

Riparian and Wetland Restoration Planting Guide for the Boise and Payette River Basins, Idaho



Grimes Creek riparian habitat, before restoration and mine tailing removal (left); Mores Creek riparian habitat, 6 years after restoration and mine tailing removal (right). Photos by Chris Murphy.

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INTRODUCTION

The purpose of this guide is to help landowners, communities, the U. S. Forest Service, and others decide which plants are most appropriate for restoring riparian and wetland habitats at their site of interest. The guide is focused on the Boise and Payette River basins, but adjacent areas, such as the upper South Fork and Middle Fork of the Salmon River and Johnson Creek, are encompassed. We have included background information to emphasize the importance of riparian and wetland restoration and introduce some of the processes creating these habitats in our watersheds. A list of information resources and potential sources of native plants is included at the end. We hope it reaches the broadest audience and increases the knowledge and desire to restore these important and beautiful habitats for future generations.

What are riparian and wetland habitats, and why are they important?

Riparian habitats include the typically dense and lush vegetation growing along streams, rivers, springs, wetlands, ponds, and lakes. They are made up of specially adapted plants that are, for at least part of the year, dependent on the presence of water, such as from flooding and high water tables fed from adjacent water bodies through the soil. They are the transition zone between aquatic or wetland habitats and dry uplands. Importantly, not all riparian and wetland habitats are alike--their characteristics are expressions of the watershed environment they occur in. Riparian habitats often form on sand, silt, and gravel deposited from river and stream flooding, such as on islands and bars, banks, and terraces. They often consist of areas influenced by frequent flooding (such as every year or every other year) and areas located above the height of frequent flooding, but still low enough in the valley bottom where plants can tap into groundwater and where floods still occur, but much less frequently.

Streams and rivers in the Boise and Payette River basins provide us with drinking and irrigation water, habitat for fish and aquatic life, and, of course, water to float our rafts and kayaks, take a swim in, or cast a line on a hot summer day. Think of riparian habitats as ribbons of green that protect the streams and rivers. They are the fortress of green that keep the sandy and gravelly stream banks from washing away during our spring floods. They slow the runoff of spring snow melt, lessening the amount of flooding. Riparian habitats can capture silt or other pollutants that enter streams during floods, even helping to build their own soil. Riparian areas and wetlands buffer streams and rivers from sediment eroding from upslope land uses, stormwater runoff from urban areas, as well as underground septic system drainage. Riparian trees and shrubs shade streams and rivers, helping to reduce stream temperatures in the summer. By doing this, they help maintain cool, clear, and clean streams flowing late into the summer. Trout require water less than about 60 degrees F for spawning. Pools and riffles in streams do not become silted in. Streams meander as much as the valley allows. Large chunks of wood

falling into streams from riparian trees and big shrubs create habitat for insects and fish, and feed nutrients into the aquatic ecosystem.

Although riparian and wetland habitats occupy only about 3% of the land in Idaho, they are vital for many birds, fish, amphibians, mussels, and other wildlife (e.g., bats, moose, and beaver), as well as the insects, spiders, and plants that feed them. Almost half of Idaho's bird species nest in riparian habitat, and wetlands are nesting habitat for almost another third. About 10% of Idaho's birds are completely dependent on these habitats and rarely found anywhere else.



Beneficiaries of healthy riparian habitat. Wild rainbow trout, North Fork Boise River (left), and bull moose on Silver Creek (right). Photos by Chris Murphy.

What is the problem?

While the riparian habitat of many streams and rivers in the Boise and Payette River basins is in good or excellent condition, it is also clear that the legacy of historic activities and current land uses have left scars on many of our most important riparian and wetland habitats. This is especially true in our wider, low elevation valleys where most homes and towns occur.

Improper, or too much, livestock grazing and browsing can decrease or eliminate seedlings of black cottonwood, aspen, willow, and other trees and shrubs, as well as preferred native grasses, sedges, and forbs. Farming practices also sometimes negatively impact native riparian plants and animals. As deeply rooted native plants are reduced, noxious weeds and other invasive, non-native species sometimes sprout on exposed soil and thrive with the lack of competition. Stream and river banks also sometimes collapse from the force of livestock trampling and trails. Similar effects can occur from any excessive amount of ground-disturbing activities, including trails and roads in riparian areas created by off-road vehicles, motorcycles, mountain bikes, and camping. Even too many fisherman trails can cause damage (yes, we can love our streams too much). These impacts have resulted in less shading of streams, excessive

amounts of sand and silt entering the stream and clogging trout spawning beds, and wider, shallower, and warmer streams throughout the Boise and Payette River basins.

Other land uses, including forest management, mining, building and maintenance of roads and highways, home and cabin construction, flood control, and the development associated with our small towns and cities (such as sewage treatment facilities) are all subject to regulations protecting our environment, streambeds, riparian habitat, and wetlands. However, together, current and past development has disrupted natural flows of streams and rivers, cleared or disrupted riparian habitat, filled wetlands, and decreased the ability of wildlife to fully use these habitats. Well-intentioned streambank stabilization techniques, such as planting non-native, invasive trees and shrubs, placement of large rocks (rip-rap), and dumping of large debris (like old cars), have displaced natural riparian habitat. Straightening streams or putting them into underground pipes or culverts also reduce habitat. Lawns stretching from homes to streambanks lack habitat and are prone to erosion. Historic mining that dredged stream beds and deposited cobble and gravel tailings in large piles within valley bottoms has had a major, long lasting negative impact on vast areas of riparian habitat, especially along Mores and Grimes Creeks. Although beaver populations have recovered in many of suitable streams within the Boise and Payette River basins, historic trapping eliminated this important creator of wetlands from many areas, resulting in lowered groundwater and less riparian habitat. Other on-going activities, such as diversions of streams for irrigation, can impact riparian habitats.



Low altitude aerial photo of dredge mine tailings along Grimes Creek, showing narrow bands of floodplain and discontinuous, degraded riparian habitat. Photo courtesy of Trout Unlimited.



Beaver dam on Grimes Creek. Beaver are important for natural recovery of degraded riparian habitat. Photo by Chris Murphy.

What does good or excellent condition riparian and wetland habitat look like?



Montane riparian habitat in excellent condition. Tenmile Creek, tributary of the South Fork Payette River (left), Lake Fork Creek, tributary of the North Fork Payette River (right). Photos by Chris Murphy.

Because rivers and streams are so variable due to the climate, elevation, bedrock, shape and steepness of valleys, soils, and other factors, the riparian habitats also vary in their appearance. They range from forests or dense shrublands to grassy meadows. However, in general, excellent forested riparian habitat in southern Idaho will have trees of multiple ages that form a canopy of several heights, including standing dead trees, or snags, that provide habitat for many species. There is typically several dense layers of shrubs underneath the trees, with grass-like and wildflower species (forbs) filling the few sunny gaps that exist. Shrubby riparian habitat will lack trees, but often have a few layers of shrubs of different heights. The more ages of trees and shrubs the better, from seedlings and saplings, to mature and old, or even dying, individuals. These habitats should be nearly continuous along the stream or river, ideally covering the banks and shading the water during much of the day. The broader and flatter the valley bottom, the wider the floodplain and riparian habitat tends to naturally be. Wetlands are often interspersed in low-lying areas and old oxbows or backwater sloughs of rivers. In contrast, streams in steep and narrow mountain valleys have narrower riparian habitat, but in some valleys the riparian trees and shrubs appear to blend seamlessly with adjacent vegetation of canyon slopes. In high mountain headwater valleys, glacial processes often created wide, gently sloped valley bottoms that now have narrow, winding, and deep streams that meander through lush, wet sedge meadows and willow shrublands.



Dense riparian vegetation effectively shading streams and stabilizing stream banks, Elk Creek (a lower montane tributary of Mores Creek) (left) and Belvidere Creek (a montane tributary of Big Creek) on Payette National Forest (right). Photos by Chris Murphy.

Watersheds—what are they and how do they influence riparian and wetland habitats?

Watersheds are areas of land divided by ridges, hills, and mountains within which all the rain and snowmelt ultimately drains into the same stream or river. They can be of any size, but for the purpose of this guide we are using 6th-level hydrologic units as delineated by the U. S. Geological Survey to define “watersheds.” Watersheds are important because any upstream disturbance or pollution impacts all landowners downstream in that watershed—it is all connected. All watersheds occurring within the larger Boise and Payette River basins were included because they share similar environmental conditions and vegetation.

Riparian habitats are dynamic. They have a range of plant communities occurring in balance with natural disturbance and flooding regimes that reflect the environment of the watersheds within which they occur. Key drivers in the function and formation of riparian and wetland habitats include climate, flooding regimes, bedrock, and soils. Climate influences the temperature of soils, precipitation timing and amount, snowpack size, and pattern of melting. Resultant flooding (hydrologic) regimes determine stream flow patterns and volume. Climate and hydrology, in turn, act upon bedrock. Erosion creates a variety of sediment types which form the basis for valley soils. Slope steepness and aspect (topography) and elevation, combined with past glaciations, affect drainage patterns, valley shapes, and valley sizes. All of these factors ultimately determine environments for riparian and wetland habitats. As a result, riparian and wetland habitats occurring in similar watersheds typically have similar vegetation.

Why restore riparian and wetland habitats?

The benefits of restoring riparian and wetland habitats are many and can save communities substantial amounts of money. Restoration can:

- maintain higher stream flows longer into the summer
- improve the fertility of soil and its ability to absorb rain and snowmelt
- raise the water table, making it more accessible to plants late into the summer
- keep water clear by reducing the amount of sediment entering the stream, benefiting water quality
- stabilize stream banks with lush, dense, and deep-rooted plants, preventing erosion
- increase the number of fish, wildlife, and plant species and their populations
- slow the flow of spring runoff, reducing the size and frequency of flooding
- improve the quality of recreation
- raise the value of your property

In wider valleys, riparian restoration can promote natural stream meandering. This process creates floodplains on inside bends of the channel where sand and gravel deposits form habitat for willows and black cottonwood tree seedlings to take root. Point bars alternate with deep pools that form on outside meander bends where overhanging shrubs and fallen logs create excellent cover for fish. Streams tend to become deeper and narrower, with an appropriate balance of deep pools and shallow, rocky riffles.



Foothill floodplain of Weiser River (left), showing high diversity of riparian habitats including coyote willows on the point bar and an old growth black cottonwood forest with a mature tall-shrub understory on high terraces. Photo by Ed Bottum.

What are native plants and why should they be planted?

A key feature of any excellent riparian or wetland habitat is that it is dominated by native plant species. Native plants, for the purpose of this planting guide, are those that grew naturally or evolved in the Boise and Payette River basins before humans introduced plants from distant places. This is not to say that humans aren't part of the natural world, nor to discount the role Native Americans had in moving plants and cultivating them for food. However, in general, native plants have grown in an area long enough (such as since the last ice ages, about 10,000 years ago) to be specially adapted to the current local climate, soils, and moisture found in the region. And what we consider native now may adjust as climate changes in the future and

plants migrate. In some cases, varieties of plant species have even evolved unique traits specific to watersheds that make them ideally suited to the environmental conditions. Moreover, native insects and wildlife co-evolved with native plants and depend on them for their survival and reproduction. In contrast, the vast majority of plants introduced by humans have invaded during just the last 175 years. Without grazing animals, diseases, or insect pests from where they originally evolved, their populations can grow dramatically, crowding out the native plants that our wildlife evolved with.

How to restore riparian habitat--go slow, work with nature, and be cautious

Restoration of riparian habitat can be simple and inexpensive, or complex and very expensive, depending on the situation. The first step in any restoration project is to identify the source of the problem causing degradation or loss of riparian and wetland habitat. Landowners usually know their land, and often the neighboring land, better than anyone else. Be observant. Does your site flood? For how long, and how often? Take note of changes to your riparian habitat. Are they due to ongoing disturbances, such as from livestock grazing or recreation, or are they due to past impacts, such as from roads, housing development, or mining? Riparian and many wetland habitats are naturally resilient and often recover in just a few years if the source of the disturbance is removed and the area protected from further disturbance. An example might be improving livestock management so as to minimize grazing and browsing in riparian or wetland habitats. This relatively low cost approach is recommended first. If natural recovery doesn't occur with removal of disturbance, then something else may be happening that is not easy to see. It could be due to other disturbances upstream that are affecting land downstream in the watershed. There may be a hidden problem in the soil. Or is the water table too deep? This could be caused by beaver removal or a straightened and unstable stream channel that has cut down into the valley. If so, it could be time to call experts in assessing riparian and watershed condition and developing restoration plans. It may be impossible to fully restore severely degraded habitat.

If riparian or wetland habitat is damaged due to past land uses, knowing the degree of damage is very important. For example, if your property includes large areas of historic placer mining tailings, then it is likely that most of the topsoil is gone, the stream is confined and lacks the ability to meander and flood, and riparian vegetation is hard to find. In this or similar cases, it is important to bring in experts in restoration ecology to develop a plan. Such a project is expensive and has a higher risk of failure. Projects are complex, in terms of working with changing stream and riparian processes, preventing further damage during restoration, and meeting regulatory obligations. Do not start moving soil without a real plan and required regulatory permits. Anytime stream channels are to be changed, or wetlands (including most riparian habitats) filled or dredged, permits are required (and these regulations are enforced).

Before beginning any restoration project, especially those requiring soil excavation or filling, it is recommended to:

- 1) Get advice and technical assistance from experts, including your local Soil Conservation District, Idaho Department of Fish and Game, Idaho Department of Environmental Quality, Natural Resources Conservation Service, U. S. Forest Service, or environmental consultants.
- 2) Obtain funding for your project. Numerous grants are available for riparian and wetland habitat restoration, including (but not limited to):
 - [Wetlands Reserve Program \(WRP\)](#) - Seeks to protect, restore, and enhance wetlands on private land. It is one of the many Farm Bill Conservation Programs, administered by the Natural Resources Conservation Service.
 - Nonpoint Source Pollution Management Grants administered by the Idaho Department of Environmental Quality through Section 319 of the Clean Water Act can be used to restore riparian and wetland habitats (<http://www.deq.idaho.gov/water-quality/grants-loans.aspx>).
 - 5 Star Restoration Program is a grant administered by the U. S. Environmental Protection Agency http://water.epa.gov/grants_funding/wetlands/restore/index.cfm
 - Several habitat restoration grants, including the Landowner Incentive Program, are available from the U. S. Fish and Wildlife Service <http://www.fws.gov/grants/>
 - [Habitat Improvement Program \(HIP\)](#) - An Idaho Department of Fish and Game program with the objective to provide technical and financial assistance to private landowners and public land managers who want to enhance habitat for upland game birds and waterfowl.
 - [Wildlife Habitat Incentives Program \(WHIP\)](#) - This Farm Bill program provides technical and financial assistance to landowners for improving wildlife habitat on their land.
 - [Environmental Quality Incentives Program \(EQIP\)](#) – This Farm Bill program provides incentives to landowners to implement conservation practices on their agricultural land, including wildlife habitat management.
- 3) Apply for necessary permits with appropriate agencies. For alterations to wetlands, permits are required by the U. S. Army Corps of Engineers and Idaho Department of Environmental Quality under Section 404 of the Clean Water Act. Alterations to stream channels below the ordinary high water mark require a permit approved by the Idaho Department of Water Resources under the Idaho Stream Channel Protection Act. Other regulations may apply.
- 4) Sign a long term maintenance agreement for stewardship and protection of the restoration site if required by the grants used to fund the riparian restoration project.



Process of restoring riparian habitat degraded by dredge mining tailing piles. Grimes Creek riparian area before restoration, showing lack of floodplain and riparian vegetation (upper left). Use of a large excavator to remove tailing piles and create frequently flooded terrace (upper right). Same floodplain terrace after planting spring planting of native trees and shrubs (lower left). Similar restoration of riparian habitat with mine tailing removal followed by planting on Mores Creek, showing 6 full years of growth. Photos by Chris Murphy.

If riparian vegetation on a stream bank, floodplain, or high terrace has been disturbed or removed, but the stream is still meandering and flooding as it has before, then this is an ideal situation for you to undertake a sort of “DIY” approach to restoring riparian habitat. In other situations, you may want to enhance what riparian vegetation that is already there, filling gaps with native shrubs to shade out noxious weeds or widening the width of the habitat. This is not to say restoration is simple, or even cheap (native plants can be expensive), nor might not succeed the first time. For example, on drier riparian sites it may be necessary to irrigate planted trees, shrubs, and herbs until they grow deep roots and become established. After planting, you may need to protect plants from browsing by moose, elk, deer, beaver, or livestock. But, you, with the help of the community and other resources, can, using this guide, plant the right plants in the right places to improve your chances of successfully restoring riparian habitat. Your family, neighbors, and, most of all, the fish and wildlife that benefit should thank you.

PLANTING GUIDE

How to use the Riparian and Wetland Restoration Planting Guide

Answer the following four questions to the best of your ability based on the location of your restoration site and observations of the habitats. They will lead you to the appropriate species to plant for your site in the table at the end.

1) Which watershed type are you in?

Based on the location of your restoration site, use the maps on the following pages to identify the type of watershed you are in. If your site falls on the border of two watershed types, or is located slightly outside the watersheds mapped, then consult the following descriptions to decide which type is represented at your location.

- *foothills and alluvial river valleys, sedimentary, low relief, semi-arid*

These watersheds are restricted to the Boise foothills, stretching from about Eagle to Luck Peak Dam. They include narrow and steep perennial or intermittently flowing streams in the hills, as well as the Boise River valley. Except for the highest ridgetops at the heads of these watersheds, the area is non-forested shrub and grassland.



Upper Dry Creek watershed in the Boise foothills. Foothill riparian habitat. Photo by Chris Murphy.

- *high northern mountains and glacial outwash valleys, batholith, high relief, snowy*

These watersheds encompass the steep, high elevation headwaters in the mountains north of the South Fork Payette River, including the highest peaks in the West Mountains (west of Cascade), the upper Deadwood River, and upper Middle Fork Payette River. They include broad, u-shaped glacial carved valleys and meadows, as well as lower elevation river valleys. Except for a few south-facing slopes in the lowest river canyons, these watersheds are entirely forested.



Upper Elk Creek, a tributary of Bear Valley Creek (Middle Fork Salmon River basin) flowing through a montane wet meadow. Photo by Chris Murphy.

- *high southern mountains, batholith, high relief, snowy*

These watersheds span from the Trinity Mountains in the south, to Peace Rock and Scott Mountain (west of Deadwood Reservoir) in the north, to the Sawtooth Mountains in the east. All high, granitic mountains south of the South Fork Payette River fall in this group. Except for south-facing slopes in the lowest river valleys, the entire area is forested.



Upper North Fork Boise River. Photo by Chris Murphy.

- *lower montane ridges and mountain stream valleys, batholith and volcanic flows, moderate relief, warm temperate*

These watersheds include foothills, lower mountains, and ridges, from the Danskin Mountains to most of the South Fork Boise River below Anderson Ranch Dam, Arrowrock and Luck Peak Reservoirs, lower Grimes and Mores Creeks, and ridges near Horseshoe Bend. This is a transitional zone that includes open grassy or shrubby slopes, ponderosa pine woodlands, and Douglas-fir forests (on northern slopes). Any volcanic (basalt) flows in the described area would fall in this group.



South Fork Boise River canyon and Danskin Mountains near Prairie. Photo by Chris Murphy.

- *lower montane ridges, mountains, and alluvial valleys, batholith, low relief, temperate*

These watersheds occupy most of the North Fork Payette River, including Long Valley. This group also includes upper Squaw Creek and the broad valleys around Placerville and Idaho City in Grimes and Mores Creeks. Except for a few south-facing slopes, these watersheds are nearly entirely forested by ponderosa pine and Douglas-fir, with Grand fir trees occur north of Banks. Cold air drains into the broad valleys, creating cold conditions more similar to higher elevation mountain valleys to the east.



Lower montane watershed draining into the Payette River near Banks. Photo by Chris Murphy.

- *montane ridges and stream valleys, batholith, moderate relief, cool temperate*

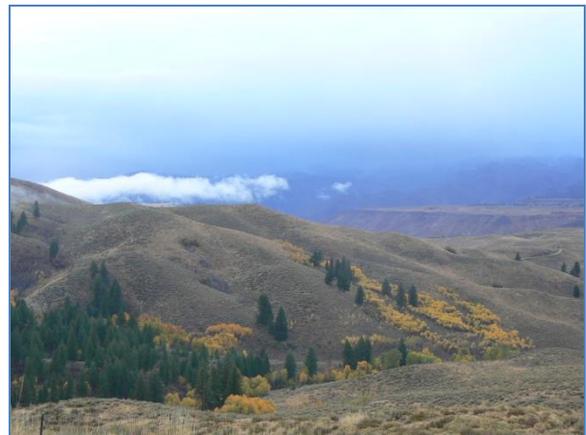
These watersheds are characterized by steep granitic slopes transitional between hotter, drier low elevation ridges and higher, colder, and snowier mountains. The group includes the valleys of the South Fork Boise River above Anderson Ranch Dam, Middle Fork Boise River above Arrowrock Reservoir, and part of the South Fork Payette River near Lowman. The area is mostly forested by Douglas-fir (except where wildfires have occurred), but south-facing slopes of river canyons may include open woodlands of ponderosa pine or Douglas-fir.



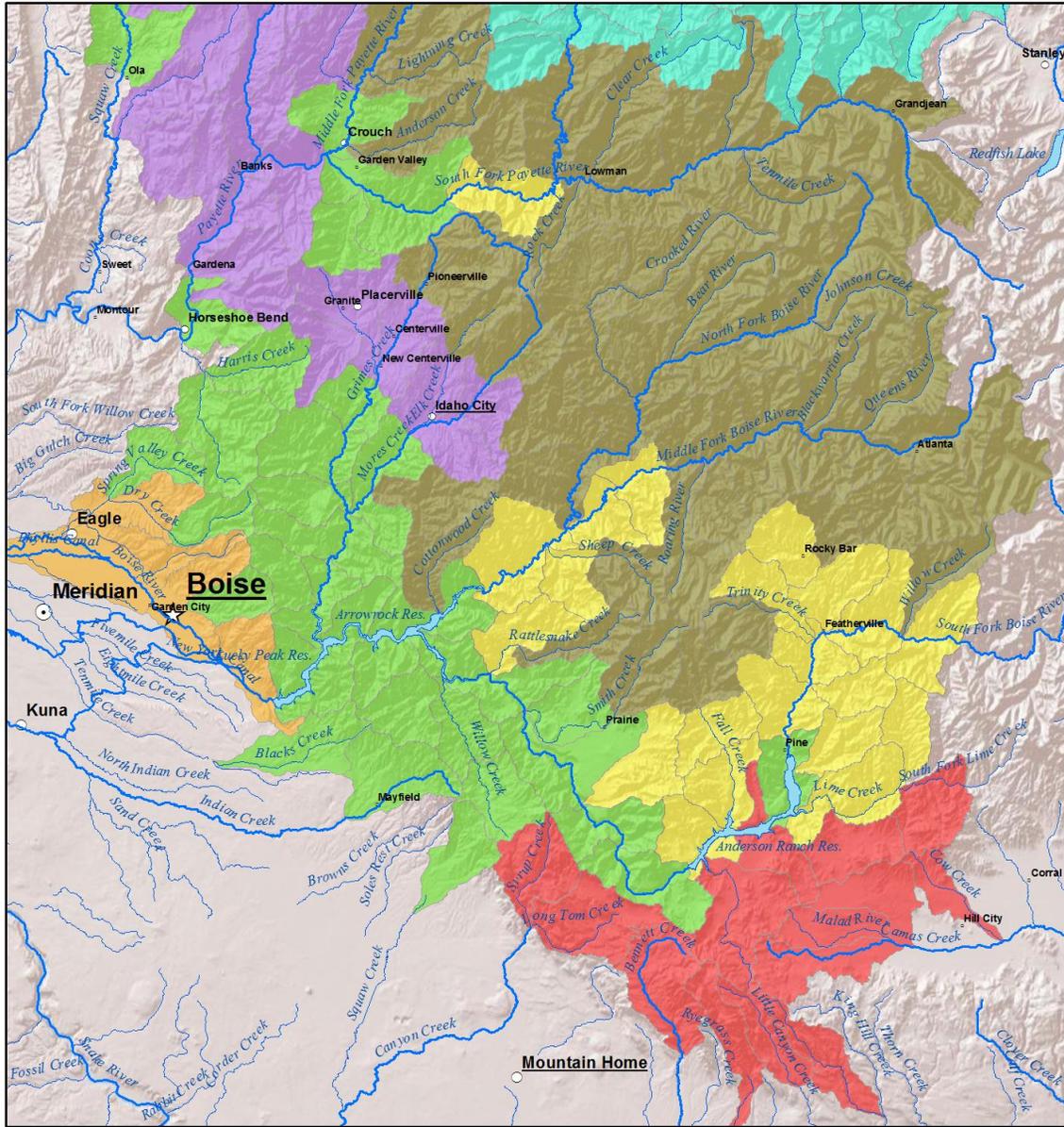
Lower Sheep Creek watershed (a tributary of the Middle Fork Boise River), burnt in 1992. Montane riparian habitat. Photo by Chris Murphy.

- *montane ridges and stream valleys, volcanic flows, low relief, semi-arid*

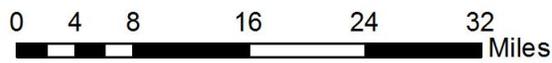
This group occurs entirely south of the South Fork Boise River and includes the granitic ridges and basaltic plateaus forming the divide between streams flowing to the Snake River Plain and those to the South Fork Boise. It also includes Bennett Mountain. Except for high elevations and north slopes with Douglas-fir forest and quaking aspen, this group is sparsely forested sagebrush country. The area is cold in the winter, but not excessively snowy.



A tributary to Anderson Ranch Reservoir. Photo by Chris Murphy.



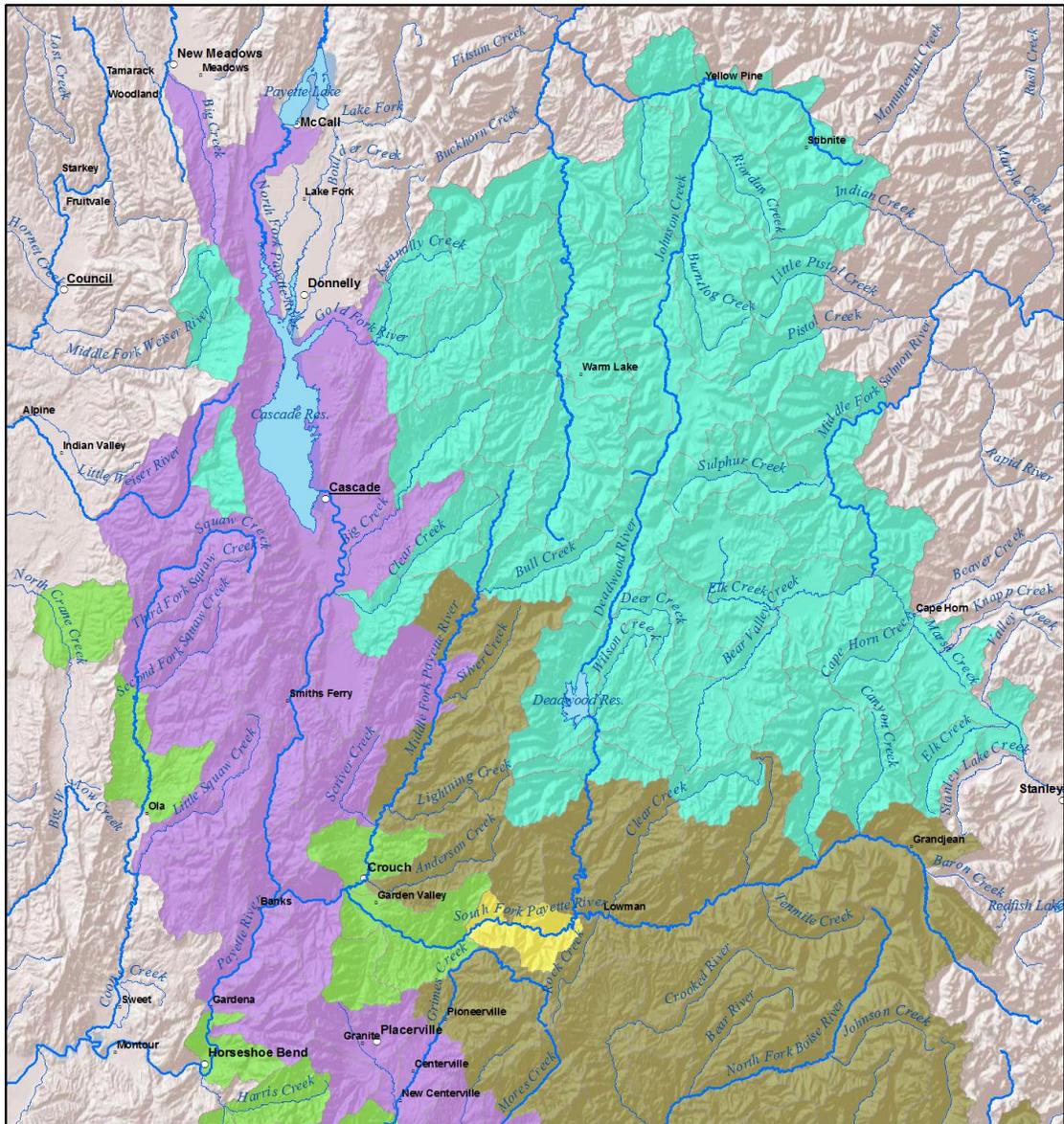
Boise and Payette River Basins



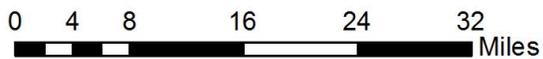
Watershed Type

- foothills and alluvial river valleys, sedimentary, low relief, semi-arid
- high northern mountains and glacial outwash valleys, batholith, high relief, snowy
- high southern mountains, batholith, high relief, snowy
- lower montane ridges and mountain stream valleys, batholith, moderate relief, warm temperate
- lower montane ridges, mountains, and alluvial valleys, batholith, low relief, temperate
- montane ridges and stream valleys, batholith, moderate relief, cool temperate
- montane ridges and stream valleys, volcanic flows, low relief, semi-arid

Boise River Basin



Boise and Payette River Basins



Watershed Type

- foothills and alluvial river valleys, sedimentary, low relief, semi-arid
- high northern mountains and glacial outwash valleys, batholith, high relief, snowy
- high southern mountains, batholith, high relief, snowy
- lower montane ridges and mountain stream valleys, batholith, moderate relief, warm temperate
- lower montane ridges, mountains, and alluvial valleys, batholith, low relief, temperate
- montane ridges and stream valleys, batholith, moderate relief, cool temperate
- montane ridges and stream valleys, volcanic flows, low relief, semi-arid

Payette River Basin and adjacent South Fork Salmon, Johnson Creek, and Middle Fork Salmon watersheds.

2) Which elevation zone within the watershed are you in?

Watersheds often span large elevations, from mountaintops to canyon bottoms, and include areas of complex topography that alter local climates. The types of riparian and wetland habitat present in any watershed will reflect these factors. To help identify habitats present at your site, the next step is to locate which broad ecological zone of the watershed you are in. Use the following maps to guide you. If you cannot decide which zone best fits your site, consult the following descriptions and look at photos in the introduction section to help you.

- *Foothills - Lower Montane, Low Elevation Valley Zone*

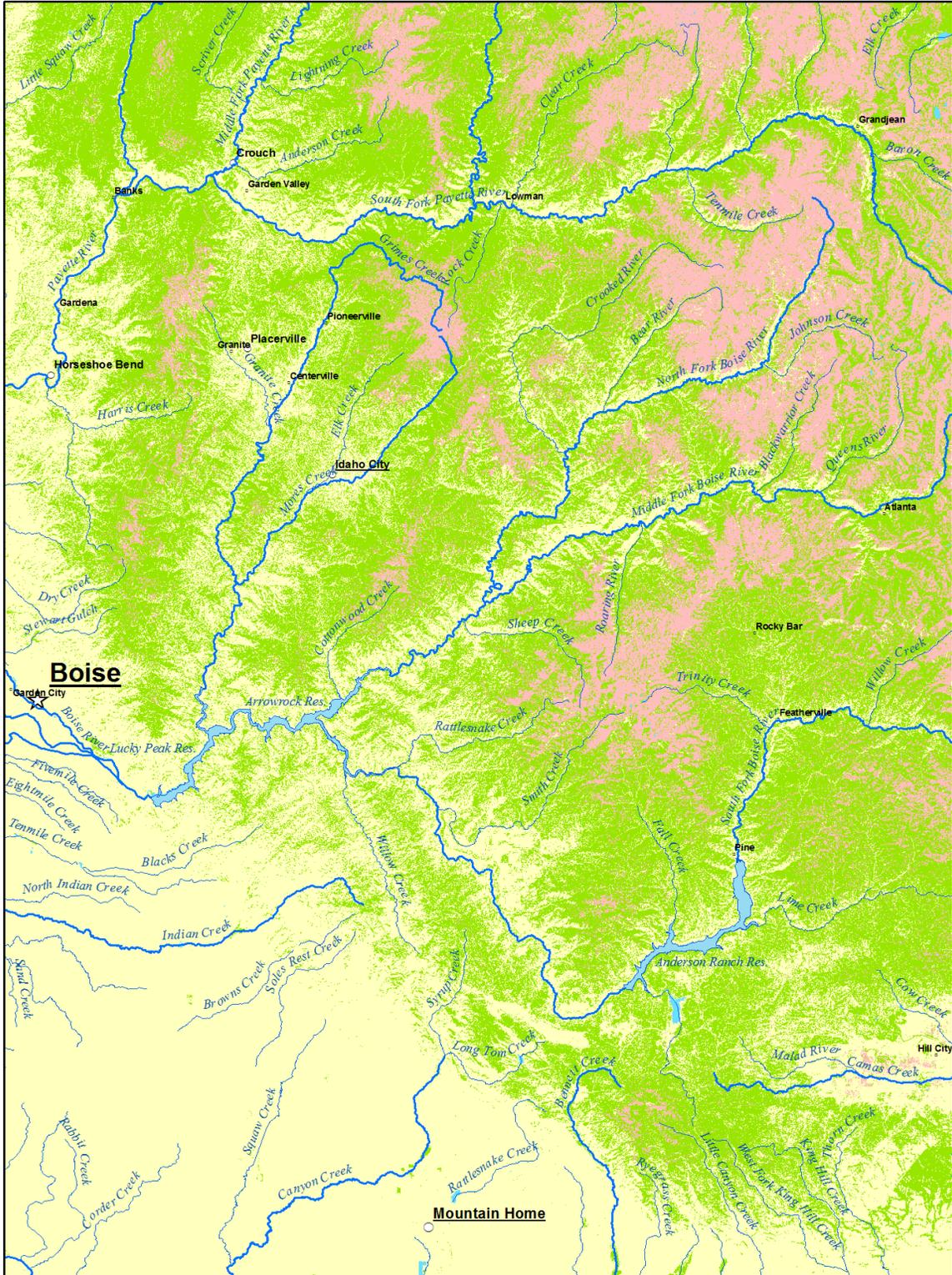
This ecological zone includes almost all of our wide river valleys and low elevation river canyons and their immediate tributary drainages. While the lowest rivers and streams tend to be wide and have high flows, side tributaries range from large creeks to intermittently flowing trickles. If you are in the valley or canyon of all the major forks of the Boise River, much of Mores and Grimes Creeks, the South Fork Payette River, the lower Middle Fork Payette River, the Payette River below Banks, or Squaw Creek, you are in this zone. If the surrounding uplands are open grass and shrub or ponderosa pine woodland (at least on southerly facing slopes), you are in this zone. If black cottonwood trees or water birch form large patches of riparian habitat, you are likely in this zone.

- *Montane, Mid-Elevation Mountain Zone*

Vast areas of the Boise and Payette River basins fall in this mountain, or montane, zone. Most steeply sloped creek valleys in the mountains fall within this zone. Some upper elevation portions of this zone include broad meadow valleys filled with sediments deposited by the last glaciations. Some of these valleys were carved by glaciers, but most areas in this zone were not. Surrounding uplands are nearly always forested with Douglas fir and/or grand fir, with ponderosa pine on southerly aspects at lower elevations. Lodgepole pine, subalpine fir, and Engelmann spruce occur at higher elevations of this zone.

- *Subalpine Zone, High Elevation Mountain Zone*

The highest elevations of the Boise and Payette River basins occur in this zone. The zone extends up steep, rocky peaks to the upper limit of tree growth. Northerly and easterly facing mountain slopes in this zone were carved by glaciers that left behind a landscape of cirque basin lakes and broad, u-shaped valleys. Surrounding uplands are mostly forested by lodgepole pine, subalpine fir, and Engelmann spruce, with woodlands of Douglas-fir on dry, southerly slopes and whitebark pine on mountaintops. Evidence of avalanches is common.

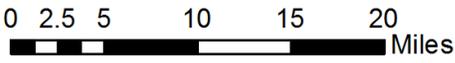


- Foothills-Lower Montane, Low Elevation Valleys
- Montane, Mid-Elevation Mountains
- Subalpine Zone, High Elevation Mountains





- Foothills-Lower Montane, Low Elevation Valleys
- Montane, Mid-Elevation Mountains
- Subalpine Zone, High Elevation Mountains



3) Which habitats at your riparian or wetland restoration site do you want to restore?

The next step is to identify the habitats present at your restoration site. The decision about which to restore will depend on you or an expert's assessment of the needs present.

For the purpose of this guide, the following definitions will be used. First, decide if your site is riparian or wetland. Use the following key:

- (A) Is your site in or at the edge of a pond, pond-like area (a depression), or in, or adjacent to, a meadow (whether wet or dry during your visit)? Some meadows include shrubs such as low-growing willows. These sites typically flood during the spring and early summer after snowmelt runoff and dry by mid or late summer, but some sites are saturated all year or nearly so. Include sites like this even if they are adjacent to a river or stream (such as a backwater slough or oxbow). **Yes = wetland (p. 20); No, go to (B)**
- (B) Is your site immediately adjacent to a spring (a spot where groundwater flows out of the ground nearly all the time in varying amounts) or a seep (where groundwater trickles out only during the spring)? **Yes = wetland (p. 20); No, go to (C)**
- (C) Is your site immediately adjacent to, or nearby, a river or stream and frequently flooded by the stream (every year or every other year)? **Yes = riparian (p. 19); No, go to (D)**
- (D) Is your site immediately adjacent to, or nearby, a river or stream but rarely flooded, where the primary source of water feeding the roots of the plants at your site is from groundwater? **Yes = riparian (p. 19); No, your site is probably in an upland area and not covered by this guide.**

To identify habitats use the following guide and photos found in the introduction. For riparian habitats, your elevation zone will determine which of the two you are working with. In some cases, two riparian types can occur immediately adjacent to each other. For example, the floodplain of a large river like the South Fork Payette would be in the Foothill and Lower Montane River Floodplain and Alluvial Terrace Woodlands and Shrublands habitat, but the small tributary stream entering the river at that location may include habitat better described as Montane Stream Riparian Alluvial Terrace Woodlands and Shrublands. If that is the case, refer to plant lists for both riparian habitat types. And remember, any habitat can occur within any of the watershed types. For wetlands, also read the planting zone descriptions for additional information that might help you with your decision. If you can't decide, consult a local riparian or wetland ecologist to help you.

Riparian habitats include:

- *Foothill and Lower Montane Floodplain and Riparian Alluvial Terrace Woodlands and Shrublands*



Lower montane floodplain of upper Grimes Creek, with willows colonizing a point bar on the inside bend of the stream and older willows and grass protecting the stream bank on the outside bend. Photo by Chris Murphy.

- *Montane Riparian Alluvial Terrace Woodlands and Shrublands*



Montane riparian habitat in excellent condition. Queens River (tributary of the Middle Fork Boise River) (left). Upper Elk Creek, a tributary of Bear Valley Creek, a narrow, deep, and sinuous stream bordered by short Wolf's willow. Note the overhanging bank creating cover for salmon. Photos by Chris Murphy.

Wetland habitats include:

- *Marshes and Aquatic Beds*

These habitats occur in shallow (< 12 inches) to deep water (18 to 36 inches or greater) in sites that are flooded for relatively long periods during the year. Marshes are characterized by “emergent” herbaceous species, or those that appear to emerge from the water (such as cattails, bulrushes, spikerushes, burreeds, etc.). Aquatic beds are identified by their lack of emergent species. They form mats of floating species (such as Rocky Mountain pond lily) and submerged species (such as pondweeds). If your site has aquatic species (plants always in water) and/or emergent plants it is likely this habitat.



Rocky Mountain pond lily aquatic bed in at high elevation in the Boise National Forest (left). Photo by Lisa Harloe. Typical cattail marsh adjacent to an aquatic bed in a southern Idaho foothill pond (right). Photo by Chris Murphy.

- *Ephemeral - Mesic Meadows and Seeps, Shrubby Cinquefoil Shrublands, and Intermittently Moist Drainages*

These meadows occur on soil that is saturated or shallowly flooded from snowmelt runoff in the spring or early summer. Soils are dry by mid-summer. Sites sometimes include seeps where groundwater flows for only a short time each year. These meadows tend to be dominated by grasses (such as timber oatgrass) or forbs (such as common camas, tall groundsel, or mule’s ears), rather than sedges. Shrubby cinquefoil is also common. Soils tend to be loamy. Sometimes creeks that rarely flow (intermittently) also support similar vegetation. These meadows and drainages occur from foothills to montane valleys.



Ephemeral meadows are often forb-dominated, as in tall groundsel (left) at Dixie Creek, a tributary to Anderson Ranch Reservoir. Photo by Lisa Harloe. Alternatively, mesic mountain meadows of timber oatgrass and wildflowers are common in central Idaho, such as at Bruce Meadows, Bear Valley (right). Photo by Chris Murphy.

- *Springs – Geothermal “Hot” Springs or Cold Springs*

Springs occur where water flows from the ground all year or for most of the year (where the water table may lie just below the surface). They support wetland vegetation that can include trees, shrubs, or herbaceous communities. The plant species present reflect how close the water or water table is to their roots. Cold springs are valued as clean water sources for humans and livestock, as well as habitat for sometimes unique aquatic life. The extreme environments at geothermal or hot springs support specially adapted aquatic communities found nowhere else. Geothermal springs are highly valued for recreation, research, and energy production.



Bonneville Hot Springs (left) near Lowman, South Fork Payette River, and Atlanta Hot Springs (right) near Atlanta, Middle Fork Boise River. Photos by Lisa Harloe.

- *Subalpine Avalanche Chutes, Conifer Woodland, Shrubland, and Meadow Wetland Complex*

This habitat occurs in subalpine cirque basins that accumulate deep snowpacks. There is a mosaic of wet forests and pocket mesic meadows fed by snow melting during early

summer. It is characterized by numerous snowmelt runoff channels that are typically dry by mid-summer. Dwarf shrublands occur in open areas unsuitable for tree establishment. As snowpacks melt, they create seasonal wetlands with many heath shrubs, including alpine laurel, huckleberries, Labrador tea, and pink mountainheath. These are highly desired recreation areas and are easily damaged by poorly located trails or campsites.



Typical subalpine wetland mosaic. Belvidere Creek watershed, Salmon River basin. Photo by Chris Murphy (left) and Lisa Harloe (right).

- *Vernal pools, Seasonally Flooded Pools, and Isolated Depressional Wetlands*

These wetland habitats occur in bowl-like closed basins, or depressions. They are shallowly flooded, primarily by rain and runoff from snowmelt, but high groundwater tables may also play a role. Unlike sites supporting marshes and aquatic beds, these wetlands are flooded for only a short duration in late winter through early summer and are typically dry by mid-summer. They are recognized by mudflats with sprouting herbs, spikerushes, and tufts of inflated sedge. They are critical habitats for aquatic organisms, such as crustaceans, specially adapted to the extreme wet-dry cycle.



Seasonal pool (left) in Ayers Meadow in Bear Valley near Stanley, Salmon River watershed. Inflated sedge dominates pool margins (right). Photos by Chris Murphy.

- *Wet Meadows and Short-Willow - Bog Birch Shrublands*

Wet meadows occur in broad mountain valleys with high water accumulation due to snowmelt runoff, high groundwater, and very poorly drained organic or clayey soils. This habitat is shallowly flooded or saturated into the summer growing season. Sites occur in depressions or on gentle slopes. This habitat is characterized by vast fields of sedges, tufted hairgrass, or Baltic rush, often with colorful forbs intermixed. In many areas, patches of low growing willows (such as Wolf's or diamondleaf willows) or bog birch occur within the meadow. These shrubs are well-adapted to wet soils.



Scenic wet meadows. Sedges and elephanthead color Elk Meadows in the Payette National Forest north of McCall (left). Wolf's willow and bog blueberry carpets Tranquil Basin, Deadwood River watershed (right). Photos by Lisa Harloe.

Peatlands, consisting of fens and Engelmann spruce swamps, occur on organic soils (peat) around springs in cold, snowy watersheds of high mountains in the Boise and Payette River basins. These habitats are extremely difficult to restore and should never be disturbed. Any restoration attempts would be experimental. They are not covered by this guide.

4) Determining the Planting Zone—How often does the site you want to restore flood and for how long?

To ensure restoration success, riparian and wetland plants need to be planted in ecological zones they are best adapted to. To determine the planting zone, consult the following guides for riparian (below, page 23) and wetland habitats (page 25).

Riparian habitats: For the purpose of this planting guide, there are two riparian planting zones for individual species based on flooding frequency. Although each zone can share many of the same plant species, the environment varies enough so that the community of plants, distinguished by characteristic mixes of dominant species and less common associated plants, is usually different.



Riparian areas with multiple planting zones. Montane riparian habitat of upper South Fork Boise River (left), showing dense gray alder and willows dominating Active Floodplain, Bank, and Low Terrace near river channel with Engelmann spruce and subalpine fir forest on High Terrace. Photo by Chris Murphy.



Foothill riparian habitat of Weiser River (right), showing coyote willow dominating Active Floodplain, Bank, and Low Terrace near the channel, with tall greenleaf willow shrubland and black cottonwood forest on High Terrace. Photo by Ed Bottum.

1) *Active Floodplain, Bank, and Low Terrace*

This zone is directly influenced by frequent flooding (such as every year or every other year). It is recognizable by the presence of debris brought in by floods. This can include large chunks of wood, silt deposits on the bases of trees and shrubs, and twigs, old grass, or plant materials trapped in trees and shrubs. There may be channel bars, islands, or banks that get scoured by intense water flows where plants tend to be stunted or even lacking. In other areas, sand, gravel, and cobble bars may form which are the garden beds for a young crop of black cottonwoods, willows, or other riparian seedlings or saplings. Overall, plants tend to be younger and communities composed of species that require flood disturbance to reproduce. The groundwater is near the surface all year. Soils are usually coarse, consisting of sand, gravel, and rock.



Examples of willow-dominated (primarily Drummond's willow) Active Floodplain, Bank, and Low Terrace planting zone along montane streams. Tamarack Creek (a tributary of the East Fork of the South Fork Salmon River) in the Payette National Forest (left). Photo by Chris Murphy. Bear River (a tributary of the North Fork Boise River) (right). Photo by Lisa Harloe.

2) High Terrace

This zone occurs above the height of frequent flooding, but is still low enough in the valley bottom where plants can tap into groundwater and floods can still occur (but much less frequently). It is recognizable by the presence of denser, taller, and older vegetation. Trees may be large and tall. Shrubs are diverse and nearly impenetrable to walk through. Multiple layers of many species occur. There is little exposed soil, unless a rare flood has deposited some sand or silt. Instead, there is often a dense carpet of grasses, sedges, and forbs on the ground, with a thatch of plant material (litter) often accumulating on the ground. There may be moss on the ground too. Litter acts like compost, becoming integrated into a fertile, loamy soil. Large woody debris originates from old, dying trees or shrubs, rather than from floating in on floodwater. The groundwater can be over 3 feet deep by late summer and accessible to the most deeply rooted plants.



“Fuzzy” riparian planting zone boundaries along montane streams. Sedges and bluejoint reedgrass dominates the Active Floodplain, Bank, and Low Terrace, with sedges decreasing through a subtle transition to the Engelmann Spruce and subalpine fir High Terrace, upper South Fork Salmon River (left). Willows dominate both the Active Floodplain, Bank, and Low Terrace and High Terrace zones along the Bear River (right). Photos by Lisa Harloe.

As with most “boundaries” in nature, there can be blurring of habitats due to local conditions and many sites include both zones. It is sometimes difficult to distinguish between the Active Floodplain and High Terrace zone. However, if you can’t decide which zone your restoration site occurs in, error on the side of the High Terrace. This is because the plants dominating High Terraces can usually tolerate being more frequently flooded, but species typical of floodplains sometimes die when the groundwater table drops deeply in late summer on High Terrace sites.

Wetland habitats: Wetland planting zones differ by not being as heavily influenced by stream or river erosion and deposition. These habitats are more stable, often flooded for longer periods of time through the growing season or sometimes even flooded all year. However, in many ephemeral and mesic meadows the groundwater table may recede over 3 feet deep by

late summer. The length of time that the site is flooded determines which plant species will thrive. This is partly due to an individual plant species adaptation to saturated soils where oxygen is lacking. However, some wetland plants can grow readily in multiple zones (e.g., common spikerush). Determining the planting zone is sometimes difficult due to fluctuating water levels and varying soil conditions. Use the following to descriptions and your observations to guide you. Six generalized wetland planting zones are defined for this guide:

1) *Very deep – permanently flooded*

This zone occurs in very deep water (> 18 inches deep, often > 3 feet) that is permanently or mostly permanently flooded (drawn down occasionally during extreme drought or for management purposes). It tends to support aquatic vegetation, especially floating (e.g., Rocky Mountain pond lily) and submerged plants (e.g., coon’s tail, milfoils, or pondweeds). Tall emergent species, such as cattail and hardstem or softstem bulrush, may be present, especially in slightly shallower water at the fringes of deep ponds and lakes.



Hyatt wetland (Boise), a marsh with very deep water supporting cattails and submerged aquatic plants (left). Photo by Chris Murphy. Rocky Mountain pond lily in a high elevation pond in the Payette National Forest (right). Photo by Jennifer Miller. Note the presence of open water in this zone.

2) *Deep – long duration*

This zone supports the majority of our commonly occurring cattail and hardstem - softstem bulrush marshes. It has relatively deep water that is flooded for long periods, ranging from almost permanently to seasonally flooded for > 3 months. Water depths average 12 - 18 inches, but seasonal fluctuations outside this range can occur. This zone also supports a variety of aquatic plants, from submerged plants (e.g., pondweeds and whitewater crowfoot) to emergent species (e.g., floating mannagrass, burreeds, and water knotweed).



Typical cattail - hardstem bulrush deep water marshes in foothills of southern Idaho. Note the presence of aquatic plants interspersed between taller cattails and bulrush. Photos by Chris Murphy.

3) *Shallow – long duration*

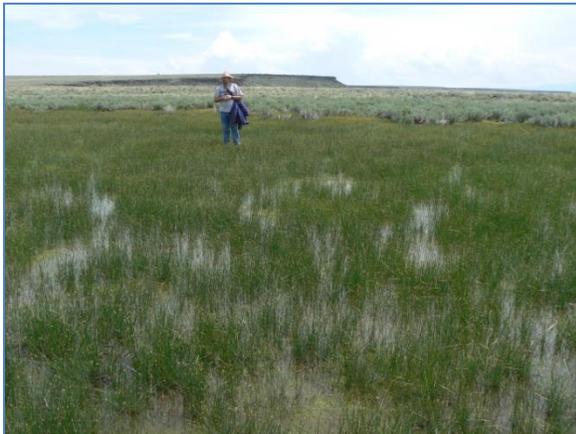
This zone is characterized by shallow flooding depths, about 6 - 12 inches deep. There is a long flooding period (typically > 3 months), ranging from semi-permanently to seasonally. It often occurs on the margins of lakes and ponds that drawdown late during the summer drought. It can occur in areas with high water accumulation due to snowmelt runoff or in depressions with very poorly drained organic or clayey soils underlying the wetland. Sites typically occur in bowl-shaped depressions. This zone supports many of our sedge-dominated wet meadows dominated by aquatic sedge or Northwest Territory (beaked) sedge, as well as marshes supporting common spikerush.



A north-central Idaho wetland supporting common spikerush and burreed, with shallow flooding in the summer that provides excellent feeding habitat for wading birds (left). Photo by IDFG. A shallowly flooded wet meadow dominated by a thick sward of aquatic sedge adjacent to a pond in a high elevation cirque basin in the North Fork Payette River watershed (right). Photo by Lisa Harloe.

4) *Shallow – short duration*

While also having shallow flooding depths (about 6 - 12 inches), this zone differs from the prior by having a much shorter flooding duration. It is typically seasonally flooded for < 3 months. Most of Idaho's wet meadows occur within this wetland zone. These wet meadows are often dominated by sedges, or occasionally rushes, grasses, and forbs. They occur on slightly sloped ground that prevents large amounts of snowmelt runoff from accumulating for very long. Soils are typically poorly drained, organic or clayey. Other sites occur in semi-arid regions where water is in shorter supply. One example includes vernal pools. These form in depressions where winter rain and snowmelt shallowly flood this habitat for a brief time only during spring. Common spikerush and a variety of annual herbs tolerant of this dramatic wet-dry cycle are characteristic.



Vernal pool in southwest Idaho supporting a shallowly flooded common spikerush community. Photo by Chris Murphy. Shallowly flooded sloped wet sedge meadow in the Boise National Forest (right). Photo by Lisa Harloe.

5) *Saturated – long duration*

Some wetlands occur on soils that are saturated for long periods (> 3 months) or even all year. These sites have zero to only brief seasonal flooding that is < 6 inches deep. Many sites are sloped. Vegetation can be quite varied, often including shrubs (such as willows and bog birch), sedges, mosses, or sometimes trees. These habitats are usually fed by springs (water leaving the ground) or sometimes groundwater that is always at the surface. If the wetland is located in the mountains in a very cold and wet environment, decomposition of leaves and other vegetative "litter" is minimal to none and peat soils form. These peatland "fen" habitats support a unique combination of plants specially adapted to perennially-saturated organic soil. At lower elevation, warmer sites springs support more common wetland species, including a variety of willows.



Typical fens on sloped, spring-fed saturated peat soils. Fen near Stanley (left). Photo by Chris Murphy. Fen in Tranquil Basin, Deadwood River watershed (right). Photo by Lisa Harloe.

6) *Saturated – short duration*

In this zone, the soil is saturated in the spring or early summer but has zero to only brief seasonal flooding. The typical depth of any flooding is < 6 inches. Soils are dry by mid-summer. Sites sometimes include seeps where groundwater leaves the ground for only a short time each year. Like the shallowly flooded – short duration zone, slightly sloped meadows are typical. However, these wet to mesic meadows tend to be dominated by grasses (such as tufted hairgrass, timber oatgrass, or bluejoint), Baltic rush, or forbs (such as common camas, tall groundsel, or mule’s ears), rather than sedges or spikerush. Shrubby cinquefoil is also common in this zone. Soils tend to be slightly better drained loams.



Typical wet - mesic meadows that occur on seasonally saturated soils that dry by mid-summer. Some are characterized by a lush mixture of forbs, including common camas, Cusick’s Indian paintbrush, bistort, and mule-ears, Corduroy Meadows (left). Large expanses of tufted hairgrass dominate Bruce Meadows (right). Both sites are in Bear Valley, in the Salmon River basin. Photos by Chris Murphy.

If you are serious about tackling a wetland restoration project, you may need further technical assistance. The interplay between soils and the depth and duration of flooding is complex and will determine the ultimate success or failure of a restoration project. Planning is critical to decide how to manage water levels and arrange species plantings by soil type to best mimic natural communities. The document “Wetland and riparian plant associations of West-central Idaho” (Murphy et al. 2011) (available from C. Murphy at Idaho Department of Fish and Game) and many other resources listed at the end of this guide can be consulted to learn about the ecology of a wide variety of wetland and riparian plant communities.

5) Plant Lists

Go to the group of tables for your watershed type. Then go to the plant lists for each riparian or wetland habitat of interest. Each keystone species in the following tables has been assigned a recommended planting zone. The proportions of each species to plant in your restoration mix can be estimated by looking at the columns for percent constancy (or the percentage of vegetation samples the plant occurred in) and mean percent cover (the estimated percent of the ground covered by the foliage of a species in each sample). In general, species with the highest combined constancy and mean cover are most important in the community and should be more abundant in your mix. These species were given “high” priority for planting, with the second most important assigned “medium,” and, if appropriate, “low” priority for less important species. To promote long-lived plant communities, all except a few of the species listed are perennials.

These lists can also be used to develop restoration goals that can be tracked by monitoring growth of vegetation after restoration. For example, the mean percent cover in the list can be used to identify an approximate desired cover after plants mature. Although not every plant will be available from a nursery, picking as many available species from the lists will ensure that your restoration project will benefit the broadest community of animals and pollinator insects. Avoid the temptation to order these species (many of which range across North America) from nurseries far outside southwest or central Idaho because nurseries in other regions will have plants poorly adapted to the environmental conditions of the Boise and Payette River basins. To find out more about the plants listed, including alternative names, their growth and ecological characteristics, and more, go to the The PLANTS Database at <http://plants.usda.gov>.

Foothills and alluvial river valleys, sedimentary, low relief, semi-arid

Foothill and Lower Montane Floodplain and Riparian Alluvial Terrace Woodlands and Shrublands

ScientificName	Common Name	% Constancy	Mean % Cover	Species Priority	Planting Zone	Lifeform
<i>Populus balsamifera</i> ssp. <i>trichocarpa</i>	black cottonwood	100	22.6	High	Floodplain	Tree
<i>Chrysothamnus nauseosus</i>	rubber rabbitbrush	20	10.0	Low	Upland	Shrub
<i>Ribes aureum</i>	golden currant	40	3.6	Low	High Terrace	Shrub
<i>Salix amygdaloides</i>	peachleaf willow	20	30.0	High	High Terrace	Shrub
<i>Salix exigua</i>	narrowleaf willow	60	16.7	High	Floodplain	Shrub
<i>Salix lasiolepis</i>	arroyo willow	20	20.0	Medium	Floodplain	Shrub
<i>Salix lutea</i>	yellow willow	60	10.0	High	Floodplain	Shrub
<i>Carex athrostachya</i>	slenderbeak sedge	40	6.5	Medium	Floodplain	Grass-like
<i>Eleocharis palustris</i>	common spikerush	60	2.0	Low	Floodplain	Grass-like
<i>Juncus effusus</i> var. <i>conglomeratus</i>	common rush	20	10.0	Low	Floodplain	Grass-like
<i>Poa secunda</i>	Sandberg bluegrass	20	10.0	Low	High Terrace	Grass
<i>Bidens frondosa</i>	devil's beggartick	20	10.0	Low	Floodplain	Forb
<i>Epilobium ciliatum</i> ssp. <i>watsonii</i>	fringed willowherb	40	5.0	Low	Floodplain	Forb
<i>Erigeron speciosus</i>	aspen fleabane	40	5.1	Low	High Terrace	Forb
<i>Euthamia occidentalis</i>	western goldentop	40	3.0	Low	Floodplain	Forb
<i>Lycopus asper</i>	rough bugleweed	40	3.0	Low	Floodplain	Forb
<i>Verbena hastata</i>	swamp verbena	40	21.5	High	Floodplain	Forb

Marshes and Aquatic Beds

ScientificName	Common Name	% Constancy	Mean % Cover	Species Priority	Planting Zone	Lifeform
<i>Carex nebrascensis</i>	Nebraska sedge	33	5.0	Medium	Shallow – short duration	Grass-like
<i>Carex pellita</i>	woolly sedge	67	15.1	High	Saturated – short duration	Grass-like
<i>Carex praegracilis</i>	clustered field sedge	33	20.0	High	Saturated – short duration	Grass-like
<i>Juncus balticus</i>	Baltic rush	33	10.0	Medium	Saturated – short duration	Grass-like
<i>Juncus effusus</i> var. <i>conglomeratus</i>	common rush	33	10.0	Medium	Shallow – short duration	Grass-like
<i>Juncus tenuis</i>	poverty rush	33	15.0	Medium	Saturated – short duration	Grass-like
<i>Muhlenbergia richardsonis</i>	mat muhly	33	20.0	High	Saturated – short duration	Grass
<i>Schoenoplectus acutus</i>	hardstem bulrush	33	70.0	High	Deep – long duration	Grass-like
<i>Sporobolus airoides</i>	alkali sacaton	33	5.0	Medium	Saturated – short duration	Grass
<i>Geum macrophyllum</i>	largeleaf avens	67	12.5	High	Saturated – short duration	Forb
<i>Euthamia occidentalis</i>	western goldentop	67	7.5	Medium	Shallow – short duration	Forb
<i>Lycopus americanus</i>	American water horehound	67	2.6	Medium	Shallow – short duration	Forb
<i>Typha latifolia</i>	broadleaf cattail	67	36.0	High	Deep – long duration	Forb/Grass-like
<i>Urtica dioica</i>	stinging nettle	33	5.0	Medium	Saturated – short duration	Forb

Lower montane ridges and mountain stream valleys, batholith and volcanic flows, moderate relief, warm temperate

Foothill and Lower Montane Floodplain and Riparian Alluvial Terrace Woodlands and Shrublands

ScientificName	Common Name	% Constancy	Mean % Cover	Species Priority	Planting Zone	Lifeform
<i>Populus balsamifera</i> ssp. <i>trichocarpa</i>	black cottonwood	44	24.7	High	Floodplain	Tree
<i>Populus tremuloides</i>	quaking aspen	13	15.5	Low	High Terrace	Tree
<i>Alnus incana</i>	gray alder	31	24.5	High	Floodplain	Shrub
<i>Betula occidentalis</i>	water birch	38	39.6	High	Floodplain	Shrub
<i>Cornus sericea</i>	redosier dogwood	78	30.4	High	Floodplain	Shrub
<i>Crataegus douglasii</i>	black hawthorn	44	13.7	High	High Terrace	Shrub
<i>Philadelphus lewisii</i>	Lewis' mock orange	31	4.8	Low	High Terrace	Shrub
<i>Prunus virginiana</i>	chokecherry	13	25.5	Medium	High Terrace	Shrub
<i>Ribes aureum</i>	golden currant	50	3.5	Low	Floodplain	Shrub
<i>Rosa woodsii</i>	Woods' rose	59	11.5	High	High Terrace	Shrub
<i>Salix exigua</i>	narrowleaf willow	16	11.8	Low	Floodplain	Shrub
<i>Salix lasiolepis</i>	arroyo willow	31	29.4	High	Floodplain	Shrub
<i>Salix lucida</i> ssp. <i>caudata</i>	greenleaf willow	41	25.2	High	Floodplain	Shrub
<i>Salix lutea</i>	yellow willow	53	18.8	High	Floodplain	Shrub
<i>Salix monochroma</i>	onecolor willow	22	13.6	Medium	Floodplain	Shrub
<i>Salix scouleriana</i>	Scouler's willow	3	70.0	Low	High Terrace	Shrub
<i>Symphoricarpos albus</i>	common snowberry	16	13.2	Low	High Terrace	Shrub
<i>Toxicodendron rydbergii</i>	western poison ivy	16	13.6	Low	Floodplain	Shrub
<i>Carex pellita</i>	woolly sedge	25	12.6	Medium	Floodplain	Grass-like
<i>Elymus glaucus</i>	blue wildrye	66	3.9	Medium	High Terrace	Grass
<i>Scirpus microcarpus</i>	panicled bulrush	25	5.2	Low	Floodplain	Grass-like
<i>Circaea alpina</i>	small enchanter's nightshade	41	3.7	Low	High Terrace	Forb
<i>Equisetum arvense</i>	field horsetail	34	10.8	Medium	Floodplain	Forb-like
<i>Galium aparine</i>	stickywilly	53	4.1	Low	High Terrace	Forb
<i>Geum macrophyllum</i>	largeleaf avens	34	3.8	Low	High Terrace	Forb
<i>Maianthemum stellatum</i>	starry false lily of the vally	31	8.8	Medium	High Terrace	Forb
<i>Osmorhiza berteroi</i>	sweetcicely	47	7.1	Medium	High Terrace	Forb

Montane Riparian Alluvial Terrace Woodlands and Shrublands

ScientificName	Common Name	% Constancy	Mean % Cover	Species Priority	Planting Zone	Lifeform
<i>Pseudotsuga menziesii</i>	Douglas-fir	29	25.0	High	High Terrace	Tree
<i>Acer glabrum</i>	Rocky Mountain maple	43	13.4	High	High Terrace	Shrub
<i>Alnus incana</i>	gray alder	43	25.0	High	Floodplain	Shrub
<i>Betula occidentalis</i>	water birch	14	40.0	High	Floodplain	Shrub
<i>Cornus sericea</i>	redosier dogwood	71	33.8	High	Floodplain	Shrub
<i>Frangula purshiana</i>	Pursh's buckthorn	29	9.0	Medium	High Terrace	Shrub
<i>Lonicera involucrata</i>	twinberry honeysuckle	29	20.0	High	Floodplain	Shrub
<i>Philadelphus lewisii</i>	Lewis' mock orange	14	15.0	Low	High Terrace	Shrub
<i>Ribes hudsonianum</i>	northern black currant	57	3.0	Low	Floodplain	Shrub
<i>Rubus parviflorus</i>	thimbleberry	29	9.0	Medium	High Terrace	Shrub
<i>Salix boothii</i>	Booth's willow	14	80.0	High	Floodplain	Shrub
<i>Salix geyeriana</i>	Geyer's willow	29	80.0	High	High Terrace	Shrub
<i>Salix scouleriana</i>	Scouler's willow	29	30.5	High	High Terrace	Shrub
<i>Symphoricarpos albus</i>	common snowberry	29	6.0	Low	High Terrace	Shrub
<i>Carex deweyana</i>	Dewey sedge	43	4.0	Low	Floodplain	Grass-like
<i>Elymus glaucus</i>	blue wildrye	57	2.8	Low	High Terrace	Grass
<i>Glyceria striata</i>	fowl mannagrass	71	2.8	Low	Floodplain	Grass
<i>Scirpus microcarpus</i>	panicked bulrush	57	5.5	Medium	Floodplain	Grass-like
<i>Circaea alpina</i>	small enchanter's nightshade	29	14.0	Medium	High Terrace	Forb
<i>Galium aparine</i>	stickywilly	71	5.2	Medium	High Terrace	Forb
<i>Geum macrophyllum</i>	largeleaf avens	100	4.3	Medium	High Terrace	Forb
<i>Maianthemum stellatum</i>	starry false lily of the vally	71	2.6	Low	High Terrace	Forb
<i>Solidago gigantea</i>	giant goldenrod	43	4.7	Low	High Terrace	Forb

Marshes and Aquatic Beds

ScientificName	Common Name	% Constancy	Mean % Cover	Species Priority	Planting Zone	Lifeform
<i>Alopecurus aequalis</i>	shortawn foxtail	50	10.0	Medium	Shallow – long duratio	Grass
<i>Carex utriculata</i>	Northwest Territory sedge	100	27.5	High	Shallow – long duratio	Grass-like
<i>Eleocharis palustris</i>	common spikerush	50	10.0	Medium	Shallow – long duratio	Grass-like
<i>Glyceria borealis</i>	small floating mannagrass	100	40.1	High	Deep – long duration	Grass
<i>Torreyochloa pallida</i> var. <i>pauciflora</i>	pale false mannagrass	50	7.0	Medium	Shallow – long duratio	Grass
<i>Lemna minor</i>	common duckweed	50	20.0	High	Deep – long duration	Forb
<i>Lysimachia thyrsoiflora</i>	tufted loosestrife	50	3.0	Medium	Shallow – long duratio	Forb
<i>Polygonum amphibium</i>	water knotweed	50	3.0	Medium	Deep – long duration	Forb
<i>Spirodela polyrrhiza</i>	common duckmeat	50	7.0	Medium	Deep – long duration	Forb
<i>Typha latifolia</i>	broadleaf cattail	50	90.0	High	Deep – long duration	Forb/Grass-like

Wet Meadows and Short-Willow - Bog Birch Shrublands

ScientificName	Common Name	Cover	Species Priority	Planting Zone	Lifeform
<i>Alopecurus aequalis</i>	shortawn foxtail	10.0	Medium	Shallow – long duration	Grass
<i>Carex nebrascensis</i>	Nebraska sedge	70.0	High	Shallow – short duration	Grass-like
<i>Carex simulata</i>	analogue sedge	1.0	Medium	Shallow – long duration	Grass-like
<i>Deschampsia caespitosa</i>	tufted hairgrass	2.0	Medium	Shallow – short duration	Grass
<i>Eleocharis palustris</i>	common spikerush	2.0	Medium	Shallow – short duration	Grass-like
<i>Juncus nevadensis</i> var. <i>nevadensis</i>	Sierra rush	1.0	Medium	Shallow – short duration	Grass-like
<i>Epilobium ciliatum</i> ssp. <i>glandulosum</i>	fringed willowherb	7.0	Medium	Shallow – short duration	Forb
<i>Montia chamissoi</i>	water minerslettuce	2.0	Medium	Shallow – short duration	Forb

Ephemeral - Mesic Meadows and Seeps, Shrubby Cinquefoil Shrublands, and Intermittently Moist Drainages

ScientificName	Common Name	% Constancy	Mean % Cover	Species Priority	Planting Zone	Lifeform
<i>Carex athrostachya</i>	slenderbeak sedge	25	7.0	Medium	Saturated – short duration	Grass-like
<i>Carex pellita</i>	woolly sedge	25	15.0	Medium	Saturated – short duration	Grass-like
<i>Carex praegracilis</i>	clustered field sedge	50	29.0	High	Saturated – short duration	Grass-like
<i>Juncus balticus</i>	Baltic rush	50	15.1	High	Saturated – short duration	Grass-like
<i>Juncus nevadensis</i> var. <i>nevadensis</i>	Sierra rush	25	10.0	Medium	Saturated – short duration	Grass-like
<i>Leymus triticoides</i>	beardless wildrye	25	8.0	Medium	Saturated – short duration	Grass
<i>Poa secunda</i>	Sandberg bluegrass	75	3.7	Medium	Saturated – short duration	Grass
<i>Achillea millefolium</i>	common yarrow	50	5.5	Medium	Saturated – short duration	Forb
<i>Agoseris glauca</i>	pale agoseris	25	25.0	High	Saturated – short duration	Forb
<i>Allium</i>	onion	25	10.0	Medium	Saturated – short duration	Forb
<i>Arnica chamissonis</i>	Chamisso arnica	50	8.0	Medium	Saturated – short duration	Forb
<i>Camassia quamash</i>	small camas	75	8.0	High	Saturated – short duration	Forb
<i>Castilleja cusickii</i>	Cusick's Indian paintbrush	25	7.0	Medium	Saturated – short duration	Forb
<i>Iris missouriensis</i>	Rocky Mountain iris	50	5.0	Medium	Saturated – short duration	Forb
<i>Lomatium nudicaule</i>	barestem biscuitroot	25	15.0	Medium	Saturated – short duration	Forb
<i>Ranunculus orthorhynchus</i>	straightbeak buttercup	50	5.1	Medium	Saturated – short duration	Forb
<i>Senecio hydrophiloides</i>	tall groundsel	50	25.5	High	Saturated – short duration	Forb
<i>Stellaria longipes</i>	longstalk starwort	25	8.0	Medium	Saturated – short duration	Forb
<i>Veratrum californicum</i>	California false hellebore	25	7.0	Medium	Saturated – short duration	Forb
<i>Wyethia amplexicaulis</i>	mule-ears	25	60.0	High	Saturated – short duration	Forb

Lower montane ridges, mountains, and alluvial valleys, batholith, low relief, temperate

Foothill and Lower Montane Floodplain and Riparian Alluvial Terrace Woodlands and Shrublands

ScientificName	Common Name	% Constancy	Mean % Cover	Species Priority	Planting Zone	Lifeform
<i>Pinus ponderosa</i>	ponderosa pine	40	8.6	Medium	High Terrace	Tree
<i>Populus balsamifera</i> ssp. <i>trichocarpa</i>	black cottonwood	20	65.0	High	Floodplain	Tree
<i>Pseudotsuga menziesii</i>	Douglas-fir	20	10.1	Low	High Terrace	Tree
<i>Acer glabrum</i>	Rocky Mountain maple	20	11.0	Low	High Terrace	Shrub
<i>Alnus incana</i>	gray alder	50	24.6	High	Floodplain	Shrub
<i>Betula occidentalis</i>	water birch	20	52.0	High	Floodplain	Shrub
<i>Cornus sericea</i>	redosier dogwood	40	5.8	Medium	Floodplain	Shrub
<i>Crataegus douglasii</i>	black hawthorn	50	18.4	High	High Terrace	Shrub
<i>Philadelphus lewisii</i>	Lewis' mock orange	30	28.7	High	High Terrace	Shrub
<i>Rosa woodsii</i>	Woods' rose	20	20.1	Medium	High Terrace	Shrub
<i>Salix boothii</i>	Booth's willow	40	10.0	Medium	Floodplain	Shrub
<i>Salix drummondiana</i>	Drummond's willow	60	7.7	Medium	Floodplain	Shrub
<i>Salix exigua</i>	narrowleaf willow	40	11.6	Medium	Floodplain	Shrub
<i>Salix lucida</i>	shining willow	30	15.3	Medium	Floodplain	Shrub
<i>Salix lutea</i>	yellow willow	50	21.0	High	Floodplain	Shrub
<i>Salix melanopsis</i>	dusky willow	10	60.0	High	Floodplain	Shrub
<i>Spiraea douglasii</i>	rose spirea	20	13.0	Medium	Floodplain	Shrub
<i>Symphoricarpos albus</i>	common snowberry	40	14.3	High	High Terrace	Shrub
<i>Glyceria striata</i>	fowl mannagrass	30	7.0	Low	Floodplain	Grass
<i>Juncus balticus</i>	Baltic rush	30	6.7	Low	Floodplain	Grass-like
<i>Canadanthus modestus</i>	giant mountain aster	60	5.2	Medium	Floodplain	Forb
<i>Equisetum arvense</i>	field horsetail	70	3.7	Medium	Floodplain	Forb-like
<i>Galium aparine</i>	stickywilly	50	5.0	Medium	High Terrace	Forb
<i>Solidago canadensis</i>	Canada goldenrod	60	4.2	Medium	High Terrace	Forb

Montane Riparian Alluvial Terrace Woodlands and Shrublands

ScientificName	Common Name	% Constancy	Mean % Cover	Species Priority	Planting Zone	Lifeform
<i>Picea engelmannii</i>	Engelmann spruce	36	36.0	High	High Terrace	Tree
<i>Alnus incana</i>	gray alder	27	20.4	High	Floodplain	Shrub
<i>Alnus viridis</i> ssp. <i>sinuata</i>	Sitka alder	18	65.0	High	Floodplain	Shrub
<i>Cornus sericea</i>	redosier dogwood	18	30.1	High	Floodplain	Shrub
<i>Crataegus douglasii</i>	black hawthorn	36	21.8	High	High Terrace	Shrub
<i>Lonicera caerulea</i>	sweetberry honeysuckle	9	30.0	Medium	High Terrace	Shrub
<i>Ribes hudsonianum</i>	northern black currant	27	11.7	Medium	Floodplain	Shrub
<i>Rubus parviflorus</i>	thimbleberry	18	16.0	Medium	High Terrace	Shrub
<i>Salix boothii</i>	Booth's willow	18	56.5	High	Floodplain	Shrub
<i>Salix eastwoodiae</i>	mountain willow	18	30.1	High	Floodplain	Shrub
<i>Salix geyeriana</i>	Geyer's willow	9	60.0	Medium	High Terrace	Shrub
<i>Salix lemmonii</i>	Lemmon's willow	18	41.0	High	High Terrace	Shrub
<i>Spiraea douglasii</i>	rose spirea	27	6.3	Low	Floodplain	Shrub
<i>Symphoricarpos albus</i>	common snowberry	45	20.8	High	High Terrace	Shrub
<i>Carex aquatilis</i>	water sedge	27	6.7	Low	Floodplain	Grass-like
<i>Carex deweyana</i>	Dewey sedge	45	6.2	Medium	Floodplain	Grass-like
<i>Carex jonesii</i>	Jones' sedge	9	40.0	Medium	Floodplain	Grass-like
<i>Carex lenticularis</i>	lakeshore sedge	9	20.0	Low	Floodplain	Grass-like
<i>Carex pellita</i>	woolly sedge	27	7.0	Low	Floodplain	Grass-like
<i>Carex stipata</i>	awlfruit sedge	27	8.4	Low	Floodplain	Grass-like
<i>Carex utriculata</i>	Northwest Territory sedge	27	8.4	Low	Floodplain	Grass-like
<i>Glyceria striata</i>	fowl mannagrass	36	6.0	Low	Floodplain	Grass
<i>Torreyochloa pallida</i> var. <i>pauciflora</i>	pale false mannagrass	36	5.3	Low	Floodplain	Grass
<i>Canadanthus modestus</i>	giant mountain aster	45	12.0	High	Floodplain	Forb
<i>Circaea alpina</i>	small enchanter's nightshade	36	11.0	Medium	High Terrace	Forb
<i>Claytonia cordifolia</i>	heartleaf springbeauty	18	15.0	Medium	High Terrace	Forb
<i>Dodecatheon jeffreyi</i>	Sierra shootingstar	18	10.5	Low	Floodplain	Forb
<i>Equisetum arvense</i>	field horsetail	64	16.9	High	Floodplain	Forb-like
<i>Galium triflorum</i>	fragrant bedstraw	55	7.4	Medium	High Terrace	Forb
<i>Heracleum maximum</i>	common cowparsnip	27	10.0	Medium	High Terrace	Forb
<i>Maianthemum stellatum</i>	starry false lily of the vally	45	7.4	Medium	High Terrace	Forb
<i>Montia chamissoi</i>	water minerslettuce	27	10.3	Medium	Floodplain	Forb
<i>Sanguisorba canadensis</i>	Canadian burnet	18	20.5	Medium	High Terrace	Forb
<i>Saxifraga odontoloma</i>	brook saxifrage	9	20.0	Low	Floodplain	Forb
<i>Streptopus amplexifolius</i>	claspleaf twistedstalk	36	5.5	Low	High Terrace	Forb
<i>Symphyotrichum</i>	aster	9	20.0	Low	High Terrace	Forb
<i>Viola palustris</i>	marsh violet	9	40.0	Medium	Floodplain	Forb
<i>Pteridium aquilinum</i>	western brackenfern	18	10.1	Low	High Terrace	Fern

Marshes and Aquatic Beds

ScientificName	Common Name	% Constancy	Mean % Cover	Species Priority	Planting Zone	Lifeform
<i>Carex utriculata</i>	Northwest Territory sedge	100	20.1	High	Shallow – long duration	Grass-like
<i>Glyceria borealis</i>	small floating mannagrass	50	90.0	High	Deep – long duration	Grass
<i>Scirpus microcarpus</i>	panicled bulrush	50	25.0	High	Shallow – long duration	Grass-like
<i>Lemna minor</i>	common duckweed	50	15.0	Medium	Deep – long duration	Forb
<i>Typha latifolia</i>	broadleaf cattail	50	90.0	High	Deep – long duration	Forb/Grass-like

Cold Springs

ScientificName	Common Name	Cover	Species Priority	Planting Zone	Lifeform
<i>Pinus ponderosa</i>	ponderosa pine	3.0	Medium	Saturated – short duration	Tree
<i>Alnus incana</i>	gray alder	15.0	High	Saturated – short duration	Shrub
<i>Cornus sericea</i>	redosier dogwood	3.0	Medium	Saturated – long duration	Shrub
<i>Carex amplifolia</i>	bigleaf sedge	90.0	High	Saturated – long duration	Grass-like
<i>Canadanthus modestus</i>	giant mountain aster	3.0	Medium	Saturated – short duration	Forb
<i>Circaea alpina</i>	small enchanter's nightshade	3.0	Medium	Saturated – short duration	Forb
<i>Epilobium ciliatum</i> ssp. <i>glandulosum</i>	fringed willowherb	4.0	Medium	Saturated – long duration	Forb
<i>Galium aparine</i>	stickywilly	50.0	High	Saturated – short duration	Forb
<i>Geum macrophyllum</i>	largeleaf avens	2.0	Medium	Saturated – short duration	Forb
<i>Heracleum maximum</i>	common cowparsnip	15.0	High	Saturated – short duration	Forb
<i>Mimulus moschatus</i>	muskflower	5.0	Medium	Saturated – short duration	Forb

Wet Meadows and Short-Willow - Bog Birch Shrublands

ScientificName	Common Name	% Constancy	Mean % Cover	Species Priority	Planting Zone	Lifeform
<i>Carex aquatilis</i>	water sedge	50	60.0	High	Shallow – long duration	Grass-like
<i>Carex illota</i>	sheep sedge	100	5.5	Medium	Saturated – short duration	Grass-like
<i>Deschampsia caespitosa</i>	tufted hairgrass	100	21.5	High	Shallow – short duration	Grass
<i>Eleocharis quinqueflora</i>	fewflower spikerush	100	16.5	High	Saturated – long duration	Grass-like
<i>Juncus balticus</i>	Baltic rush	50	3.0	Medium	Saturated – short duration	Grass-like
<i>Muhlenbergia filiformis</i>	pullup muhly	100	2.0	Medium	Saturated – short duration	Grass
<i>Antennaria corymbosa</i>	flat-top pussytoes	50	3.0	Medium	Saturated – short duration	Forb
<i>Camassia quamash</i>	small camas	100	16.5	High	Saturated – short duration	Forb
<i>Dodecatheon jeffreyi</i>	Sierra shootingstar	100	20.0	High	Shallow – short duration	Forb
<i>Mimulus primuloides</i>	primrose monkeyflower	100	1.6	Medium	Saturated – short duration	Forb
<i>Pedicularis groenlandica</i>	elephanthead lousewort	100	5.5	Medium	Shallow – short duration	Forb
<i>Penstemon globosus</i>	globe penstemon	100	5.1	Medium	Saturated – short duration	Forb
<i>Potentilla gracilis</i>	slender cinquefoil	100	26.5	High	Saturated – short duration	Forb
<i>Symphyotrichum</i>	aster	50	3.0	Medium	Saturated – short duration	Forb
<i>Trifolium longipes</i>	longstalk clover	100	15.1	High	Saturated – short duration	Forb

Ephemeral - Mesic Meadows and Seeps, Shrubby Cinquefoil Shrublands, and Intermittently Moist Drainages

ScientificName	Common Name	% Constancy	Mean % Cover	Species Priority	Planting Zone	Lifeform
<i>Carex microptera</i>	smallwing sedge	20	60.0	High	Saturated – short duration	Grass-like
<i>Carex multicosata</i>	manyrib sedge	20	15.0	Medium	Saturated – short duration	Grass-like
<i>Carex nebrascensis</i>	Nebraska sedge	20	10.0	Medium	Saturated – short duration	Grass-like
<i>Juncus balticus</i>	Baltic rush	40	30.1	High	Saturated – short duration	Grass-like
<i>Juncus howellii</i>	Howell's rush	60	5.0	Medium	Saturated – short duration	Grass-like
<i>Juncus nevadensis</i> var. <i>nevadensis</i>	Sierra rush	40	27.5	High	Saturated – short duration	Grass-like
<i>Achillea millefolium</i>	common yarrow	60	6.7	Medium	Saturated – short duration	Forb
<i>Camassia quamash</i>	small camas	60	23.3	High	Saturated – short duration	Forb
<i>Epilobium brachycarpum</i>	tall annual willowherb	20	30.0	High	Saturated – short duration	Forb
<i>Fragaria virginiana</i>	Virginia strawberry	20	20.0	Medium	Saturated – short duration	Forb
<i>Madia glomerata</i>	mountain tarweed	20	15.0	Medium	Saturated – short duration	Forb
<i>Penstemon globosus</i>	globe penstemon	20	20.0	Medium	Saturated – short duration	Forb
<i>Perideridia gairdneri</i>	Gardner's yampah	40	7.6	Medium	Saturated – short duration	Forb
<i>Potentilla gracilis</i>	slender cinquefoil	60	19.7	High	Saturated – short duration	Forb
<i>Senecio hydrophiloides</i>	tall groundsel	60	23.3	High	Saturated – short duration	Forb
<i>Trifolium longipes</i> ssp. <i>pedunculatum</i>	longstalk clover	40	4.5	Medium	Saturated – short duration	Forb
<i>Wyethia amplexicaulis</i>	mule-ears	20	80.0	High	Saturated – short duration	Forb

Montane ridges and stream valleys, volcanic flows, low relief, semi-arid

Foothill and Lower Montane Floodplain and Riparian Alluvial Terrace Woodlands and Shrublands

ScientificName	Common Name	% Constancy	Mean % Cover	Species Priority	Planting Zone	Lifeform
<i>Populus balsamifera ssp. trichocarpa</i>	black cottonwood	40	55.0	High	Floodplain	Tree
<i>Philadelphus lewisii</i>	Lewis' mock orange	40	2.0	Low	High Terrace	Shrub
<i>Ribes aureum</i>	golden currant	80	1.0	Low	High Terrace	Shrub
<i>Salix lasiolepis</i>	arroyo willow	40	50.0	High	Floodplain	Shrub
<i>Salix lucida ssp. caudata</i>	greenleaf willow	80	72.0	High	Floodplain	Shrub
<i>Salix lutea</i>	yellow willow	20	3.0	Low	Floodplain	Shrub
<i>Clematis ligusticifolia</i>	western white clematis	60	4.7	Medium	High Terrace	Vine
<i>Elymus glaucus</i>	blue wildrye	80	14.3	High	High Terrace	Grass
<i>Scirpus microcarpus</i>	panicled bulrush	40	5.5	Medium	Floodplain	Grass-like
<i>Torreyochloa pallida var. pauciflora</i>	pale false mannagrass	20	60.0	High	Floodplain	Grass
<i>Galium aparine</i>	stickywilly	40	10.5	Medium	High Terrace	Forb

Montane Riparian Alluvial Terrace Woodlands and Shrublands

ScientificName	Common Name	% Constancy	Mean % Cover	Species Priority	Planting Zone	Lifeform
<i>Populus tremuloides</i>	quaking aspen	50	60.0	High	High Terrace	Tree
<i>Rosa woodsii</i>	Woods' rose	100	10.5	High	High Terrace	Shrub
<i>Salix boothii</i>	Booth's willow	100	40.0	High	Floodplain	Shrub
<i>Salix lemmonii</i>	Lemmon's willow	100	22.0	High	High Terrace	Shrub
<i>Salix lucida ssp. caudata</i>	greenleaf willow	50	20.0	High	Floodplain	Shrub
<i>Salix planifolia var. planifolia</i>	diamond willow	50	25.0	High	High Terrace	Shrub
<i>Spiraea douglasii</i>	rose spirea	50	50.0	High	Floodplain	Shrub
<i>Symphoricarpos albus</i>	common snowberry	50	50.0	High	High Terrace	Shrub
<i>Elymus glaucus</i>	blue wildrye	50	3.0	Low	High Terrace	Grass
<i>Glyceria striata</i>	fowl mannagrass	50	4.0	Low	Floodplain	Grass
<i>Scirpus microcarpus</i>	panicled bulrush	50	10.0	Medium	Floodplain	Grass-like
<i>Cardamine oligosperma</i>	little western bittercress	50	4.0	Low	Floodplain	Forb
<i>Geum macrophyllum</i>	largeleaf avens	100	2.0	Low	High Terrace	Forb
<i>Maianthemum stellatum</i>	starry false lily of the vally	100	2.0	Low	High Terrace	Forb
<i>Montia chamissoi</i>	water minerslettuce	50	4.0	Low	Floodplain	Forb
<i>Senecio hydrophiloides</i>	tall groundwel	50	6.0	Medium	Floodplain	Forb
<i>Veratrum californicum</i>	California false hellebore	50	25.0	High	High Terrace	Forb
<i>Veronica americana</i>	American speedwell	50	7.0	Medium	Floodplain	Forb

Ephemeral - Mesic Meadows and Seeps, Shrubby Cinquefoil Shrublands, and Intermittently Moist Drainages

ScientificName	Common Name	% Constancy	Mean % Cover	Species Priority	Planting Zone	Lifeform
Achnatherum nelsonii ssp. dorei	Dore's needlegrass	50	5.0	Medium	Saturated – short duration	Grass
Carex nebrascensis	Nebraska sedge	50	20.0	High	Shallow – short duration	Grass-like
Carex praeegracilis	clustered field sedge	50	7.0	Medium	Saturated – short duration	Grass-like
Danthonia californica	California oatgrass	100	16.0	High	Saturated – short duration	Grass
Deschampsia caespitosa	tufted hairgrass	100	15.1	High	Shallow – short duration	Grass
Hordeum brachyantherum	meadow barley	50	30.0	High	Saturated – short duration	Grass
Juncus confusus	Colorado rush	100	20.0	High	Saturated – short duration	Grass-like
Penstemon attenuatus	sulphur penstemon	50	50.0	High	Saturated – short duration	Forb
Polygonum bistortoides	American bistort	50	4.0	Medium	Shallow – short duration	Forb
Potentilla gracilis	slender cinquefoil	50	20.0	High	Saturated – short duration	Forb
Senecio integerrimus	lambstongue ragwort	50	6.0	Medium	Saturated – short duration	Forb
Wyethia helianthoides	sunflower mule-ears	50	60.0	High	Saturated – short duration	Forb

Montane ridges and stream valleys, batholith, moderate relief, cool temperate

Foothill and Lower Montane Floodplain and Riparian Alluvial Terrace Woodlands and Shrublands

ScientificName	Common Name	% Constancy	Mean % Cover	Species Priority	Planting Zone	Lifeform
<i>Pinus ponderosa</i>	ponderosa pine	43	40.0	High	High Terrace	Tree
<i>Populus balsamifera</i> ssp. <i>trichocarpa</i>	black cottonwood	50	15.2	High	Floodplain	Tree
<i>Alnus incana</i>	gray alder	21	14.0	Medium	Floodplain	Shrub
<i>Amelanchier alnifolia</i>	Saskatoon serviceberry	43	9.9	Medium	High Terrace	Shrub
<i>Betula occidentalis</i>	water birch	29	38.5	High	Floodplain	Shrub
<i>Cornus sericea</i>	redosier dogwood	57	4.9	Medium	Floodplain	Shrub
<i>Crataegus douglasii</i>	black hawthorn	36	25.2	High	High Terrace	Shrub
<i>Philadelphus lewisii</i>	Lewis' mock orange	36	15.6	High	High Terrace	Shrub
<i>Rubus idaeus</i>	American red raspberry	14	13.0	Low	High Terrace	Shrub
<i>Rubus parviflorus</i>	thimbleberry	29	29.5	High	High Terrace	Shrub
<i>Salix lucida</i> ssp. <i>caudata</i>	greenleaf willow	21	19.0	Medium	Floodplain	Shrub
<i>Salix melanopsis</i>	dusky willow	29	28.3	High	Floodplain	Shrub
<i>Symphoricarpos albus</i>	common snowberry	36	19.6	High	High Terrace	Shrub
<i>Carex lenticularis</i>	lakeshore sedge	29	19.5	High	Floodplain	Grass-like
<i>Carex pellita</i>	woolly sedge	50	5.2	Medium	Floodplain	Grass-like
<i>Eleocharis palustris</i>	common spikerush	21	13.0	Medium	Floodplain	Grass-like
<i>Elymus glaucus</i>	blue wildrye	57	3.2	Low	High Terrace	Grass
<i>Poa wheeleri</i>	Wheeler's bluegrass	29	7.8	Low	High Terrace	Grass
<i>Apocynum androsaemifolium</i>	spreading dogbane	14	12.5	Low	Floodplain	Forb
<i>Equisetum arvense</i>	field horsetail	29	7.8	Low	Floodplain	Forb-like

Montane Riparian Alluvial Terrace Woodlands and Shrublands

ScientificName	Common Name	% Constancy	Mean % Cover	Species Priority	Planting Zone	Lifeform
<i>Pinus ponderosa</i>	ponderosa pine	17	30.0	High	High Terrace	Tree
<i>Pseudotsuga menziesii</i>	Douglas-fir	33	25.5	High	High Terrace	Tree
<i>Acer glabrum</i>	Rocky Mountain maple	50	7.7	Medium	High Terrace	Shrub
<i>Cornus sericea</i>	redosier dogwood	50	45.0	High	Floodplain	Shrub
<i>Frangula purshiana</i>	Pursh's buckthorn	17	50.0	High	High Terrace	Shrub
<i>Mahonia repens</i>	creeping barberry	33	16.0	High	High Terrace	Shrub
<i>Ribes inerme</i>	whitestem gooseberry	33	4.0	Low	High Terrace	Shrub
<i>Rubus parviflorus</i>	thimbleberry	33	13.0	Medium	High Terrace	Shrub
<i>Salix boothii</i>	Booth's willow	33	60.0	High	Floodplain	Shrub
<i>Salix drummondiana</i>	Drummond's willow	33	8.5	Medium	Floodplain	Shrub
<i>Salix exigua</i>	narrowleaf willow	17	70.0	High	Floodplain	Shrub
<i>Salix lemmonii</i>	Lemmon's willow	17	10.0	Low	High Terrace	Shrub
<i>Salix lucida ssp. caudata</i>	greenleaf willow	17	10.0	Low	Floodplain	Shrub
<i>Salix melanopsis</i>	dusky willow	33	10.0	Medium	Floodplain	Shrub
<i>Sambucus nigra ssp. cerulea</i>	blue elderberry	17	20.0	Medium	High Terrace	Shrub
<i>Calamagrostis canadensis</i>	bluejoint	33	10.1	Medium	Floodplain	Grass
<i>Carex subfusca</i>	brown sedge	33	3.6	Low	High Terrace	Grass-like
<i>Elymus glaucus</i>	blue wildrye	67	4.0	Medium	High Terrace	Grass
<i>Galium mexicanum ssp. asperulum</i>	Mexican bedstraw	50	5.3	Medium	High Terrace	Forb

Marshes and Aquatic Beds

ScientificName	Common Name	Cover	Species Priority	Planting Zone	Lifeform
<i>Potamogeton</i>	pondweed	0.1	Medium	Deep – long duration	Forb
<i>Ranunculus aquatilis</i>	whitewater crowfoot	98.0	High	Deep – long duration	Forb

Geothermal "Hot" Springs

ScientificName	Common Name	Cover	Species Priority	Planting Zone	Lifeform
<i>Carex cusickii</i>	Cusick's sedge	90.0	High	Saturated – long duration	Grass-like
<i>Eleocharis palustris</i>	common spikerush	20.0	High	Saturated – long duration	Grass-like
<i>Schoenoplectus americanus</i>	chairmaker's bulrush	3.0	Medium	Saturated – long duration	Grass-like
<i>Scirpus microcarpus</i>	panicled bulrush	10.0	High	Saturated – long duration	Grass-like
<i>Cicuta douglasii</i>	western water hemlock	3.0	Medium	Saturated – long duration	Forb
<i>Symphyotrichum ascendens</i>	western aster	10.0	High	Saturated – short duration	Forb

High northern mountains and glacial outwash valleys, batholith, high relief, snowy

Foothill and Lower Montane Floodplain and Riparian Alluvial Terrace Woodlands and Shrublands

ScientificName	Common Name	% Constancy	Mean % Cover	Species Priority	Planting Zone	Lifeform
<i>Cornus sericea</i>	redosier dogwood	50	50.0	High	Floodplain	Shrub
<i>Ribes hudsonianum</i>	northern black currant	50	50.0	High	Floodplain	Shrub
<i>Ribes inerme</i>	whitestem gooseberry	50	5.0	Medium	High Terrace	Shrub
<i>Salix melanopsis</i>	dusky willow	50	60.0	High	Floodplain	Shrub
<i>Carex lenticularis</i>	lakeshore sedge	50	4.0	Medium	Floodplain	Grass-like
<i>Carex microptera</i>	smallwing sedge	50	3.0	Low	High Terrace	Grass-like
<i>Cinna latifolia</i>	drooping woodreed	50	10.0	High	Floodplain	Grass
<i>Angelica arguta</i>	Lyall's angelica	50	5.0	Medium	High Terrace	Forb
<i>Claytonia cordifolia</i>	heartleaf springbeauty	50	5.0	Medium	High Terrace	Forb
<i>Epilobium ciliatum</i> ssp. <i>glandulosum</i>	fringed willowherb	100	3.0	Medium	Floodplain	Forb
<i>Equisetum arvense</i>	field horsetail	50	7.0	Medium	Floodplain	Forb-like
<i>Geum macrophyllum</i>	largeleaf avens	50	3.0	Low	High Terrace	Forb
<i>Mitella pentandra</i>	five-stamen miterwort	50	20.0	High	High Terrace	Forb
<i>Saxifraga odontoloma</i>	brook saxifrage	50	30.0	High	Floodplain	Forb
<i>Symphotrichum foliaceum</i>	alpine leafybract aster	50	3.0	Low	Floodplain	Forb

Montane Riparian Alluvial Terrace Woodlands and Shrublands

ScientificName	Common Name	% Constancy	Mean % Cover	Species Priority	Planting Zone	Lifeform
<i>Abies grandis</i>	grand fir	11	22.5	Low	High Terrace	Tree
<i>Abies lasiocarpa</i>	subalpine fir	49	18.5	High	High Terrace	Tree
<i>Picea engelmannii</i>	Engelmann spruce	49	24.0	High	High Terrace	Tree
<i>Pinus contorta</i>	lodgepole pine	20	13.0	Low	High Terrace	Tree
<i>Acer glabrum</i>	Rocky Mountain maple	11	24.8	Medium	High Terrace	Shrub
<i>Alnus incana</i>	gray alder	14	8.2	Low	Floodplain	Shrub
<i>Alnus viridis</i> ssp. <i>sinuata</i>	Sitka alder	20	33.9	High	Floodplain	Shrub
<i>Betula nana</i>	dwarf birch	9	30.3	Medium	Floodplain	Shrub
<i>Cornus sericea</i>	redosier dogwood	17	33.8	High	Floodplain	Shrub
<i>Lonicera caerulea</i>	sweetberry honeysuckle	29	16.6	Medium	High Terrace	Shrub
<i>Menziesia ferruginea</i>	rusty menziesia	9	31.7	Medium	High Terrace	Shrub
<i>Rhamnus alnifolia</i>	alderleaf buckthorn	9	30.0	Low	High Terrace	Shrub
<i>Ribes inerme</i>	whitestem gooseberry	11	20.8	Low	High Terrace	Shrub
<i>Ribes lacustre</i>	prickly currant	29	8.2	Low	High Terrace	Shrub
<i>Rubus parviflorus</i>	thimbleberry	20	10.3	Low	High Terrace	Shrub

Montane Riparian Alluvial Terrace Woodlands and Shrublands continued.

ScientificName	Common Name	% Constancy	Mean % Cover	Species Priority	Planting Zone	Lifeform
<i>Salix drummondiana</i>	Drummond's willow	29	42.2	High	Floodplain	Shrub
<i>Salix eastwoodiae</i>	mountain willow	37	26.2	High	Floodplain	Shrub
<i>Salix lemmonii</i>	Lemmon's willow	11	67.5	High	High Terrace	Shrub
<i>Salix planifolia</i> var. <i>monica</i>	diamondleaf willow	14	15.2	Low	Floodplain	Shrub
<i>Salix wolfii</i>	Wolf's willow	11	27.5	Medium	High Terrace	Shrub
<i>Vaccinium membranaceum</i>	thinleaf huckleberry	23	10.8	Low	High Terrace	Shrub
<i>Bromus ciliatus</i>	fringed brome	29	5.0	Low	High Terrace	Grass
<i>Calamagrostis canadensis</i>	bluejoint	71	36.1	High	Floodplain	Grass
<i>Carex aquatilis</i>	water sedge	40	16.9	High	Floodplain	Grass-like
<i>Carex scopulorum</i>	mountain sedge	37	8.7	Medium	Floodplain	Grass-like
<i>Carex vesicaria</i>	blister sedge	17	10.0	Low	Floodplain	Grass-like
<i>Deschampsia caespitosa</i>	tufted hairgrass	20	7.7	Low	Floodplain	Grass
<i>Festuca subulata</i>	bearded fescue	14	8.6	Low	High Terrace	Grass
<i>Caltha leptosepala</i> ssp. <i>howellii</i>	Howell's marsh marigold	6	25.1	Low	Floodplain	Forb
<i>Canadanthus modestus</i>	giant mountain aster	20	8.3	Low	Floodplain	Forb
<i>Circaea alpina</i>	small enchanter's nightshade	9	15.0	Low	High Terrace	Forb
<i>Claytonia cordifolia</i>	heartleaf springbeauty	40	4.5	Low	High Terrace	Forb
<i>Dodecatheon jeffreyi</i>	Sierra shootingstar	46	4.2	Low	Floodplain	Forb
<i>Fragaria virginiana</i>	Virginia strawberry	49	4.6	Low	High Terrace	Forb
<i>Galium triflorum</i>	fragrant bedstraw	29	5.0	Low	High Terrace	Forb
<i>Lupinus polyphyllus</i>	bigleaf lupine	23	5.1	Low	Floodplain	Forb
<i>Mitella pentandra</i>	five-stamen miterwort	49	3.2	Low	High Terrace	Forb
<i>Penstemon globosus</i>	globe penstemon	23	7.3	Low	Floodplain	Forb
<i>Streptopus amplexifolius</i>	claspleaf twistedstalk	37	3.4	Low	High Terrace	Forb
<i>Symphotrichum foliaceum</i>	alpine leafybract aster	66	6.9	Medium	Floodplain	Forb
<i>Thalictrum occidentale</i>	western meadow-rue	43	7.0	Medium	High Terrace	Forb
<i>Viola orbiculata</i>	darkwoods violet	40	5.7	Low	High Terrace	Forb
<i>Pteridium aquilinum</i>	western brackenfern	3	70.0	Low	High Terrace	Fern

Marshes and Aquatic Beds

ScientificName	Common Name	% Constancy	Mean % Cover	Species Priority	Planting Zone	Lifeform
<i>Carex utriculata</i>	Northwest Territory sedge	80	13.0	High	Shallow – long duration	Grass-like
<i>Eleocharis acicularis</i>	needle spikerush	20	70.0	High	Shallow – long duration	Grass-like
<i>Sparganium angustifolium</i>	narrowleaf bur-reed	20	80.0	High	Shallow – long duration	Grass-like
<i>Sparganium natans</i>	small bur-reed	20	40.0	High	Shallow – long duration	Grass-like
<i>Nuphar lutea</i> ssp. <i>polysepala</i>	Rocky Mountain pond-lily	40	35.0	High	Very deep – permanent	Forb
<i>Potamogeton</i> (e.g., <i>P. foliosus</i>)	pondweed	20	20.0	Medium	Very deep – permanent	Forb

Geothermal “Hot” Springs

ScientificName	Common Name	% Constancy	Mean % Cover	Species Priority	Planting Zone	Lifeform
<i>Dichanthelium acuminatum</i> var. <i>fasciculatum</i>	western panicgrass	100	25.1	High	Saturated – short duration	Grass
<i>Eleocharis rostellata</i>	beaked spikerush	50	80.0	High	Saturated – long duration	Grass-like
<i>Juncus bufonius</i>	toad rush	50	30.0	High	Saturated – short duration	Grass-like
<i>Mimulus guttatus</i>	seep monkeyflower	50	5.0	Medium	Saturated – short duration	Forb
<i>Symphyotrichum eatonii</i>	Eaton's aster	50	15.0	High	Saturated – short duration	Forb

Vernal pools, Seasonally Flooded Pools, and Isolated Depressional Wetlands

ScientificName	Common Name	% Constancy	Mean % Cover	Species Priority	Planting Zone	Lifeform
<i>Carex aquatilis</i>	water sedge	50	10.0	Medium	Shallow – long duration	Grass-like
<i>Carex utriculata</i>	Northwest Territory sedge	50	20.0	High	Shallow – long duration	Grass-like
<i>Carex vesicaria</i>	blister sedge	100	75.0	High	Shallow – long duration	Grass-like

Wet Meadows and Short-Willow - Bog Birch Shrublands

ScientificName	Common Name	% Constancy	Mean % Cover	Species Priority	Planting Zone	Lifeform
<i>Lonicera caerulea</i>	sweetberry honeysuckle	41	7.6	Medium	Saturated – short duration	Shrub
<i>Salix eastwoodiae</i>	mountain willow	18	10.8	Medium	Shallow – short duration	Shrub
<i>Salix planifolia</i> var. <i>monica</i>	diamondleaf willow	44	33.7	High	Saturated – long duration	Shrub
<i>Salix wolfii</i>	Wolf's willow	36	41.9	High	Saturated – short duration	Shrub
<i>Vaccinium uliginosum</i>	bog blueberry	18	10.3	Medium	Saturated – long duration	Shrub
<i>Calamagrostis canadensis</i>	bluejoint	38	28.6	High	Saturated – short duration	Grass
<i>Carex aquatilis</i>	water sedge	79	22.6	High	Shallow – long duration	Grass-like
<i>Carex luzulina</i>	woodrush sedge	23	17.6	High	Shallow – short duration	Grass-like
<i>Carex scopulorum</i>	mountain sedge	10	30.0	Medium	Saturated – long duration	Grass-like
<i>Carex utriculata</i>	Northwest Territory sedge	62	22.2	High	Shallow – long duration	Grass-like
<i>Deschampsia caespitosa</i>	tufted hairgrass	72	23.9	High	Shallow – short duration	Grass
<i>Juncus balticus</i>	Baltic rush	46	12.0	High	Saturated – short duration	Grass-like
<i>Muhlenbergia filiformis</i>	pullup muhly	46	7.5	Medium	Saturated – short duration	Grass
<i>Antennaria corymbosa</i>	flat-top pussytoes	51	5.6	Medium	Saturated – short duration	Forb
<i>Dodecatheon jeffreyi</i>	Sierra shootingstar	44	6.0	Medium	Shallow – short duration	Forb
<i>Penstemon globosus</i>	globe penstemon	41	12.5	High	Saturated – short duration	Forb
<i>Ranunculus alismifolius</i>	plantainleaf buttercup	13	14.0	Medium	Saturated – short duration	Forb
<i>Symphyotrichum foliaceum</i>	alpine leafybract aster	41	8.3	Medium	Saturated – short duration	Forb
<i>Symphyotrichum spathulatum</i> var. <i>spathulatum</i>	western mountain aster	49	11.1	High	Saturated – short duration	Forb

Ephemeral - Mesic Meadows and Seeps, Shrubby Cinquefoil Shrublands, and Intermittently Moist Drainages

ScientificName	Common Name	% Constancy	Mean % Cover	Species Priority	Planting Zone	Lifeform
<i>Dasiphora floribunda</i>	shrubby cinquefoil	36	42.5	High	Saturated – short duration	Shrub
<i>Carex aquatilis</i>	water sedge	45	7.4	Medium	Shallow – short duration	Grass-like
<i>Carex microptera</i>	smallwing sedge	55	23.9	High	Saturated – short duration	Grass-like
<i>Carex praticola</i>	meadow sedge	55	4.7	Medium	Saturated – short duration	Grass-like
<i>Carex subfusca</i>	brown sedge	27	15.0	Medium	Saturated – short duration	Grass-like
<i>Juncus balticus</i>	Baltic rush	45	7.8	Medium	Saturated – short duration	Grass-like
<i>Danthonia intermedia</i>	timber oatgrass	55	26.0	High	Saturated – short duration	Grass
<i>Deschampsia caespitosa</i>	tufted hairgrass	55	15.9	High	Shallow – short duration	Grass
<i>Hordeum brachyantherum</i>	meadow barley	45	33.4	High	Saturated – short duration	Grass
<i>Koeleria macrantha</i>	prairie Junegrass	18	18.0	Medium	Saturated – short duration	Grass
<i>Melica bulbosa</i>	oniongrass	9	25.0	Low	Saturated – short duration	Grass
<i>Achillea millefolium</i>	common yarrow	82	6.0	High	Saturated – short duration	Forb
<i>Agoseris glauca</i>	pale agoseris	36	9.0	Medium	Saturated – short duration	Forb
<i>Antennaria corymbosa</i>	flat-top pussytoes	45	7.6	Medium	Saturated – short duration	Forb
<i>Eurybia integrifolia</i>	thickstem aster	55	11.5	High	Saturated – short duration	Forb
<i>Gentiana affinis</i>	pleated gentian	55	6.0	Medium	Saturated – short duration	Forb
<i>Packera pseudoaurea</i> var. <i>pseudoaurea</i>	falsegold groundsel	18	11.5	Low	Saturated – short duration	Forb
<i>Penstemon globosus</i>	globe penstemon	82	12.8	High	Saturated – short duration	Forb
<i>Potentilla diversifolia</i>	varileaf cinquefoil	55	6.2	Medium	Saturated – short duration	Forb
<i>Symphotrichum foliaceum</i>	alpine leafybract aster	45	13.0	High	Saturated – short duration	Forb
<i>Symphotrichum spathulatum</i> var. <i>spathulatum</i>	western mountain aster	55	10.5	High	Saturated – short duration	Forb

Subalpine Avalanche Chutes, Conifer Woodland, Shrubland, and Meadow Wetland Complex

ScientificName	Common Name	% Constancy	Mean % Cover	Species Priority	Planting Zone	Lifeform
<i>Abies lasiocarpa</i>	subalpine fir	100	7.7	High	Saturated – short duration	Tree
<i>Picea engelmannii</i>	Engelmann spruce	67	12.5	High	Saturated – short duration	Tree
<i>Alnus viridis</i> ssp. <i>sinuata</i>	Sitka alder	33	90.0	High	Saturated – short duration	Shrub
<i>Ledum glandulosum</i>	western Labrador tea	67	7.0	Medium	Saturated – short duration	Shrub
<i>Phyllodoce empetriformis</i>	pink mountainheath	67	30.0	High	Saturated – short duration	Shrub
<i>Vaccinium scoparium</i>	grouse whortleberry	67	20.0	High	Saturated – short duration	Shrub
<i>Agrostis</i>	bentgrass	33	10.0	Medium	Saturated – short duration	Grass
<i>Calamagrostis canadensis</i>	bluejoint	33	20.0	Medium	Saturated – short duration	Grass
<i>Carex scopulorum</i>	mountain sedge	33	20.0	Medium	Shallow – short duration	Grass-like
<i>Eleocharis quinqueflora</i>	fewflower spikerush	33	10.0	Medium	Saturated – long duration	Grass-like
<i>Antennaria umbrinella</i>	umber pussytoes	33	15.0	Medium	Saturated – short duration	Forb
<i>Claytonia cordifolia</i>	heartleaf springbeauty	33	15.0	Medium	Saturated – short duration	Forb
<i>Dodecatheon jeffreyi</i>	Sierra shootingstar	67	16.5	High	Shallow – short duration	Forb
<i>Gentiana calycosa</i>	Rainier pleated gentian	67	11.5	High	Saturated – short duration	Forb
<i>Ligusticum tenuifolium</i>	Idaho licorice-root	67	5.5	Medium	Saturated – short duration	Forb
<i>Luzula glabrata</i> var. <i>hitchcockii</i>	Hitchcock's smooth woodrush	67	8.5	Medium	Saturated – short duration	Forb
<i>Potentilla flabellifolia</i>	high mountain cinquefoil	67	11.5	High	Saturated – short duration	Forb
<i>Symphotrichum foliaceum</i>	alpine leafybract aster	67	11.0	High	Saturated – short duration	Forb
<i>Thalictrum occidentale</i>	western meadow-rue	33	20.0	Medium	Saturated – short duration	Forb

High southern mountains, batholith, high relief, snowy

Foothill and Lower Montane Floodplain and Riparian Alluvial Terrace Woodlands and Shrublands

ScientificName	Common Name	% Constancy	Mean % Cover	Species Priority	Planting Zone	Lifeform
<i>Pinus ponderosa</i>	ponderosa pine	35	23.0	High	High Terrace	Tree
<i>Populus balsamifera</i> ssp. <i>trichocarpa</i>	black cottonwood	35	21.5	High	Floodplain	Tree
<i>Acer glabrum</i>	Rocky Mountain maple	13	22.0	Medium	High Terrace	Shrub
<i>Alnus incana</i>	gray alder	39	20.7	High	Floodplain	Shrub
<i>Amelanchier alnifolia</i>	Saskatoon serviceberry	35	8.8	Medium	High Terrace	Shrub
<i>Betula occidentalis</i>	water birch	9	55.0	High	Floodplain	Shrub
<i>Cornus sericea</i>	redosier dogwood	57	7.7	Medium	Floodplain	Shrub
<i>Crataegus douglasii</i>	black hawthorn	39	23.2	High	High Terrace	Shrub
<i>Salix boothii</i>	Booth's willow	30	7.6	Medium	Floodplain	Shrub
<i>Salix exigua/melanopsis</i> hybrid		22	10.2	Medium	Floodplain	Shrub
<i>Salix lucida</i> ssp. <i>caudata</i>	greenleaf willow	35	7.2	Medium	Floodplain	Shrub
<i>Salix melanopsis</i>	dusky willow	39	37.0	High	Floodplain	Shrub
<i>Symphoricarpos albus</i>	common snowberry	17	18.3	Medium	High Terrace	Shrub
<i>Calamagrostis canadensis</i>	bluejoint	39	4.9	Low	Floodplain	Grass
<i>Carex lenticularis</i>	lakeshore sedge	52	12.9	High	Floodplain	Grass-like
<i>Carex pellita</i>	woolly sedge	48	3.3	Low	Floodplain	Grass-like
<i>Eleocharis palustris</i>	common spikerush	17	18.0	Medium	Floodplain	Grass-like
<i>Elymus glaucus</i>	blue wildrye	57	3.8	Medium	High Terrace	Grass
<i>Juncus covillei</i>	Coville's rush	26	5.0	Low	Floodplain	Grass-like
<i>Poa wheeleri</i>	Wheeler's bluegrass	13	29.3	Medium	High Terrace	Grass
<i>Canadanthus modestus</i>	giant mountain aster	43	3.4	Low	Floodplain	Forb
<i>Equisetum arvense</i>	field horsetail	65	4.4	Medium	Floodplain	Forb-like
<i>Maianthemum stellatum</i>	starry false lily of the vally	35	5.3	Low	High Terrace	Forb
<i>Mentha arvensis</i>	wild mint	39	5.3	Medium	Floodplain	Forb
<i>Solidago canadensis</i>	Canada goldenrod	43	3.9	Low	High Terrace	Forb
<i>Pteridium aquilinum</i>	western brackenfern	4	50.0	Medium	High Terrace	Fern

Montane Riparian Alluvial Terrace Woodlands and Shrublands

ScientificName	Common Name	% Constancy	Mean % Cover	Species Priority	Planting Zone	Lifeform
<i>Abies lasiocarpa</i>	subalpine fir	19	13.1	Medium	High Terrace	Tree
<i>Picea engelmannii</i>	Engelmann spruce	18	39.6	High	High Terrace	Tree
<i>Populus tremuloides</i>	quaking aspen	6	38.3	Medium	High Terrace	Tree
<i>Acer glabrum</i>	Rocky Mountain maple	23	12.6	Medium	High Terrace	Shrub
<i>Alnus incana</i>	gray alder	39	25.0	High	Floodplain	Shrub
<i>Alnus viridis ssp. sinuata</i>	Sitka alder	8	37.0	Medium	Floodplain	Shrub
<i>Amelanchier alnifolia</i>	Saskatoon serviceberry	44	7.5	Medium	High Terrace	Shrub
<i>Cornus sericea</i>	redosier dogwood	56	20.3	High	Floodplain	Shrub
<i>Crataegus douglasii</i>	black hawthorn	19	25.0	Medium	High Terrace	Shrub
<i>Frangula purshiana</i>	Pursh's buckthorn	18	12.9	Medium	High Terrace	Shrub
<i>Linnaea borealis</i>	twinflower	10	15.9	Low	High Terrace	Shrub
<i>Rhamnus alnifolia</i>	alderleaf buckthorn	26	42.8	High	High Terrace	Shrub
<i>Ribes hudsonianum</i>	northern black currant	44	13.5	High	Floodplain	Shrub
<i>Ribes inerme</i>	whitestem gooseberry	29	7.1	Low	High Terrace	Shrub
<i>Ribes lacustre</i>	prickly currant	35	6.4	Medium	High Terrace	Shrub
<i>Rubus parviflorus</i>	thimbleberry	37	8.1	Medium	High Terrace	Shrub
<i>Salix boothii</i>	Booth's willow	26	30.4	High	Floodplain	Shrub
<i>Salix drummondiana</i>	Drummond's willow	24	40.5	High	Floodplain	Shrub
<i>Salix eastwoodiae</i>	mountain willow	3	90.0	Medium	Floodplain	Shrub
<i>Salix lemmonii</i>	Lemmon's willow	5	50.7	Medium	High Terrace	Shrub
<i>Salix lutea</i>	yellow willow	6	22.5	Low	Floodplain	Shrub
<i>Salix scouleriana</i>	Scouler's willow	19	18.4	Medium	High Terrace	Shrub
<i>Spiraea douglasii</i>	rose spirea	29	17.1	Medium	High Terrace	Shrub
<i>Bromus vulgaris</i>	Columbia brome	32	4.7	Low	High Terrace	Grass
<i>Calamagrostis canadensis</i>	bluejoint	31	14.3	Medium	Floodplain	Grass
<i>Carex deweyana</i>	Dewey sedge	53	2.8	Low	Floodplain	Grass-like
<i>Elymus glaucus</i>	blue wildrye	61	4.3	Medium	High Terrace	Grass
<i>Festuca subulata</i>	bearded fescue	42	4.1	Low	High Terrace	Grass
<i>Glyceria striata</i>	fowl mannagrass	63	3.8	Medium	Floodplain	Grass
<i>Circaea alpina</i>	small enchanter's nightshade	35	7.3	Medium	High Terrace	Forb
<i>Claytonia cordifolia</i>	heartleaf springbeauty	44	8.5	Medium	High Terrace	Forb
<i>Corydalis caseana ssp. cusickii</i>	Cusick's fumewort	21	7.7	Low	Floodplain	Forb
<i>Galium triflorum</i>	fragrant bedstraw	73	2.9	Low	High Terrace	Forb
<i>Heracleum maximum</i>	common cowparsnip	35	5.0	Low	High Terrace	Forb
<i>Maianthemum stellatum</i>	starry false lily of the vally	53	3.5	Low	High Terrace	Forb
<i>Rudbeckia occidentalis</i>	western coneflower	42	3.6	Low	High Terrace	Forb
<i>Thalictrum occidentale</i>	western meadow-rue	74	4.4	Medium	High Terrace	Forb
<i>Urtica dioica</i>	stinging nettle	55	4.3	Medium	High Terrace	Forb
<i>Athyrium filix-femina</i>	common ladyfern	21	8.8	Low	Floodplain	Fern
<i>Pteridium aquilinum</i>	western brackenfern	11	19.7	Low	High Terrace	Fern

Marshes and Aquatic Beds

ScientificName	Common Name	% Constancy	Mean % Cover	Species Priority	Planting Zone	Lifeform
<i>Agrostis scabra</i>	rough bentgrass	67	3.0	Medium	Shallow – short duration	Grass
<i>Carex cusickii</i>	Cusick's sedge	67	36.0	High	Shallow – long duration	Grass-like
<i>Carex utriculata</i>	Northwest Territory sedge	67	5.5	Medium	Shallow – long duration	Grass-like
<i>Eleocharis palustris</i>	common spikerush	67	5.1	Medium	Shallow – long duration	Grass-like
<i>Glyceria borealis</i>	small floating mannagrass	33	50.0	High	Deep – long duration	Grass
<i>Glyceria striata</i>	fowl mannagrass	33	50.0	High	Shallow – short duration	Grass
<i>Juncus ensifolius</i>	swordleaf rush	33	60.0	High	Shallow – short duration	Grass-like
<i>Scirpus microcarpus</i>	panicled bulrush	67	3.0	Medium	Shallow – long duration	Grass-like
<i>Sparganium angustifolium</i>	narrowleaf bur-reed	67	5.5	Medium	Deep – long duration	Grass-like
<i>Lemna minor</i>	common duckweed	67	25.0	High	Deep – long duration	Forb

Geothermal "Hot" Springs

ScientificName	Common Name	% Constancy	Mean % Cover	Species Priority	Planting Zone	Lifeform
<i>Carex cusickii</i>	Cusick's sedge	71	10.4	High	Saturated – long duration	Grass-like
<i>Carex pellita</i>	woolly sedge	29	8.5	Medium	Saturated – short duration	Grass-like
<i>Eleocharis quinqueflora</i>	fewflower spikerush	14	70.0	High	Saturated – long duration	Grass-like
<i>Eleocharis rostellata</i>	beaked spikerush	57	37.5	High	Saturated – long duration	Grass-like
<i>Juncus ensifolius</i>	swordleaf rush	86	12.7	High	Saturated – short duration	Grass-like
<i>Muhlenbergia richardsonis</i>	mat muhly	57	7.0	Medium	Saturated – short duration	Grass
<i>Schoenoplectus americanus</i>	chairmaker's bulrush	86	41.7	High	Saturated – long duration	Grass-like
<i>Cicuta douglasii</i>	western water hemlock	14	20.0	Medium	Saturated – long duration	Forb
<i>Mentha arvensis</i>	wild mint	29	9.0	Medium	Saturated – short duration	Forb
<i>Mimulus guttatus</i>	seep monkeyflower	71	6.2	Medium	Saturated – short duration	Forb
<i>Symphotrichum ascendens</i>	western aster	100	5.2	High	Saturated – short duration	Forb
<i>Viola</i>	violet	29	11.0	Medium	Saturated – short duration	Forb

Cold Springs

ScientificName	Common Name	% Constancy	Mean % Cover	Species Priority	Planting Zone	Lifeform
<i>Rhamnus alnifolia</i>	alderleaf buckthorn	60	17.3	High	Saturated – short duration	Shrub
<i>Salix bebbiana</i>	Bebb willow	40	20.1	High	Saturated – short duration	Shrub
<i>Carex amplifolia</i>	bigleaf sedge	40	60.0	High	Saturated – long duration	Grass-like
<i>Carex cusickii</i>	Cusick's sedge	40	13.5	High	Saturated – long duration	Grass-like
<i>Carex pellita</i>	woolly sedge	40	11.5	Medium	Saturated – short duration	Grass-like
<i>Carex utriculata</i>	Northwest Territory sedge	40	15.1	High	Saturated – long duration	Grass-like
<i>Glyceria striata</i>	fowl mannagrass	80	19.8	High	Saturated – long duration	Grass
<i>Leersia oryzoides</i>	rice cutgrass	20	90.0	High	Saturated – long duration	Grass
<i>Scirpus microcarpus</i>	panicled bulrush	20	30.0	High	Saturated – long duration	Grass-like
<i>Canadanthus modestus</i>	giant mountain aster	40	10.0	Medium	Saturated – short duration	Forb
<i>Cicuta douglasii</i>	western water hemlock	40	10.1	Medium	Saturated – long duration	Forb
<i>Epilobium ciliatum</i> ssp. <i>glandulosum</i>	fringed willowherb	60	10.3	High	Saturated – long duration	Forb
<i>Equisetum arvense</i>	field horsetail	100	16.6	High	Saturated – long duration	Forb-like
<i>Mimulus moschatus</i>	muskflower	40	11.0	Medium	Saturated – short duration	Forb
<i>Symphyotrichum ascendens</i>	western aster	60	10.7	High	Saturated – short duration	Forb

Wet Meadows and Short-Willow - Bog Birch Shrublands

ScientificName	Common Name	% Constancy	Mean % Cover	Species Priority	Planting Zone	Lifeform
<i>Agrostis humilis</i>	alpine bentgrass	67	5.1	Medium	Saturated – short duration	Grass
<i>Carex bebbii</i>	Bebb's sedge	33	5.0	Medium	Shallow – short duration	Grass-like
<i>Carex scopulorum</i>	mountain sedge	100	33.3	High	Shallow – long duration	Grass-like
<i>Carex stipata</i>	awlfruit sedge	33	20.0	Medium	Shallow – short duration	Grass-like
<i>Carex utriculata</i>	Northwest Territory sedge	33	70.0	High	Shallow – long duration	Grass-like
<i>Glyceria striata</i>	fowl mannagrass	33	30.0	High	Shallow – short duration	Grass
<i>Juncus effusus</i>	common rush	33	10.0	Medium	Shallow – long duration	Grass-like
<i>Caltha leptosepala</i> ssp. <i>howellii</i>	Howell's marsh marigold	33	60.0	High	Shallow – short duration	Forb
<i>Dodecatheon jeffreyi</i>	Sierra shootingstar	67	32.0	High	Shallow – short duration	Forb
<i>Ligusticum grayi</i>	Gray's licorice-root	100	18.0	High	Saturated – short duration	Forb
<i>Polygonum bistortoides</i>	American bistort	100	6.0	Medium	Saturated – short duration	Forb
<i>Potentilla flabellifolia</i>	high mountain cinquefoil	67	2.1	Medium	Saturated – short duration	Forb

Ephemeral - Mesic Meadows and Seeps, Shrubby Cinquefoil Shrublands, and Intermittently Moist Drainages

ScientificName	Common Name	% Constancy	Mean % Cover	Species Priority	Planting Zone	Lifeform
<i>Achnatherum nelsonii</i> ssp. <i>dorei</i>	Dore's needlegrass	33	4.0	Medium	Saturated – short duration	Grass
<i>Carex microptera</i>	smallwing sedge	33	50.0	High	Saturated – short duration	Grass-like
<i>Juncus parryi</i>	Parry's rush	33	10.0	Medium	Saturated – short duration	Grass-like
<i>Leymus cinereus</i>	basin wildrye	67	65.0	High	Saturated – short duration	Grass
<i>Achillea millefolium</i>	common yarrow	100	6.4	High	Saturated – short duration	Forb
<i>Dodecatheon jeffreyi</i>	Sierra shootingstar	33	20.0	High	Shallow – short duration	Forb
<i>Penstemon globosus</i>	globe penstemon	33	30.0	High	Shallow – short duration	Forb
<i>Potentilla flabellifolia</i>	high mountain cinquefoil	33	5.0	Medium	Saturated – short duration	Forb
<i>Potentilla gracilis</i>	slender cinquefoil	33	4.0	Medium	Saturated – short duration	Forb
<i>Senecio serra</i>	tall ragwort	67	9.0	High	Saturated – short duration	Forb
<i>Symphotrichum foliaceum</i>	alpine leafybract aster	33	20.0	High	Saturated – short duration	Forb

Subalpine Avalanche Chutes, Conifer Woodland, Shrubland, and Meadow Wetland Complex

ScientificName	Common Name	Cover	Species Priority	Planting Zone	Lifeform
<i>Abies lasiocarpa</i>	subalpine fir	20.0	High	Saturated – short duration	Tree
<i>Picea engelmannii</i>	Engelmann spruce	3.0	Medium	Saturated – short duration	Tree
<i>Phyllodoce empetriformis</i>	pink mountainheath	15.0	High	Saturated – short duration	Shrub
<i>Salix eastwoodiae</i>	mountain willow	3.0	Medium	Shallow – short duration	Shrub
<i>Carex nigricans</i>	black alpine sedge	2.0	Medium	Saturated – short duration	Grass-like
<i>Carex scopulorum</i>	mountain sedge	2.0	Medium	Shallow – long duration	Grass-like
<i>Caltha leptosepala</i> ssp. <i>howellii</i>	Howell's marsh marigold	30.0	High	Shallow – short duration	Forb
<i>Dodecatheon jeffreyi</i>	Sierra shootingstar	30.0	High	Shallow – short duration	Forb
<i>Gentiana calycosa</i>	Rainier pleated gentian	3.0	Medium	Saturated – short duration	Forb
<i>Parnassia fimbriata</i>	fringed grass of Parnassus	20.0	High	Saturated – long duration	Forb
<i>Pedicularis bracteosa</i>	bracted lousewort	15.0	High	Saturated – short duration	Forb
<i>Polygonum bistortoides</i>	American bistort	2.0	Medium	Shallow – short duration	Forb
<i>Saxifraga odontoloma</i>	brook saxifrage	5.0	Medium	Saturated – long duration	Forb

Develop a planting strategy—before and after restoration

Additional planning will help ensure that your investment of time, labor energy, materials, and plants is put to its best use and restoration most likely to succeed. Consult the wealth of resources on riparian and wetland restoration listed in the Resources section at the end of this guide. Many articles are provided by the Natural Resources Conservation Service, Aberdeen Plant Materials Center (<http://plant-materials.nrcs.usda.gov/idpmc/publications.html#TN>).

- Plant a diverse mixture of trees (if appropriate for the site), shrubs, and, if possible, understory grass-like plants and forbs. This will provide a variety of root depths, from species with deep taproots to shallow fibrous rooted types. The resulting community will better stabilize stream banks.
- Use cuttings of native trees and shrubs at, or adjacent to, your restoration site, if available. This will save money and these individuals will be very well-adapted to your environment. Cuttings are composed of long branches of species most likely to root, specifically black cottonwood, willows, and redosier dogwood (if scratched). Other species do not root well. Cuttings are taken from dormant plants after leaf drop in the fall or before leaf buds grow in the spring. Creative plantings techniques, such as weaving planted willow cuttings into a dense mat, can be very effective in stabilizing eroding stream banks.
- Other shrub and tree species are typically available as bare root stock and containerized plants from nurseries. They can be expensive, but buying in bulk helps reduce costs. Avoid planting these on sites that receive the full force of spring runoff where erosion may wash them away.
- Grasses, sedges, and rushes can be planted by seeding or transplanted plugs of native turf harvested from within or adjacent to your site (if available). Seeding can be tricky and may work best in the fall so seeds have time to work into the soil and sprout well before summer drought sets in. Native plant sod, grown in nurseries, is an expensive but very effective method of rapidly establishing herbaceous cover on moist ground. Examine the possibility of collecting seeds of desired grasses, grass-like species, and forbs from within, or adjacent to, your restoration site.
- Know how to properly plant trees, shrubs, and other plants to maximize their likelihood of survival. Don't rush; enjoy your hard work outside. Recruit family members, friends, neighbors, and community members for a planting party.
- Some ground is notoriously difficult to dig holes in for plants, especially rocky sites. You may need to employ mechanical hole digging strategies, such as motorized auger type posthole diggers and water-jet "stingers."
- Avoid planting in neat and tidy rows. Mimic nature, sometimes planting clusters of plants (not too close together though as to create competition or too much shade), or sometimes spread out, depending on your site.

- Success can occur with either spring plantings, immediately after floods recede, or fall plantings when rain and snow begins to fall.
- Provide irrigation, if possible and necessary, to really get plant roots established.
- Control invasive and noxious weed species using methods appropriate for your site. For example, avoid spraying most herbicides near water and instead use hand-pulling or mowing. Herbicide spraying is best done by licensed applicators before planting.
- Protect newly planted plants from browsing and grazing by moose, elk, deer, beaver, or livestock until large enough to recover from such damage. You might also need to limit the number of people recreating at your site. Methods include temporary or permanent fencing, and tubes or cages around plants.

Where to get native plants for restoration in the Boise and Payette River watersheds

This is not intended to be a complete list of all plant suppliers for central and southern Idaho. All desired plant species may not be available from these nurseries. This list does not imply endorsement of these companies by Idaho Department of Fish and Game, Idaho Department of Lands, U. S. Forest Service, or Trout Unlimited.

- Aberdeen Plant Materials Center, Aberdeen, <http://plant-materials.nrcs.usda.gov/idpmc/>
- Buffalo-berry Farm, McCall, <http://buffaloberryfarm.com/>
- Conservation Seeding & Restoration, Inc., Kimberly, <http://www.csr-inc.com/>
- Draggin' Wing Farm, Water-Thrifty Plants for Idaho, Boise, <http://www.waterthriftyplants.com/>
- NativesWest Nursery and Landscaping, Kooskia, <http://www.nativeswest.com/>
- North Fork Native Plants, Rexburg, <http://www.northforknativeplants.com/>

Resources

A Guide to Native Trout Restoration: Science to Protect and Restore Coldwater Fishes and Their Habitats. 2006. Williams, J. E., W. Colyer, N. Gillespie, A. Harig, D. DeGraaf, and J. McGurrin. Trout Unlimited, Arlington, VA. 28 pp.

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[Riparian/Wetland Project Information Series No. 9: Design criteria for revegetation in riparian zones of the intermountain area.](#) 1995. Carlson, J. R., G. L. Conaway, J. L. Gibbs, and J.C. Hoag. USDA-NRCS Aberdeen Plant Materials Center, Aberdeen, ID. 12 pp.

[Riparian/Wetland Project Information Series No. 11: Getting a "Bang for your Buck" on your next wetland project.](#) 1998. Sellers, M. and J. C. Hoag. USDA-NRCS Aberdeen Plant Materials Center, Aberdeen, ID. 5 pp.

[Riparian/Wetland Project Information Series No. 13: A reference guide for the collection and use of ten common wetland plants of the Great Basin and Intermountain West.](#) 1998. Hoag, J. C. and M. Zierke. USDA-NRCS Aberdeen Plant Materials Center, Aberdeen, ID. 13 pp.

[Riparian/Wetland Project Information Series No. 14: Harvesting, Propagating and Planting Wetland Plants.](#) 2000. Hoag, J. C. USDA-NRCS Aberdeen Plant Materials Center, Aberdeen, ID. 9 pp.

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[Riparian/Wetland Project Information Series No. 18: Streambank Soil Bioengineering Considerations for Semi- Arid Climates.](#) 2005. Hoag, J. C. and J. Fripp. USDA-NRCS Aberdeen Plant Materials Center, Aberdeen, ID. 15 pp.

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How the guide was developed

This planting guide is based on a watershed approach to riparian restoration planning. We assumed that minimally or lightly disturbed watersheds were most likely to have fully functioning processes, as well as naturally occurring communities of plants representative of the types of riparian and wetland habitats we should be restoring. We used a scientific approach to develop plant lists, based on hundreds of samples of riparian and wetland vegetation taken by Idaho Department of Fish and Game botanists across these river basins during the last 10 years. First, we used Geographic Information System software to determine which watersheds were minimally or lightly disturbed by human land uses, such as agriculture, urban development, road building, water diversions, and other disturbances. We also assumed that similar watersheds will have streams and rivers with processes that result in similar types and proportions of riparian and wetland habitats. We used statistical methods to classify watersheds of the Boise and Payette River basins according to their characteristics, specifically the climate, bedrock, elevation, steepness, landforms, sun exposure, and soils of each watershed. This is necessary to compare “apples to apples,” meaning riparian habitats that occur in similar environments. From this, we were able to identify 7 watershed types occurring in the Boise and Payette River basins. Vegetation samples from minimally disturbed watersheds in each watershed type were summarized by habitat type. The most frequently occurring and consistently most abundant plant species in each riparian or wetland habitat are the “keystone” species. These are the plants that should be present to anchor any restoration project. Although they may not always be available from regional nurseries, they should be included in restoration planting plans.