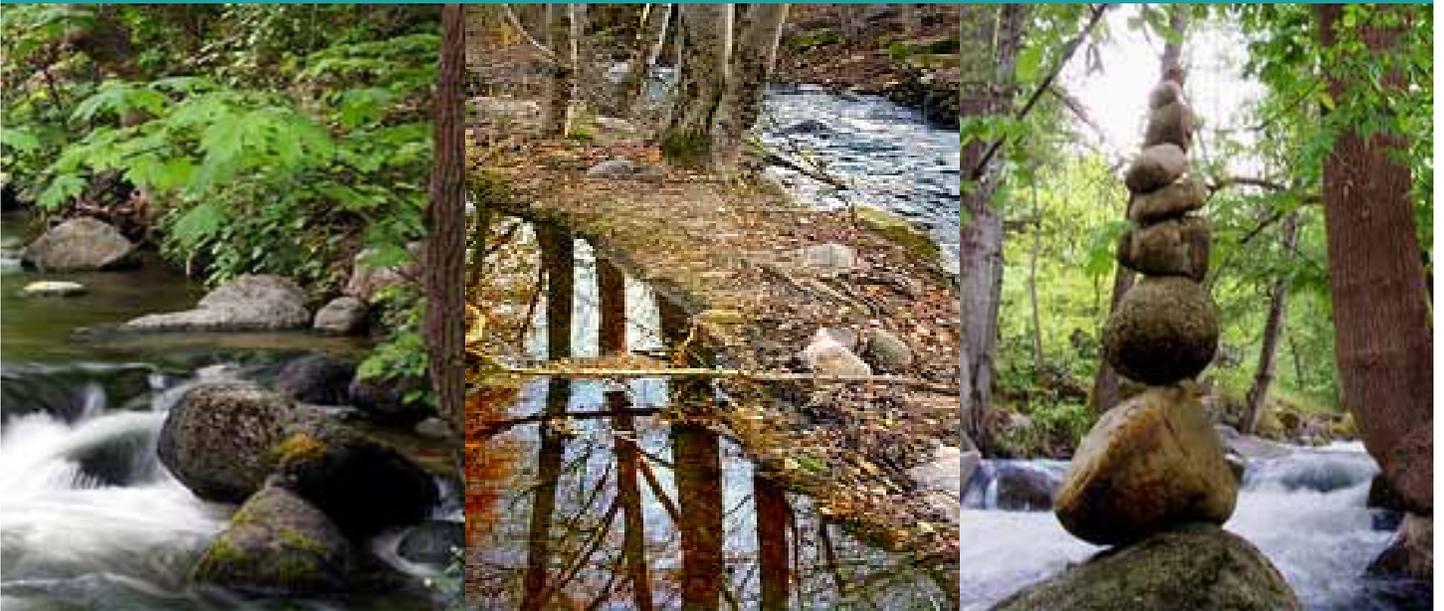


Stream & Wetland Enhancement Guide



CITY OF
ASHLAND



Department of Community Development
(541) 488-5305
www.ashland.or.us

Stream & Wetland Enhancement Guide

A healthy network of urban streams and wetlands protects water quality, reduces flooding impacts, provides fish and wildlife habitat, and enhances the beauty and livability of our community.



You can help protect and enhance these important natural resources by learning the techniques outlined in this guide. These techniques will help you control erosion, manage invasive plants, and cultivate a healthy, native landscape. This guide is arranged into sections to help you understand, design, plant and manage streamside vegetation.

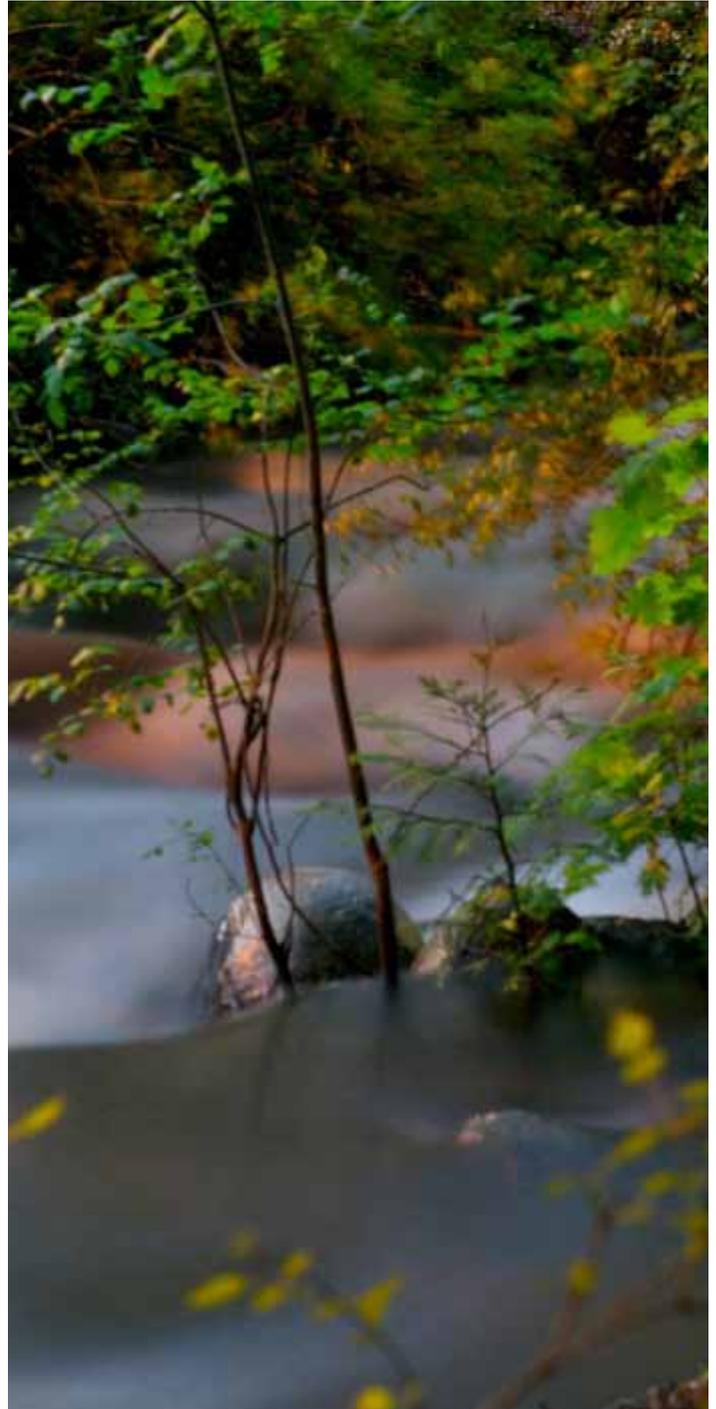
For more information about how you can protect your neighborhood streams and wetlands, and find out about regulations pertaining to the alteration of riparian and wetland habitats contact the City of Ashland Department of Community Development at (541) 488-5305 or visit the City's web page dedicated to Water Resources:

www.ashland.or.us/waterresources

Stream & Wetland Enhancement Guide

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1. Water Resource Protection Zones - Streams

A riparian area is the area of land adjacent to a stream. Healthy riparian areas reduce the chance of damaging floods, improve water quality and provide habitat and food for fish and wildlife. Plants in healthy riparian areas perform numerous functions:

- 1) provide wood to streams, creating fish habitat and slowing the stream current during and after storms,
- 2) shade streams in summer for fish health and minimize evaporation loss of water,
- 3) reduce erosion by holding soil in place with roots,
- 4) filter sediment out of muddy runoff, keeping sediment from smothering fish habitat,
- 5) allow heavy winter rains to soak into the soil instead of running into the stream providing a measure of flood protection,
- 6) filter out pollutants, such as fertilizers, pesticides and animal wastes and
- 7) provide important food sources, homes, shelter and travel corridors for wildlife, fish and other aquatic organisms.



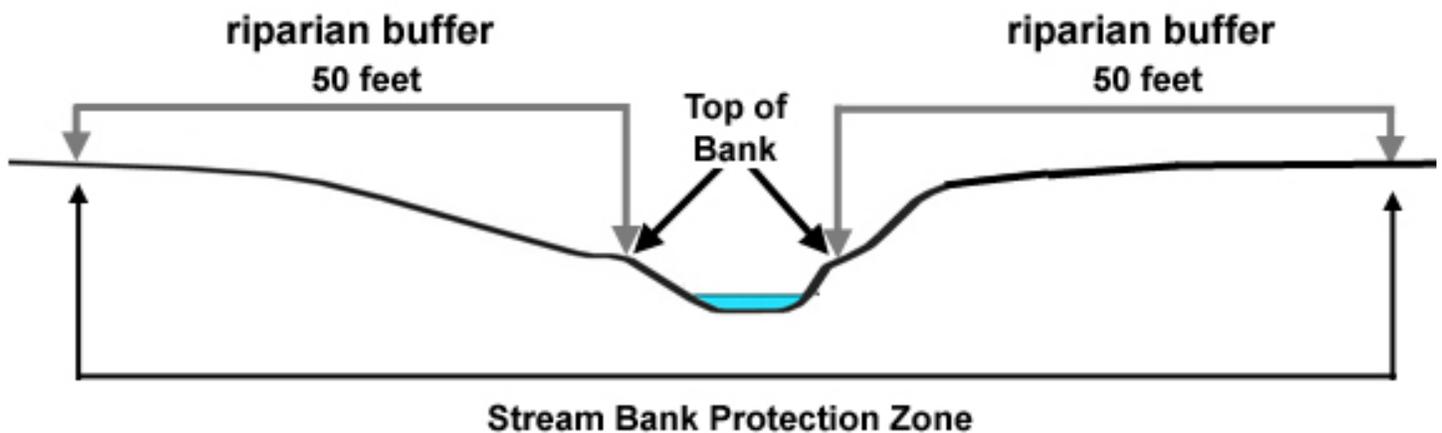
Healthy riparian areas include a variety of types and ages of plants including trees, shrubs, grasses and groundcovers. Plants adapted to local rainfall, climate, insects and soil conditions tend to be easier to care for because they need less water and pesticides.

Wetlands and riparian areas are now largely appreciated for the myriad of functions they provided to society as well as for their aesthetic and intrinsic values. Cities are increasingly finding the conservation of wetlands and riparian areas enhances community character and is an important quality of life measure. The preservation and restoration of water resources and incorporation of wetlands and riparian corridors in open spaces generally is considered a positive aspect of property, whether it is privately held or a public open space.

The City of Ashland's Land Use Ordinance (Chapter 18.63) establishes "**Water Resource Protection Zones**" which are defined below.

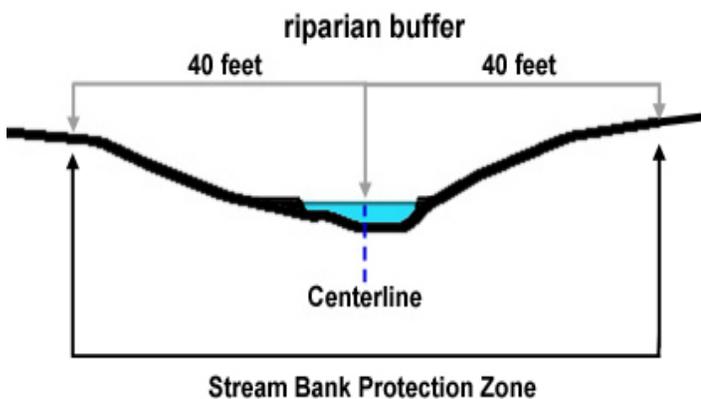
A *Stream Bank Protection Zone* is a type of Water Resource Protection Zone regulated by the City of Ashland.. There are three types of Stream Bank Protection Zones regulated by the City of Ashland. *Riparian Corridors*, *Local Streams* and *Intermittent and Ephemeral Streams*.

Riparian Corridor – For streams classified as Riparian Corridor fish-bearing streams with an annual average stream flow less than one-thousand (1,000) cubic feet per second and on the Water Resources Map, the Stream Bank Protection Zone includes the stream, plus a riparian buffer consisting of all lands within fifty (50) feet upland from the top of bank.



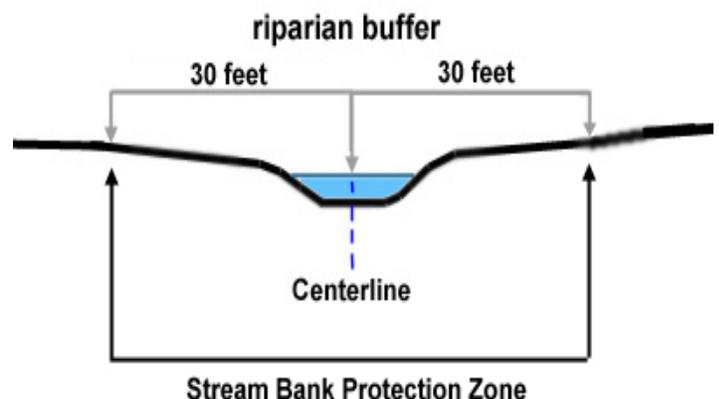
Local Streams

For streams classified as non-fish-bearing Local Streams and on the Water Resources Map, the Stream Bank Protection Zone includes the stream, plus a riparian buffer consisting of all lands forty (40) feet from the centerline of the stream.



Intermittent and Ephemeral Streams

For streams classified as Intermittent and Ephemeral Streams on the Water Resources Map, the Stream Bank Protection Zone includes the stream, plus a riparian buffer consisting of all lands within thirty (30) feet from the centerline of the stream.



Water Resource Protection Zones - Wetlands



Wetlands have historically been disparaged as nothing more than swamps and were commonly drained and filled to make way development. Fortunately, today there is a greater understanding of the critical function wetlands play in our environment. Wetlands are among the most biologically productive natural ecosystems in the world providing unique habitats that heavily influence the life cycle of native plants and animals.

The benefits of established wetlands include

- Support of many species of plants and animals
- Flood control
- Improved water control and quality
- Enhancement of recreational and educational opportunities.



A Wetland Protection Zone is an area that includes locally significant and other possible wetlands and is a type of Water Resource Protection Zone regulated by the City of Ashland Land Use Ordinance (Chapter 18.63). Within these sensitive areas certain human activities are regulated in order to protect the structures and functions of the wetland. The precise boundary of a wetland and wetland buffer is established by a *qualified wetland specialist** who conducts an on-site wetland delineation and a survey.

There are two types of Wetland Protection Zones defined by Ashland’s Ordinance: “Locally Significant Wetlands” and “Other Possible Wetlands”.

Locally Significant Wetlands – For wetlands classified as locally significant on the Water Resources Map, the Wetland Protection Zone consists of all lands identified to have a wetland presence on the wetland delineation, plus a wetland buffer consisting of all lands within fifty (50) feet of the upland-wetland edge.



Other Possible Wetlands – For wetlands not classified as locally significant on the Water Resources Map, the Wetland Protection Zone consists of all lands identified to have a wetland presence on the wetland delineation, plus all lands within twenty (20) feet of the upland-wetland edge. *Other Possible Wetlands* include all areas designated as such on the Water Resources Map and any unmapped wetlands discovered on site.



* A qualified wetland specialist is an individual who has the appropriate credentials verifying proven expertise and vocational experience conducting wetland delineations. Such individuals would include registered professional engineers, landscape architects, biologists, or other persons trained or certified in wetland mitigation, restoration, and enhancement methods.

2. Rogue Basin Native Plants

Trees

-   **Big Leaf Maple** (*Acer macrophyllum*)
-   **Vine Maple** (*Acer circinatum*)
-   **Red Alder** (*Alnus rubra*, suitable non-native)
-   **White Alder** (*Alnus rhombifolia*)
-   **Western Dogwood** (*Cornus nuttallii*)
-   **Black Hawthorne** (*Crataegus douglasii*)
-   **Oregon Ash** (*Fraxinus latifolia*)
-   **Western Crabapple** (*Pyrus fusca*)
-   **Pacific Willow** (*Salix lasiandra*)
-   **Scouler Willow** (*Salix scouleriana*)
-   **Dusky Willow** (*Salix exigua* ssp. *melanopsis*)
-   **Red Willow** (*Salix lavigata*)
-   **Incense Cedar** (*Calocedrus decurrens*)
-   **Ponderosa Pine** (*Pinus ponderosa*)
-   **Oregon White Oak** (*Quercus garryana*)
-   **California Black Oak** (*Quercus kelloggii*)
-   **Western Birch** (*Betula occidentalis*)
-   **Western Yew** (*Taxus brevifolia*)
-   **Oregon Myrtle** (*Umbellularia californica*)
-   **Prickly Currant** (*Ribes lacustre*)
-   **Black Cottonwood** (*Populus balsamifera*)

Understory Trees and Shrubs

-   **Serviceberry** (*Amelanchier alnifolia*)
-   **Red Osier Dogwood** (*Cornus stolonifera*, *sericea*)
-   **Brown Dogwood** (*Cornus galbrata*)
-   **Ocean Spray** (*Holodiscus discolor*)
-   **Indian Plum** (*Oemleria cerasiformis*)
-   **Pacific Ninebark** (*Physocarpus capitatus*)
-   **Nootka Rose** (*Rosa nutkana*)
-   **Thimbleberry** (*Rubus parviflorus*)
-   **Golden Currant** (*Ribes aureum*)
-   **White Flowering Currant** (*Ribes divaricatum*)
-   **Red Flowering Currant** (*Ribes sanguineum*)
-   **Blue Elderberry** (*Sambucus cerulea*)
-   **Huckleberry** (*Vaccinium membranaceum*)
-   **Red Huckleberry** (*Vaccinium parvifolium*)
-   **Oregon Grape** (*Mahonia aquifolium*, *Mahonia piperiana* or *Berberis aquifolium*)
-   **Sword Fern** (*Polystichum munitum*)
-   **Snowberry** (*Symphoricarpos albus*)
-   **California Hazel** (*Corylus cornuta* var. *californica*)
-   **Salal** (*Gaultheria shallon*)
-   **Oso-berry** (*Oemleria cerasiformis*)
-   **Oregon Boxwood/Oregon Boxleaf/ Mountain Lover** (*Paxistima myrsinites*)
-   **Chokeberry, Chokecherry** (*Prunus virginiana*)
-   **Native Azalea** (*Rhododendron occidentale*)
-   **Cluster Rose** (*Rosa pisocarpa*)
-   **Willow, Coyote** (*Salix exigua*)
-   **Willow, Arroyo** (*Salix lasiolepis*)
-   **Douglas Spirea** (*Spirea douglasii*)
-   **Western Viburnum** (*Viburnum ellipticum*)
-   **Cascara** (*Rhamnus purshiana*)
-   **Mountain Mahogany** (*Cercocarpus betuloides*)
-   **Deerbrush** (*Ceanothus integerrimus*)
-   **Dwarf Rose/Baldhip Rose** (*Rosa gymnocarpa*)

KEY



Consultation with a Landscape or Nursery Professional regarding specific site suitability is recommended.

Rogue Basin Native Plants

Riparian Wetland Plants

-   Scouring Rush (*Equisetum hyemale*)
-   Soft Rush (*Juncus effuses*)
-   Slough Sedge (*Carex obnupta*)
-   Creek Sedge (*Carex nudata*)
-   Creeping Spike-rush (*Eleocharis palustris*)
-   Baltic Rush (*Juncus balticus*)
-   Hardstem Bulrush (*Scirpus accutus*)
-   Small-fruited Bulrush (*Scirpus microcarpus*)
-   American Brookline (*Veronica americana*)
-   Wapato (*Sagittaria latifolia*)
-   Cattail (*Typha latifolia*)



Common Snowberry (*Symphoricarpos albus*)

Grasses

-   Orchardgrass (*Dactylis glomerata*, suitable non-native)
-   Bluejoint Reedgrass (*Calamagrostis canadensis*)
-   Idaho Fescue (*Festuca idahoensis*)
-   Roemer's Fescue (*Festuca roemerii*)
-   Meadow Barley (*Hordeum brachyantherum*)
-   Manna Grass (*Glyceria spp.*)

Wildflowers

-   Columbine (*Aquilegia formosa*)
-   Asters (*Aster chilensis* ssp. *hallii*, A. *subspicatus*)
-   Wild Ginger (*Asarum caudatum*)
-   Fireweed (*Epilobium angustifolia*)
-   Shooting Star (*Dodecatheon hendersonii*)
-   Woodland Strawberry (*Fragaria vesca*)
-   Colt's Foot (*Petasites frigidus*)
-   Lupines (*Lupinus rivularis*, L. *polyphyllus*)
-   Western Bleeding Heart (*Dicentra formosa*)
-   Cliff Penstemon (*Penstemon rupicola*)
-   Common Camas (*Camasa quamash*)
-   Insideout Flower (*Vancouveria hexandra*)

Vines

-   Western Clematis (*Clematis ligusticifolia*)
-   Orange Honeysuckle (*Lonicera ciliosa*)
-   Hairy Honeysuckle (*Lonicera hispidula*)
-   Greenbriar (*Smilax Californica*)
-   California Wild Grape (*Vitis californica*)



Western Clematis (*Clematis ligusticifolia*)

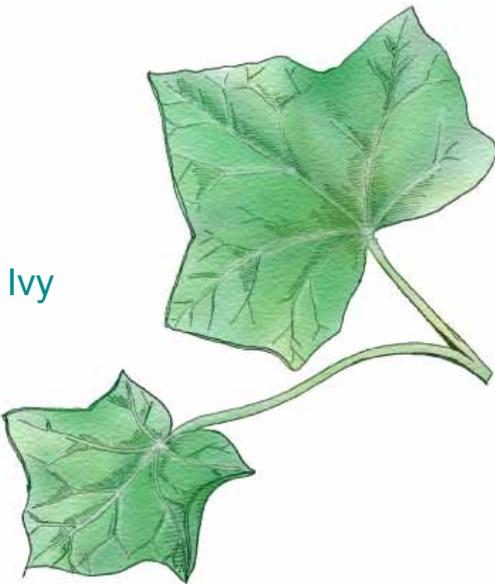
Please check with the Planning Department for the most current listing when selecting appropriate plants for landscapes within Stream Protection or Wetland Protection Zones, by contacting the City of Ashland Department of Community Development at (541) 488-5305 or visit the City's web page dedicated to Water Resources: www.ashland.or.us/waterresources

3. Noxious and Invasive Plants

The following plants, should **not** be planted in or near streams or wetlands as they have the potential to completely dominate all native plants. Existing stands of invasive or noxious plants in stream corridors and wetlands should be removed and replaced with native plants.



Scotch Broom



Ivy



Himalayan Blackberry

- English Holly (*Ilex aquifolium*)
- Yellow Water Iris (*Iris pseudacorus*)
- Purple Loosestrife (*Lythrum salicaria*)
- Bird's Foot Trefoil (*Lotus corniculatus*)

Common Invasive Species

- Scotch Broom (*Cytisus scoparius*)
- Japanese Knotweed (*Polygonum cuspidatum*)
- Ivy (*Hedera helix* and any *Hedera* spp.)
- Himalayan Blackberry (*Rubus armeniacus*)
- Reed Canary Grass (*Phalaris arundinacea*)
- English Laurel (*Prunus laurocerasus*)
- Periwinkles (*Vinca minor*, *V. major*)
- Bamboo spp. (several genera)

For the City of Ashland Prohibited Plant List, an up to date listing of noxious and invasive plants which are prohibited in riparian areas visit: www.ashland.or.us/waterresources.



More Prohibited Plants

Trees

- American Ash, seeded varieties (*Fraxinus americana*)
- Amur Maple (*Acer tataricum*)
- Buckeye or Common Horsechestnut (*Aesculus hippocastanum*)
- Black Locust (*Robinia pseudoacacia*)
- English Hawthorn (*Crataegus monogyna*)
- European Filbert (*Corylus avellana*)
- Fruiting Cherry species (*Prunus spp.*)
- Fruiting Plums (*Prunus spp.*)
- Green Ash, seeded varieties (*Fraxinus pennsylvanica*)
- Mountain Ash/ Rowan/ Rowan Berry (*Sorbus aucuparia*)
- Norway Maple (*Acer platanoides*)
- Norwegian Sunset Maple “Keithsform” (*Acer truncatum x Acer platanoides*)
- Pacific Sunset Maple “Warrenred” (*Acer truncatum x Acer platanoides*)
- Tree of Heaven (*Ailanthus altissima*)
- Running Bamboo (*Any species*)

Shrubs

- Butterfly Bush (*Buddleia davidii*)
- Cotoneasters (*Cotoneaster spp.*)
- Common Privet (*Ligustrum vulgare*)
- Dog Rose (*Rosa canina*)
- European Cranberry Bush (*Viburnum opulus*)
- Spanish Broom (*Spartium junceum*)
- Sweetbriar Rose (*Rosa eglanteria*)
- Scotch Broom (*Cytisus scoparius*)
- English Laurel (*Prunus laurocerasus*)
- Portugal Laurel (*Prunus lusitanica*)
- Himalayan Blackberry (*Rubus armeniacus*)
- Evergreen Blackberry (*Rubus lacianatus*)

Ground Cover and Vines

- Ivy (*Any species*)
- Multiflora Rose (*Rosa multiflora*)
- Periwinkle (*Vinca major & Vinca minor*)
- St. John’s Wort (*Hypericum calycinum*)
- Traveler’s Joy (*Clematis vitalba*)
- Virginia Creeper (*Parthenocissus quinquefolia*)

Perennial and Grasses

- Fennel (*Foeniculum vulgare*)
- Giant Reed, or Cane (*Arundo donax*)
- Italian Arum (*Arum italicum*)
- Lemon Balm (*Melissa officinalis*)
- Mints (*Mentha spp.*)
- Yellow Flag Iris (*Iris pseudoacorus*)
- Giant Horsetail (*Equisetum telmateia*)
- Giant Knotweed (*Polygonum sachalinense*)
- Japanese Knotweed (*Polygonum cuspidatum*)
- Leafy Spurge (*Euphorbia esula*)
- Puncture Vine* (*Tribulus terrestris*)
- Purple Loosestrife (*Lythrum salicaria*)
- Star Thistle (*Centaurea solstitialis*)
- Tansy Ragwort (*Senecio jacobaea*)
- Pampas Grass (*Cortaderia jubata*)



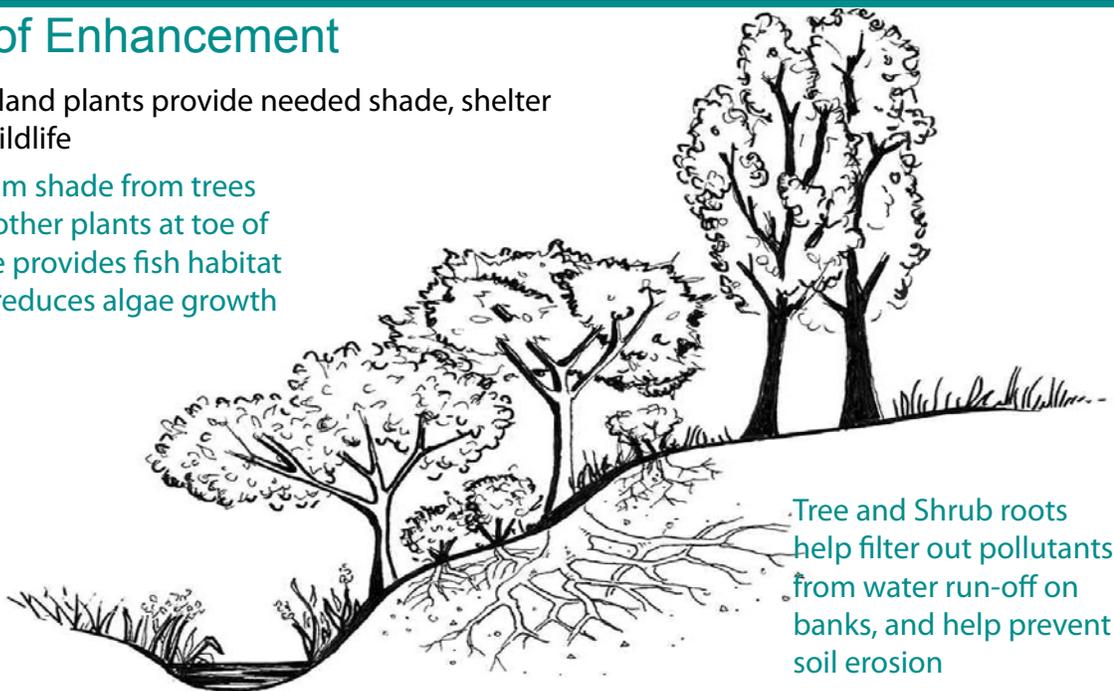
St. John's Wort (*Hypericum calycinum*)

4. Planting and Managing Streamside Vegetation

Benefits of Enhancement

Riparian woodland plants provide needed shade, shelter and food for wildlife

Stream shade from trees and other plants at toe of slope provides fish habitat and reduces algae growth



Tree and Shrub roots help filter out pollutants from water run-off on banks, and help prevent soil erosion

Native Planting Area

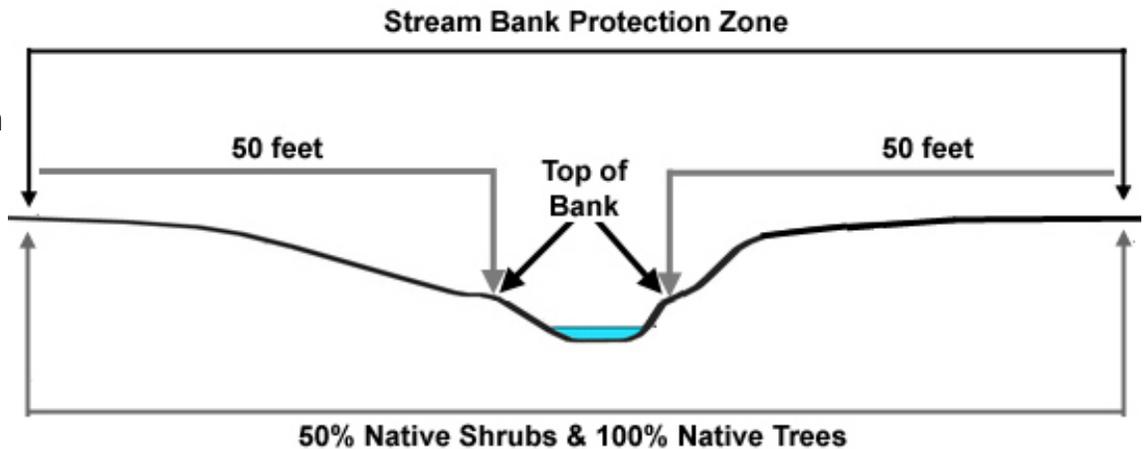
Local Native Plant Species are those plant species appropriate to planting in or adjacent to a Water Resource that are native species indigenous to the Rogue River Basin. Local native plant species are adapted to the elevation, weather, soils and hydrology of the area and will support the desired structures, functions, and values of the water resource. Once established these plants require significantly less maintenance than non-native species

To determine the most appropriate native plants for your property, use your site characteristics, and use the Native and Prohibited lists (contact the Community Development Department for up-to date listings) to select appropriate plants. As an on the ground guide, check out the types of native plants that are growing on undisturbed shorelines near your property or on adjacent properties with similar conditions to determine what plants are well suited for your conditions.

By City Ordinance (see below 18.63.120.B.c.1) the area from the centerline of the stream to the upland edge of the Stream Protection Zone shall be planted predominately with native plants. Additionally all new trees within the Stream Protection Zone shall be native species. In all cases the use of noxious and invasive plants as identified in the City of Ashland's Prohibited Plant List (see section 3 of this guide) within Water Resource Protection Zones is strictly prohibited.

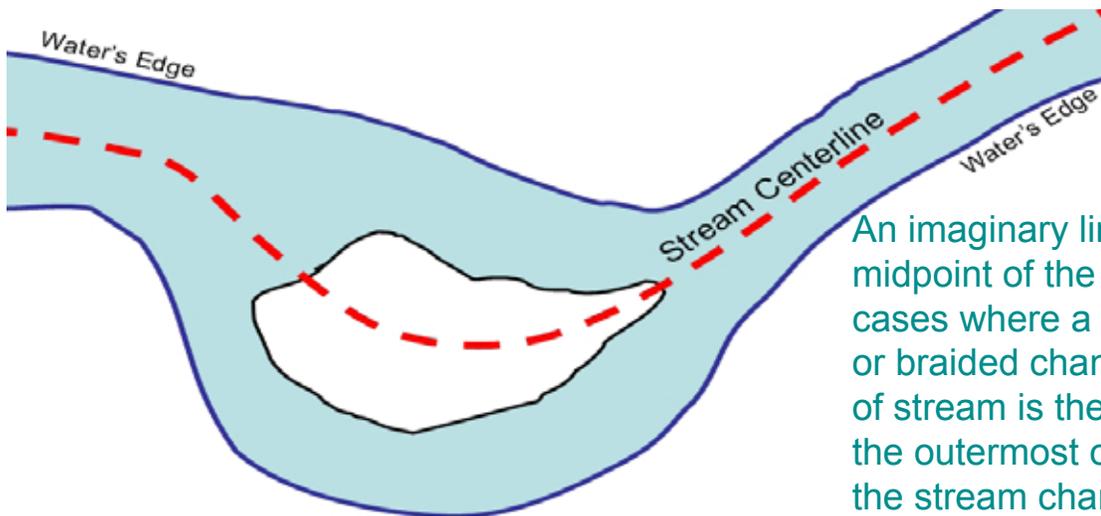
Ashland Municipal Code 18.63.120.B.1.c: The Stream Bank Protection Zone shall be a minimum of 50% plant coverage in local native plant species with the installation of new trees only to consist of native trees. The Wetland Protection Zone shall be 100% plant coverage in local native plant species and in accordance with local, state and federal approved management plans. Local native plant species for stream bank and wetland applications are identified on the City of Ashland's Local Native Plant Species List. The use of noxious and invasive plants on the City of Ashland's Prohibited Plant List in Water Resource Protection Zones is prohibited.

The diagram to the left illustrates the requirement that within Stream Bank Protection Zones at least half of all plantings shall be Native Plants, and 100% of all trees shall be native as designated in Chapter 18.63 of the Ashland Land Use Ordinance.



The City of Ashland Department of Community Development maintains a list of recognized site-appropriate local native plant species for both wetland and stream bank water resource applications, along with a list of known local suppliers. In this guide you can find a listing of Native plants in section 2, however as plants may be added to or removed from the Local Native Plant List (as approved by the Staff Advisor and the City Horticulturist) **please check with the Planning Department for the most current listing when selecting appropriate plants for landscapes within Stream Protection or Wetland Protection Zones.**

Centerline of Stream



An imaginary line that is in the midpoint of the stream channel. In cases where a stream has multiple or braided channels, the centerline of stream is the midpoint between the outermost or upland sides of the stream channels

Upon determining the classification of the stream on your property (*Local Stream, Intermittent and Ephemeral Stream, or Riparian Corridor*) refer to the full ordinance (Chapter 18.63) for the required width of the Stream Bank Protection Zone for that specific classification, to determine the corresponding native planting area that applies to your specific stream frontage.

Managing Streamside Vegetation

Watering

After planting native vegetation, irrigate trees and shrubs for five years during the summer dry period. Mulch to retain moisture. Native grasses and wildflowers need no supplemental irrigation. The pre-existing natural vegetation, and the natural transition to dry upland plants, should be considered when establishing the watering needs of new plantings.

Controlling Insects, Diseases and Undesirable Plants

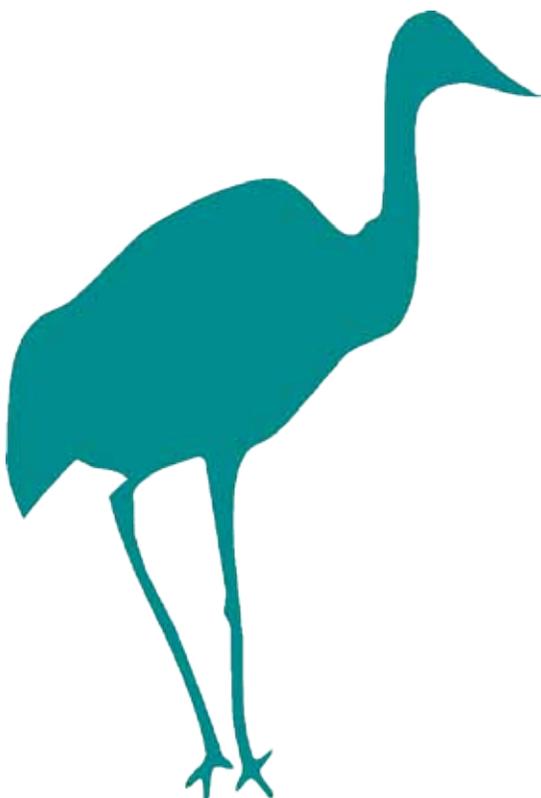
Generally, native plants do not require the use of insecticides or fungicides, and the use of such can be hazardous to native plants and wildlife if introduced into riparian or wetland area or waterways. For more information on pesticide use contact the OSU Extension Service at (541) 773-7671. For information on herbicide use refer to section 9 of this guide.

Fertilizing

Native trees and shrubs may benefit from a spring application of an organic fertilizer for two years after planting. Chemical fertilizers may contain high levels of phosphorus or other chemicals which in excess, can cause waters to become polluted by promoting excessive growth of algae and other aquatic plants. Therefore the use of chemical fertilizers is prohibited in a Water Resources Protection Zone within Ashland. Native grasses and wildflowers require no fertilizer.

Other Maintenance Practices

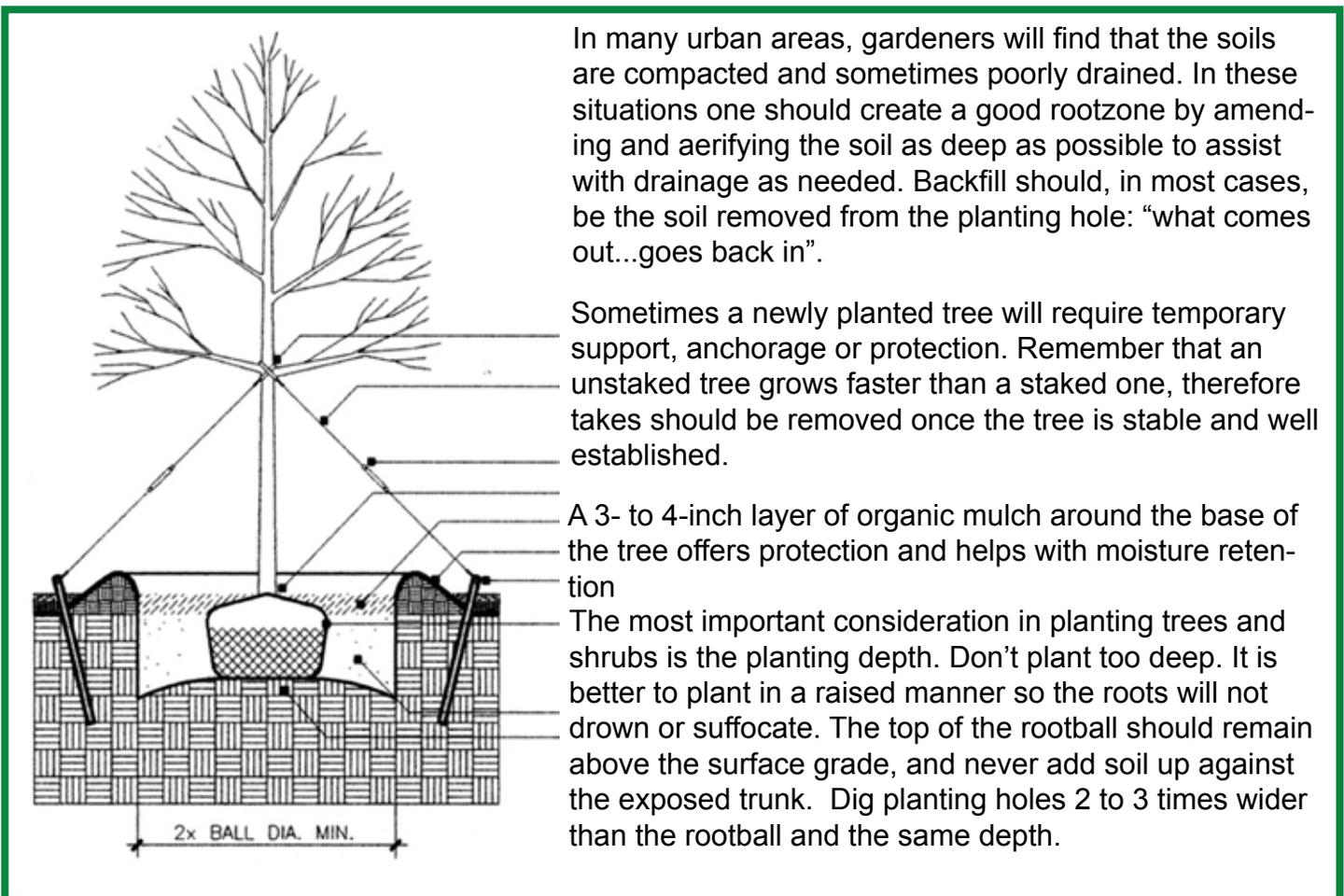
The pruning of native trees and shrubs is not required. Native grasses benefit from a once yearly high mowing or string line trimming. New plantings should be protected with wire netting to prevent damage from wildlife (see section 6).



5. Planting Techniques

When making landscape planting selections, one must consider the specific conditions of the site (shade vs. full sun, dry vs wet, soil type, etc) in order to determine which plants are best suited to these specific characteristics . One of the advantages of selecting native plants, is that they are adapted to the soil, moisture, and weather conditions of the area and as such need less maintenance over time.

Once you've selected an appropriate native tree, or shrub, ensuring its survival requires proper planting techniques. A properly planted tree or shrub will be more tolerant of adverse conditions and require much less management than one planted incorrectly. Planting technique ultimately impacts water quality as it minimizes water, fertilizer and pesticide use.



Always remember to give your plants room to grow to their mature size.

6. Plant Protection

Protection of new plantings from foraging wildlife will be necessary to assist in the establishment of trees and shrubs.

Rigid mesh protection tubes as pictured can provide protection to allow new plantings to mature without falling victim to damage from wildlife. These mesh tubes, staked in place to prevent movement, are an effective barrier device to prevent deer, and rodent damage of new plantings. Mature trees may continue to be subject to animal damage in which case wire netting can continue to be a useful physical barrier.

The best protection consists of encircling individual trees and shrubs with a securely fastened, stiff woven or webbed wire with a mesh no larger than one and a half to two inches. Tree protection should be at least 30 inches high or even 48



inches in certain situations. Protection is important even in cases where your new plantings are not the preferred food for foraging wildlife as any planting may be “taste tested” if preferred food trees are scarce.

Allowing light to penetrate the protection tube is necessary to allow natural growth of the new planting. If the tube is constructed of a solid material with poor light transmission properties, the plant will stretch upward toward the opening at the top at an accelerated rate. Ventilation is

necessary to prevent heat build up and to allow the circulation of fresh air to the new plantings. For these reasons solid protection tubes are not advised. Protection tubes with all of these qualities are available commercially, or all the materials necessary to make a custom tube are readily available at local hardware and landscape supply stores.

If the diameter of the tree is within one-half inch of the diameter of the tree shelter, the shelter needs to be removed or enlarged to accommodate future growth of the tree.

On an annual basis it is good practice inspect the protection tubes, remove any ground vegetation which may have grown inside the tree shelter, adjust any ties or strapping to accommodate growth of the tree. This inspection is also a good opportunity to check stakes and replace any which may have broken or come loose over the year.



7. Streamside Stabilization and Erosion Control

Streamside Erosion

Soil erosion occurs whenever water meets land with enough force to move soil. Throughout Ashland this occurs along streambanks and especially along stream banks with bare soil. Streambank erosion can be dramatic, especially after large rainfalls or floods. However, normal streamflows, excess runoff from urbanized areas and irrigation can continually erode soil.

Traditional methods of controlling streamflow and wave-induced erosion have relied on structural practices like rip rap, retaining walls and sheet piles. In many cases these methods are expensive, ineffective or socially unacceptable.

An alternative approach is bioengineering, a method of construction using live plants alone or combined with dead or inorganic materials, to produce living, functioning systems to prevent erosion, control sediment and provide improved habitat for fish and wildlife. Bioengineering uses combinations of structural practices and live vegetation to provide erosion protection for hillslopes, streambanks and lakeshores.

When To Seek Expert Help

Bioengineering consultants are available to help with all aspects of site assessment, design and installation. Their input could make the difference between success or failure. Although bioengineering techniques can be used successfully to stabilize the streambank, and reduce erosion and improve habitat by the homeowner without input from consultants, it is best to consider expert help if characteristics of your site are such that significant erosion and steep stream banks are present. Further if any alteration of the slope bank grade is intended, existing trees are expected to be removed, or construction adjacent to or within the stream bank protection zone is proposed, then local and state permitting may be required. In such circumstances contact the City of Ashland Department of Community Development prior to undertaking any such activity.

The description above and a number of the illustrative graphics in this section are excerpted from the publication: *Bioengineering for Hillslope, Streambank and Lakeshore Erosion Control* by Thomas G. Franti, Water Management Specialist

<http://www.ianrpubs.unl.edu/epublic/pages/publicationD.jsp?publicationId=562>

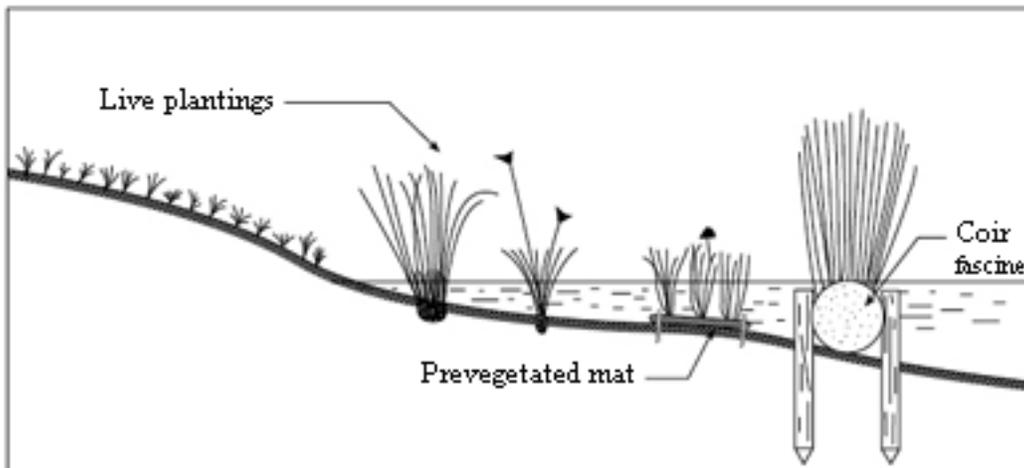


Note: Local and State permits may be required.

Streamside Stabilization and Erosion Control

Advantages of bioengineering solutions are:

- 1) low cost and lower long-term maintenance cost than traditional methods;
- 2) low maintenance of live plants after they are established;
- 3) environmental benefits of wildlife habitat, water quality improvement and aesthetics;
- 4) improved strength over time as root systems develop and increase structural stability; and
- 5) compatibility with environmentally sensitive sites or sites with limited access.

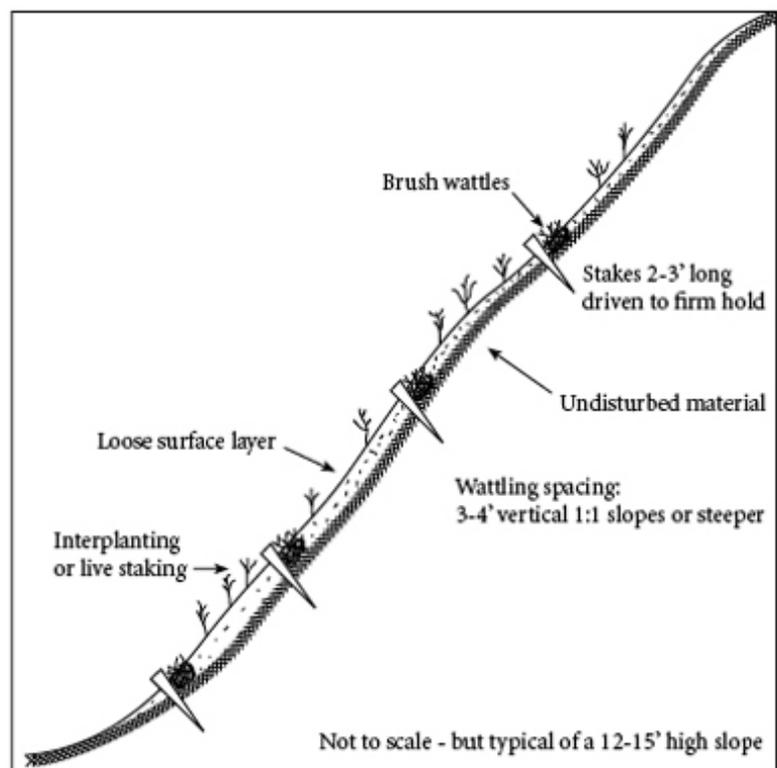


Live Cuttings and Plantings

Once established live vegetation secures materials in place. However, even at the initial planting and use of live cuttings (as stakes) can also function to provide immediate stabilization benefits.

Contour Wattling (Fascine Bundles)

This method is used to control surface erosion by breaking long slopes into shorter slopes. Bundles of branches 8-10" in diameter secured with twine, called wattles or fascines, are placed in shallow trenches along the slope or streambank contour. Trenches are excavated by hand to half the diameter of the bundles. After the wattle is staked in place, the trench is backfilled until only the top of the bundle is exposed. Wattles can be used for hillslope restoration, road embankments, wide gullies or slump areas.



Note: Local and State permits may be required.

Streamside Stabilization and Erosion Control

Brush Layering

Brush Layering is a procedure which uses live cut branches along the slope of an eroding shoreline. The cut ends of branches are placed in a trench at the toe of the slope and anchored with a wattle (a wattle is a bundle of twigs bound into cylinders essentially creating a densely filled fiber log). The branches are secured by a grid of stakes and jute rope, wire or other material. The live cut branches sprout and take root, thus stabilizing the shoreline with a dense matrix of roots. Additional toe protection may be needed to resist scour and undercutting.



Brush Layering pictured

Stakes or Live Cuttings

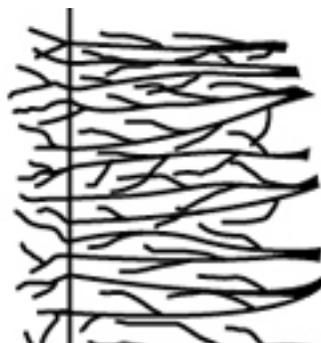
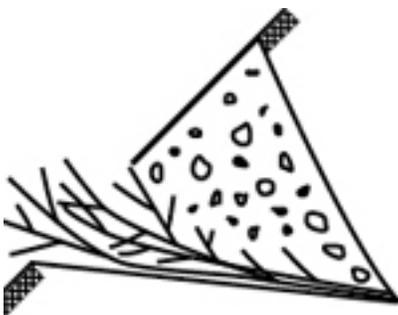
This method requires the use of 2-3 foot long stakes driven at an angle into the slope. The use of live, rootable vegetative cuttings, often willow (*Salix* spp.) or other species appropriate for the riparian protection zone, help protect eroding shorelines as rooting furthers the stabilization. The cuttings are tamped into the soil, sprout and take root, stabilizing the streambank with a dense matrix of roots.



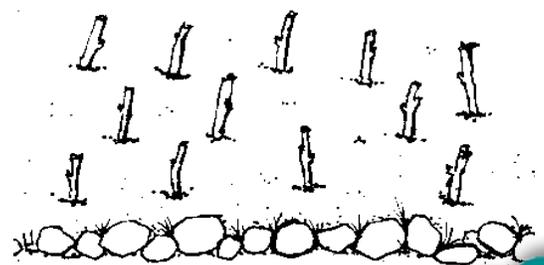
Pole Cutting Installation pictured

The plant material is installed during the fall or spring when the original plant (and consequently cuttings from it) are dormant. Woody plants which have good rooting characteristics make good staking plant stock. Stakes are generally 2 to 3 feet long and 1/2 to 1^{1/2} inches in diameter and can be collected from sections or branches of plants from donor sites.

Brush Layering cross section and Plain View



Live Cuttings



Flow →

Note: Local and State permits may be required.

8. Plant Communities

Riparian Woodlands

Tips for Enhancing the Woodland Plant Community

Plant riparian woodland plants and trees in upland areas to improve quality of water run-off and reduce erosion

Use native trees, shrubs, grasses and wildflowers planted for shade and erosion control and habitat enhancement in riparian corridors



Don't Dump oil and litter in storm drains.

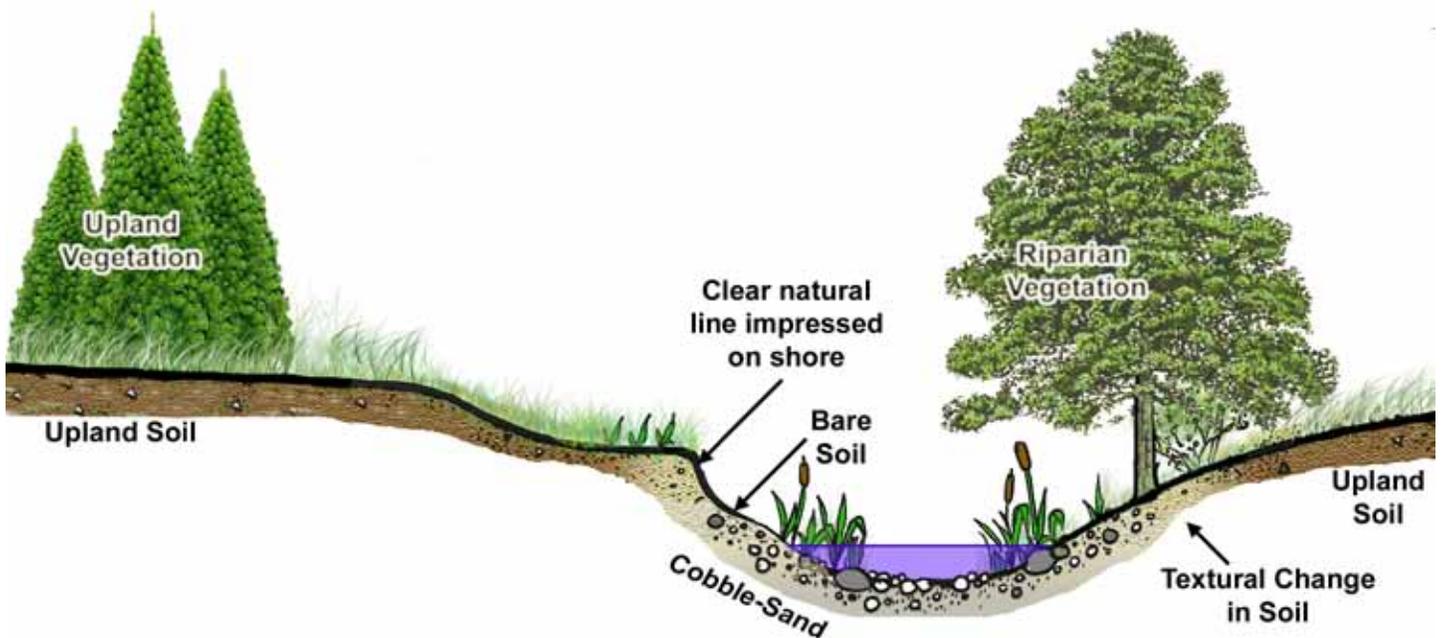


Don't throw garden debris or garbage on stream banks or in the water.

Consider a wildflower mix as an attractive alternative to lawn.

Remove English Ivy, Blackberries, and other invasive exotics and replace with native plants.

Stabilize streambanks with bioengineered methods to reduce erosion and establish plantings.



Plant Communities

Wetlands

A wetland's most familiar visual feature is the varied vegetation that typically denotes the presence of standing water. However, long periods of flooding and periodic drying create unique conditions within a wetland plant community and native wetland plants are specifically adapted to these fluctuations in environmental conditions. It is important to recognize the constraints of this unique environment when planning a wetland enhancement project. Plant communities established in new or improved wetlands will fare better if they closely resemble communities in similar, local wetlands.

To increase the likelihood of a successful wetland rehabilitation it is suggested that project managers:

- 1) Select herbaceous species that rapidly stabilize the substrate and that have potential value for fish and wildlife;
- 2) Select species that are adaptable to a broad range of water depths. A survey of vegetation at local wetlands of the type being created or restored can identify the conditions of "wetness" needed by native species;
- 3) Avoid choosing only those species that are commonly foraged by wildlife expected to use the site (deer and geese have been known to denude sites);
- 4) Avoid committing significant areas of the site to species that have questionable potential for successful establishment.

Garbisch, 1986; Marble, 1990; Pacific Estuarine Research Laboratory



9. Use of Herbicides

Once a noxious or invasive species becomes well established its control can be difficult. The City strongly recommends using mechanical methods of removal such as mowing and hand removal where effective. With persistence a property owner can remove unwanted blackberries and other invasives without using herbicides.

In some cases mechanical removal alone may prove ineffective at eliminating the invasive species from the sensitive habitat. In such cases the removal of problematic invasives can necessitate the selective use of herbicides.

- In recognition that the use of herbicides in sensitive wetland and riparian areas may degrade water quality, harm aquatic organisms, and potentially harm native vegetation it is imperative that their use be limited and selective.
- Herbicide use should not be used for ongoing maintenance.

It is critical that the application of herbicides in riparian and wetland areas is done in a manner to avoid injurious spray drift and contamination of the water. Working with a certified professional* (see definition below) is highly recommended and will ensure the following:

- Use of products that are specifically labeled for aquatic use, used in conformance with their product labels, thus minimizing the risk for fish and other aquatic organisms. Non-target plants and animals need to be protected from negative effects of any applied herbicides.
- Where herbicide treatment of noxious or invasive plants is necessary within the riparian zone, a professional applicator will select treatment methods and chemical concentrations so that herbicide application is both minimized and most effective.
- A certified professional will be able to carry out application of herbicides consistent with local, state, and federal laws.

* A certified professional is someone who has obtained a License either as a Commercial Pesticide Operator, Commercial Pesticide Applicator, or Public Pesticide Applicator through the Pesticides Division of the Oregon Department of Agriculture.

To qualify for a license such professionals have demonstrated their knowledge of how to apply pesticides safely and correctly by passing the State written pesticide certification test(s). To determine if the company or individual you have selected to apply herbicides on your property maintains a valid licence through the State of Oregon you can search for the business here:

<http://oda.state.or.us/dbs/licenses/search.lasso?&division=pest>

Note: Local and State permits may be required.

Use of Herbicides

To ensure herbicides are selected and appropriately applied to limit risk to stream and wetland habitats, enlisting the services of a certified professional* is recommended.

The use of all herbicides must be in strict conformance with the product's label. Certified professional applicators will understand and follow the complex label information precisely, so no harm will result from misuse or mishandling of the herbicide. It is illegal to use a product in any way that is inconsistent with its label. Depending on the noxious or invasive plant to be removed, the herbicide concentration, application method, and time of use, will vary and thus application by a certified professional is the best way to ensure success.

Although **Roundup™** is a herbicide containing glyphosate, it also contains *surfactants* or other adjuvants that would be harmful in riparian and wetland areas, and thus **Roundup should not be used in these sensitive areas.**



Management Plan

To create and restore healthy native plant communities, the long term control of invasive plant species is critical. To achieve this goal, property owners need to, remove existing invasive plant infestations, control new invasives promptly, and conduct follow up inspection of treated sites to prevent reestablishment of problematic non-native species.

Due to the propagation methods and herbicide sensitivity of various invasive species, a management strategy needs to be developed to maximize the long term effectiveness of the initial removal. Planting desirable seeds or nursery stock once the invasives are removed is often critical to long term success.

An ongoing riparian and wetland management plan that incorporates the ongoing efforts to control problematic invasive plants, establish native plants, limit erosion, and protect and maintain the area is a vital component to a successful restoration.

For further information on requirements regarding enhancement and mitigation plans within Water Resource Protection Zones please review chapter 18.63.070 of the Ashland Land Use Ordinance.

There are specific restrictions on herbicide use along salmon-bearing streams

If your property includes or is the immediate proximity of such streams you need to be aware of and abide by these restrictions. Bear Creek, Ashland Creek, and Neil Creek, are all such creeks within the Ashland area. A Map of all covered streams in Jackson County can be found here:

<http://oregon.gov/ODA/PEST/docs/pdf/jackson.pdf>

As a result of a lawsuit filed against the Environmental Protection Agency (EPA) by the Washington Toxics Coalition (2002, and 2004), a federal judge has ordered that "buffer zones" be placed around salmon bearing streams for the application of certain pesticides. The limits of this ruling continue to change upon judicial review, for the most up to date limitations visit this website:

<http://egov.oregon.gov/ODA/PEST/buffers.shtml>

Note: Local and State permits may be required.

10. Additional Resources

Riparian Tree Planting in Southwest Oregon

M. Bennett and G. Ahrens 2007, Oregon State University

<http://extension.oregonstate.edu/catalog/pdf/em/em8893-e.pdf>

Managing Himalayan Blackberry in Western Oregon Riparian Areas

M. Bennett, EM884 2007, Oregon State University

<http://extension.oregonstate.edu/catalog/pdf/em/em8894.pdf>

USDA National Plant Database System

<http://plants.usda.org>

Citizens Guide to Stream Restoration, Izack Walton League, 1995.

Books, pamphlets and videos
(800) 284-4592

Gardening with Native Plants of the Pacific Northwest

Kruckeberg, University of Washington Press, 1982.

Going Native: Biodiversity in Our Own Backyards

Rice, Wilson 4 West, 1994.

Redesigning the American Lawn

Dorman, Dalmori and Gaballe, Yale University Press, 1993.

The Natural Habitat Garden, Druse Clarkson Potter Publishers, 1994.

Pacific Estuarine Research Laboratory,
Garbisch, 1986; Marble, 1990

Organizations

Native Plant Society of Oregon,
2584 NW Savier Street,
Portland, Oregon 97210.
www.npsoregon.org.

Rogue Valley Council of Governments
PO Box 3275,
Central Point, Oregon 97502

The Wetlands Conservancy,
Provides organizational and technical assistance to stream and wetland groups. They also have a variety of brochures, guides and videos.
(503) 691-1394

Native Plant Resources

Althouse Nursery,
Cave Junction, Oregon
(541) 592-2395.

Callahan Seed,
Gold Hill, Oregon
(541) 855-1164

Forest Farms,
Williams, Oregon
(541) 846-7269
www.forestfarm.com

Plant Oregon,
Talent, Oregon
www.plantoregon.com
(541) 535-3531

Siskiyou Nursery,
Medford, Oregon
(541) 772-6846
www.wave.net/upg/srpn/



Stream & Wetland Enhancement Guide

The materials provided in this Guide are for informational purposes only. The current City ordinance regulating activities in Water Resource Areas, up to date Native and Prohibited Plant lists, approved Herbicide listing and a detailed map of inventoried Water Resource Areas can be viewed online at:

<http://www.ashland.or.us/waterresources>

Guide Developed by the City of Ashland Department of Community Development
Assistance provided by the Rogue Valley Council of Governments Water Resources Department, and Ashland Parks Department



**CITY OF
ASHLAND**

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www.ashland.or.us.