://www.nwf.org>

**NATIVE PLANT SOCIETY OF OREGON**

2584 NW Savier St., Portland, OR 97210  
<http://www.npsoregon.org>

**THE NATURE CONSERVANCY**

87200 Rathbone Rd., Eugene, OR 97402  
(541) 343-1010 <http://www.nature.org>

**NW COALITION FOR ALTERNATIVES TO PESTICIDES**

PO Box 1393 Eugene, OR 97440  
(541) 344-5044 <http://www.pesticide.org>

**OREGON DEPT. OF ENVIRONMENTAL QUALITY**

165 East 7<sup>th</sup> Ave., Ste #100, Eugene, OR 97401  
(541) 686-7838 / (800) 844-8467  
<http://www.oregon.gov/DEQ>

**OREGON DEPT OF FISH AND WILDLIFE**

2509 SW 1st Ave. / PO Box 59  
Portland, OR 97207 (503) 872-5264  
<http://www.dfw.state.or.us>

**OREGON DIVISION OF STATE LANDS**

Permitting Stream Bank Repairs 775 Summer St  
NE Salem, OR 97310 (503) 378-3805 x 274  
<http://www.oregon.gov/DSL>

**OREGON WATER RESOURCES DEPT.**

955 Center NE Salem, OR 97310  
(503) 378-8455  
<http://egov.oregon.gov/OWRD>

**OREGON STATE UNIVERSITY EXTENSION SERVICE**

996 Jefferson St., Eugene, OR 97402  
(541) 344-5859  
<http://extension.oregonstate.edu>

**OREGON TILTH**

31615 Fern Rd., Philomath, OR 97370  
(503) 929-6742 <http://www.tilth.org>

**PACIFIC NORTHWEST CHAPTER INTERNATIONAL SOCIETY OF ARBORICULTURE**

PO Box 30713 Seattle, WA 98103 (206) 784-1945  
<http://www.pnwisa.org>

**THE XERCES SOCIETY**

4828 SE Hawthorne Blvd., Portland, OR 97215  
(503) 232-6639 [www.xerces.org](http://www.xerces.org)

**USDA NATURAL RESOURCES CONSERVATION SERVICE**

780 Bailey Hill Rd., Ste #5, Eugene, OR 97402  
(541) 465-644 [www.nrcs.usda.gov](http://www.nrcs.usda.gov)