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Deep Canyon and Subalpine Riparian and Wetland Plant Associations of the Malheur, Umatilla, and Wallowa-Whitman National Forests

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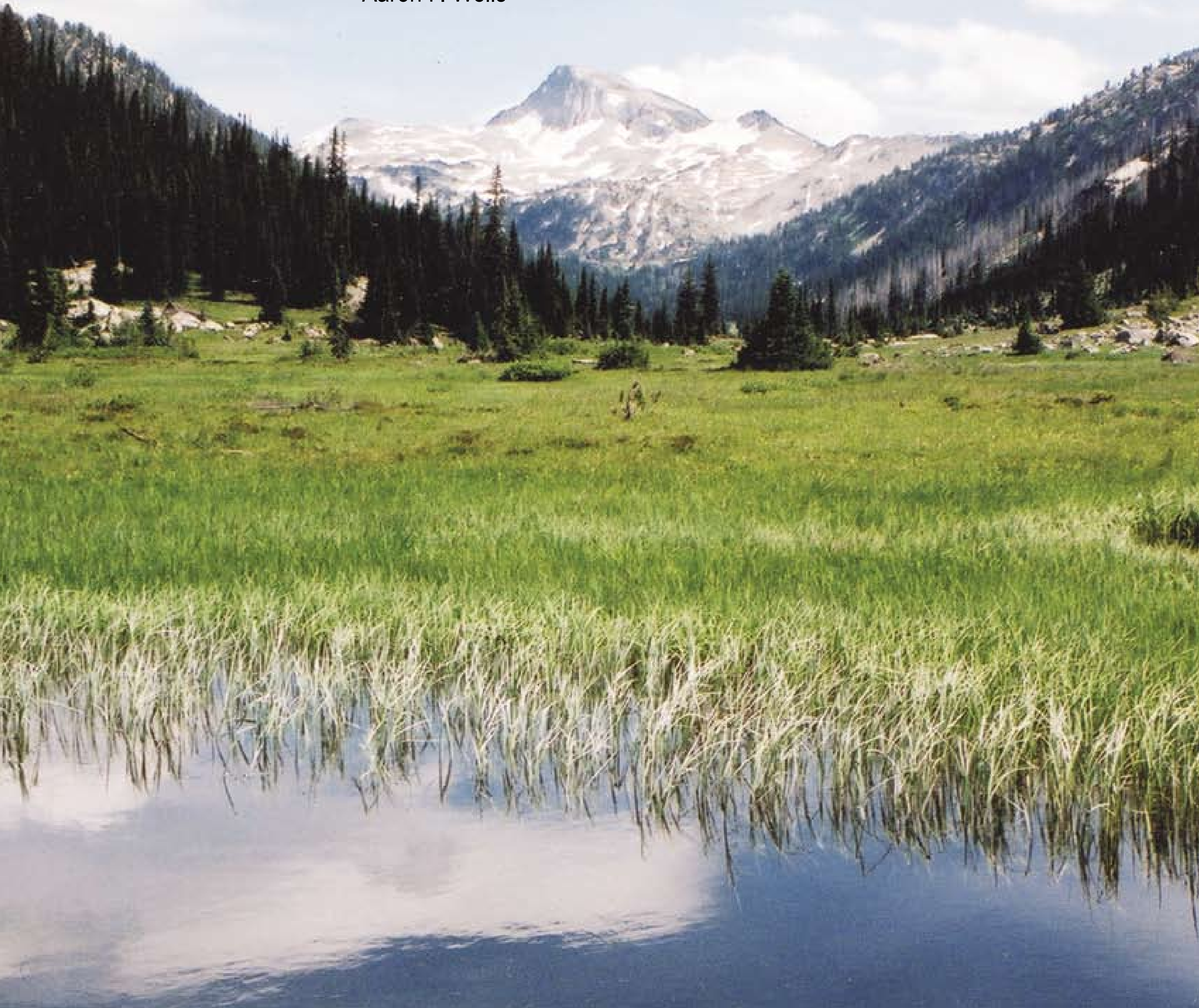

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Cover: Eagle Cap from east Lostine River, Eagle Cap Wilderness, Oregon. Photo by Aaron Wells.

Snake River, Hells Canyon National Recreation Area, Oregon and Idaho. Photo by Aaron Wells.

Abstract

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This guide presents a classification of the deep canyon and subalpine riparian and wetland vegetation types of the Malheur, Umatilla, and Wallowa-Whitman National Forests. A primary goal of the deep canyon and subalpine riparian and wetland classification was a seamless linkage with the midmontane northeastern Oregon riparian and wetland classification provided by Crowe and Clausnitzer in 1997. The classification is based on potential natural vegetation and follows directly from the plant association concept for riparian zones. The 95 vegetation types classified across the three national forests were organized into 16 vegetation series, and included some 45 vegetation types not previously classified for northeastern Oregon subalpine and deep canyon riparian and wetland environments. The riparian and wetland vegetation types developed for this guide were compared floristically and environmentally to riparian and wetland classifications in neighboring geographic regions. For each vegetation type, a section was included describing the occurrence(s) of the same or floristically similar vegetation types found in riparian and wetland classifications developed for neighboring geographic regions. Lastly, this guide was designed to be used in conjunction with the midmontane guide to provide a comprehensive look at the riparian and wetland vegetation of northeastern Oregon.

Keywords: Riparian, wetland, classification, northeastern Oregon, potential natural vegetation, plant association, plant community, Hells Canyon, Wallowa Mountains, Elkhorn Mountains, Strawberry Mountains, Wenaha-Tucannon Wilderness, North Fork Umatilla Wilderness, Snake River, Columbia River watershed.

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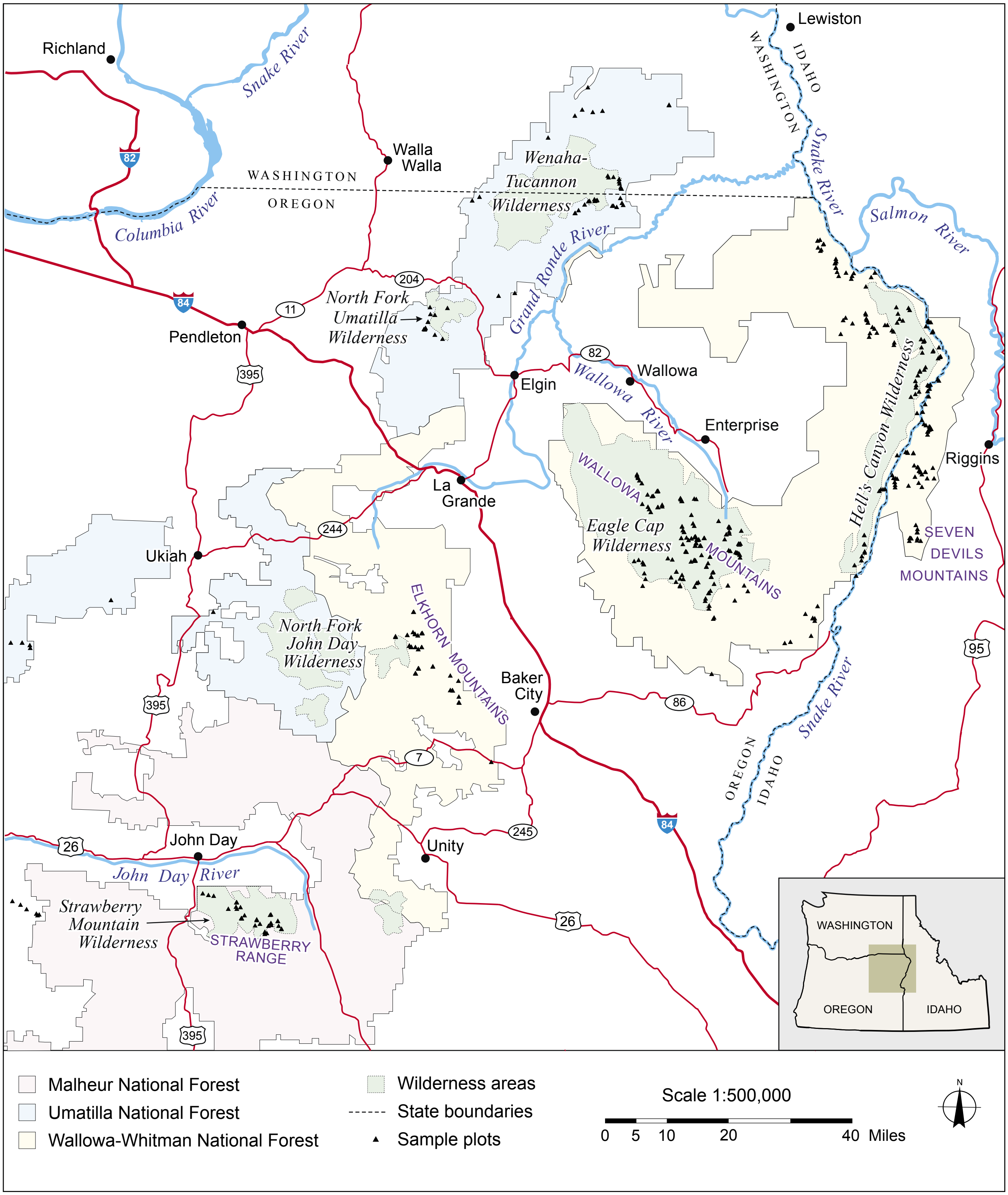
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Richland
Snake River
WASHINGTON
IDAHO
Walla Walla
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OREGON
Columbia River
Wenaha-Tucannon Wilderness
Snake River
Salmon River
Grand Ronde River
North Fork Umatilla Wilderness
Pendleton
Elgin
Wallowa
Wallowa River
Enterprise
Riggins
Hell's Canyon Wilderness
La Grande
WALLOWA MOUNTAINS
Eagle Cap Wilderness
SEVEN DEVILS MOUNTAINS
Ukiah
ELKHORN MOUNTAINS
North Fork John Day Wilderness
Baker City
Snake River
OREGON
IDAHO
John Day
Unity
John Day River
Strawberry Mountain Wilderness
STRAWBERRY RANGE
WASHINGTON
OREGON
IDAHO
Malheur National Forest
Umatilla National Forest
Wallowa-Whitman National Forest
Wilderness areas
State boundaries
Sample plots
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Introduction

Riparian corridors and wetlands are the most dynamic and complex biophysical habitats on the terrestial portion of the Earth, encompassing a diverse mosaic of landforms, communities, and environments (Fleischner 1994, Naiman et al. 1993). In a general sense, wetlands have been defined as lands within or adjacent to, and hydrologically influenced by, streams, rivers, lakes, meadows, and seeps (Cowardin et al. 1979). Riparian zone is defined more specifically as the strip of land along streams or rivers that is affected by stream processes (flooding, sedimentation, etc.) and in turn affects stream structure and function.

Riparian zones and wetlands are dynamic interfaces between terrestrial and aquatic systems, and the two are intimately linked in such a way that one cannot be defined without the other. An interface, in the above sense, may be thought of as a semipermeable membrane regulating the flow of energy and material between adjoining systems (upland and aquatic) (Naiman and Decamps 1997). Wetland vegetation and soils have a number of functions, both biotic and abiotic, across landscapes.

Riparian zones function as corridors for species movements, including both active and passive dispersal (Malanson 1993, Tabacchi et al. 1998). Active dispersal occurs when plant propagules are carried downstream by stream waters and upstream by wind or animals and deposited on distant landforms. Passive dispersal occurs when animal species use the linear pattern of riparian zones as travel corridors.

Wetlands are also important habitat for animal species ranging from butterflies (Galiano et al. 1985) and passerine birds (Taylor 1986), to black bears (see app. H for animal scientific names) and mule deer (Klimas et al. 1981, Loft et al. 1991). In arid regions such as northeastern Oregon, wetlands, although representing a relatively small proportion of the total land area, are disproportionately important to wildlife by providing the only reliable water resource throughout the year (Taylor 1986).

Riparian and wetland vegetation influences the amount and quality of solar radiation that reaches the stream channel (Gregory et al. 1991). Solar radiation influences water temperature and primary productivity of a stream reach. Stream water temperature can influence individual growth rates of salmonids (Li et al. 1994). Primary productivity has been shown to directly influence the macro-invertebrate productivity (Behmer and Hawkins 1986, Hawkins 1986) and community composition (Delong and Brusven 1998, Tait et al. 1994) of a stream reach as well as indirectly influencing populations of salmonids that feed on macro-invertebrates (Hawkins et al. 1983). Riparian and wetland vegetation shades the stream from solar radiation, maintaining cooler temperatures. Riparian and wetland vegetation also provides habitat for fish species through overhanging vegetation and down woody debris (Gurnell et al. 2002).

Forested headwater streams, which are numerous in the subalpine and canyon country of northeastern Oregon, are important sources of allocthonous (i.e., originating from outside the stream) energy inputs to the stream channel (Gomi et al. 2002, Vannote et al. 1980). Headwater streams also serve as refugia for rare or endemic species such as *Carex backii* (see app. A for plant names and authorities), a USDA Forest Service Pacific Northwest Region sensitive species.

Riparian and wetland vegetation acts passively to slow floodwaters and dampen the effects of high flow periods (Gurnell et al. 2002, Naiman and Decamps 1997). In fact, willows (*Salix* spp.) with their flexible stems, ability to sprout from broken or buried stems, and buoyant seeds are highly adapted to periodic flooding (Karrenberg et al. 2002). Thick, deep root mats of riparian species such as *Juncus balticus*, *Carex aquatilis*, and *Senecio triangularis* physically (deep, dense, tangled roots) and chemically (root exudates) hold soil particles together thus increasing streambank stability. One further adaptation of riparian plant species, such as *Carex utriculata*, is the formation of large hollow cells (aerenchymous tissue) in the roots to store air for metabolic use during periods of soil saturation (Kozlowski 1984).

The influence of riparian zones and wetlands on sediment and nutrient inputs from uplands is threefold. Aboveground, riparian and wetland vegetation slows runoff from uplands and floodwaters, trapping and storing sediments in the floodplain.

Belowground, riparian and wetland plant roots intercept groundwater moving through the riparian zone/wetland toward the stream and sequester the excess nutrients, thus mediating the effects of eutrophication in systems affected by agriculture (Fail et al. 1988, Gregory et al. 1991). In this way, riparian zones and wetlands deliver nitrogen and other nutrients primarily as coarse particulate organic matter rather than directly as inorganic compounds (Pinay et al. 2002).

Lastly, the duration and extent of riparian and wetland soil saturation can influence the concentration and species of nitrogen (nitrate, nitrite, ammonia) entering the aquatic environment (Pinay et al. 2002). Depending on the oxidation-reduction status, soil in riparian zones can act as a source (ammonification and nitrification) or result in a loss of (denitrification) nitrogen. Certain species of riparian/wetland plants (*Alnus* spp.) have formed symbiotic relationships with nitrogen-fixing bacteria in their roots. The bacteria "fix" or transform gaseous nitrogen (N_2) into forms that are biologically exploitable (NH_4), providing another source of nitrogen for the aquatic ecosystem.

Aquatic systems and their associated riparian and wetland plant communities are indeed intimately linked in such a way that one cannot be defined without the other. Riparian zones and wetlands influence the biota of stream systems at the level of the individual organism (Li et al. 1994), the population (Hawkins et al. 1983), and the community (Tait et al. 1994). Physically, riparian zones and wetlands buffer the potentially destructive forces of floodwaters on streambanks and function as sources and sinks for sediment and nutrients. Lastly, on the level of ecosystems, riparian zones regulate the flow of nutrients into aquatic environments. Alteration of the riparian and wetland component of aquatic systems can have far-reaching effects on the structure and function of the associated abiotic environment.

Objectives

Wetland plant associations of northeastern Oregon have been identified for midmontane wetland systems (Crowe and Clausnitzer 1997), but little was known about the deep canyon and subalpine wetland plant associations of northeastern Oregon before the present study. This management guide presents a classification of the deep canyon and subalpine wetland plant associations, community types, and communities (defined below) for the Blue Mountains Physiographic Province of Oregon including the Wallowa-Whitman, Umatilla, and Malheur National Forests. This guide is complementary to, and overlaps with, the midmontane wetland guide provided by Crowe and Clausnitzer (1997). Managers and landowners should use these two guides in conjunction with one another to aid in the identification of plant associations, and optimize management decisions.

Wetland classifications have been developed for much of the Western United States, including central Oregon (Kovalchik 1987, Padgett 1981), Montana (Hansen et al. 1995), California and Nevada (Manning and Padgett 1995), Washington (Crawford 2003, Kovalchik and Clausnitzer 2004), Utah and eastern Idaho (Padgett et al. 1989), eastern Idaho and western Wyoming (Youngblood et al. 1985), and western Idaho (Jankovsky-Jones et al. 2001, Miller 1976). The comparison of plant associations identified (objective one in this study) to those from adjacent geographic areas would provide information on the generality and specificity of the plant associations. Comparing plant associations from different studies can be difficult as each plant classification is based on different multivariate statistical techniques and theoretical views of the authors. One result is that plant associations from different classification schemes, that may in reality be the same association, get labeled differently (Nicholls and Tudorancea 2001).

The second objective of this guide is to compare the plant associations between the present classification and those of the surrounding areas in order to identify areas of overlap and the degree of generality (or rarity) of individual associations.

Classification Concepts

Distinctions between plant community, plant community type, and plant association are similar to those described in Crowe and Clausnitzer (1997):

Plant community—an assemblage of plants living together and interacting among themselves in a specific location. The plant community suffix is reserved for single occurrences of distinct vegetation assemblages.

Plant community type—a set of plant communities with similar structure and floristic composition that are seral in nature and often follow directly from a disturbance event (fire, flooding, etc.). Assuming a constant environment over a given period, a plant community type will undergo a natural shift in floristic composition through plant succession.

Plant association—as defined by Kovalchik (1987), "an assemblage of native vegetation in equilibrium with the environment on a specific fluvial surface." The implication is that as the environment (flood regime, soils, etc.) changes through time, the vegetative potential shifts across that environment space.

As in Crowe and Clausnitzer (1997), a single occurrence of a distinct vegetation assemblage sampled during this classification effort may be labeled as a plant community type or plant association **if** similar assemblages have been identified in adjacent riparian and wetland classifications.

Synecological Perspective and Terminology

Traditional concepts in plant succession, designed for uplands, state that the most shade-tolerant or "climax" species in a stand will take over a given site in the absence of disturbance. The climax concept reflects the most meaningful integration of the environmental factors affecting vegetation because it represents the end result of plant succession (Steele et al. 1981). Application of these concepts to riparian zones and wetlands becomes difficult given the potential for vegetative change with a change in the soil and water characteristics of the fluvial/wetland surface over time (Kovalchik 1987).

The plant association concept, as defined above, is an attempt to alleviate these difficulties and provide a meaningful site classification that integrates environment and vegetation in the dynamic environments of riparian and wetland systems. The climax concept is incorporated within the plant association concept wherein the most shade- and/or water-tolerant species at a site will prevail in the absence of disturbance. In this way, sites are not necessarily classified by the present plant assemblage; rather, classification is based on potential climax vegetation, often times limited to the understory canopy layers or relatively sparse occurrences. Put another way, the classification of plant associations is not based on dominance, but rather the potential for dominance in the absence of disturbance.

The rule of thumb adhered to in the present classification for identifying potential climax vegetation at forested sites is greater than or equal to 5 percent understory regeneration of a more shade-tolerant species (Steele et al. 1981). Shrub and herbaceous sites were classified by using the "greater than or equal to 25 percent foliar cover" [of a more shade- and/or water-tolerant species] rule originally coined by Kovalchik (1987), and adopted by Crowe and Clausnitzer (1997).

The only notable exception to the above rules of thumb is within the Subalpine Fir and Engelmann Spruce Series. In upland vegetation classifications, subalpine fir is considered the most shade-tolerant tree species when present, with Engelmann spruce coming in at a close second. Unique to riparian zones and wetlands is that edaphic conditions are often more important to successional dynamics than the solar radiation levels in the understory. Engelmann spruce tends to be more tolerant of saturated soil conditions than subalpine fir, making it difficult to interpret successional dynamics when both species occur in the understory with similar vigor. Two associations were identified that suffered from this ambiguity: PIEN-ABLA/CASC12 and PIEN-ABLA/SETR. Although the above two types were placed in the Engelmann spruce series, the potential exists, given a reduction in soil moisture, for subalpine fir to become the prevailing climax species.

Study Area

Blue Mountains Physiographic Province

The study focuses on the deep canyon and midelevation benches (550–1300 m), and subalpine (1800–2600 m) riparian and wetland plant associations of the Blue Mountains physiographic province of northeastern Oregon. The Blue Mountains physiographic province is defined by Orr and Orr (1999) as that area of northeastern Oregon that is bounded on the east by Hells Canyon and the Seven Devils Mountains, on the south at Ontario in Malheur County, on the north by the Snake River in Washington, and on the west by an irregular line running near Pendleton, Prineville, Burns, and back to Ontario.

Deep canyons and midelevation benches are primarily represented by Hells Canyon Wilderness and National Recreation Area (HCNRA) tributaries of the Snake River as well as representative samples of deep canyon and midelevation benches in the John Day River drainage to the southwest and the Umatilla National Forest to the northwest and into southern Washington.

Subalpine riparian and wetland plant associations are represented by streams, meadows, and glacial lakes in the Wallowa, Strawberry, Elkhorn, and Seven Devils mountain ranges. Although the Seven Devils are actually in Idaho, as will be shown later, the geology of these volcanic peaks is similar to that of the Wallowa Mountains, one mountain range to the west, and they are therefore included in this study.

Geology: Overview

The geologic history of the study area is quite complex including accretion of exotic terranes, subduction and uplift, massive flood events, periods of intense volcanic activity, and glaciation (Orr and Orr 1999). Exotic terrane refers to a geologic unit that did not form where it is presently located (Vallier 1998). In the case of the Blue Mountains, the exotic terrane has its origin as the magmatic axis of an island arc in the ancestral Pacific Ocean. Comparison of ancient basalt flows in the Blue Mountains with those in the Wrangell Mountains of southeastern Alaska and Vancouver Island in Canada suggests that the Blue Mountain island arc initially formed in the area of what is presently southeastern Alaska (Orr and Orr 1999). This collection of terranes referred to as "Wrangellia" was moved southward along strike-slip and transform faults to eventually collide with the North American continent (Vallier 1998). Five major exotic terranes constitute the Blue Mountain Island Arc (arranged from east to west): Olds Ferry, Izee, Grindstone, Baker, and Wallowa terranes.

Vallier (1998) divided the stratified rocks within the terranes into discrete mappable rock units termed formations. A description of the major formations in the Blue Mountains province follows.

Permian rocks include two older members of the Clover Creek Greenstone: the Windy Ridge and Hunsaker Creek formations. These two formations are the result of early volcanic activity on the Blue Mountain Island Arc (Pohs 2000, Vallier 1998). These formations are composed of mainly pyroclastic breccia and tuff, conglomerate, sandstone, and siltstone. Triassic Period rock units in Hells Canyon are represented by two more recent formations of the Clover Creek Greenstone: the Wild Sheep Creek and Doyle Creek formations. The Triassic rocks are mafic andesites and breccias, as well as sedimentary rocks derived from the deposition of sediments into the surrounding basin, resulting from the erosion of lava flows present on the island arc. Rocks of the Clover Creek Greenstone are common throughout the Blue Mountains as well as the Seven Devils mountains of Idaho (Pohs 2000).

Overlying the older Triassic rocks is the late Triassic Martin Bridge limestone, which developed in a warm, tropical environment along the periphery of the volcanic island arc. The Martin Bridge Limestone is not entirely limestone as the name suggests, also including noncalcareous sandstones, breccia, and siltstone (Vallier 1998).

The late Triassic/early Jurassic Hurwal formation consists mainly of sandstone, siltstone, and breccia with no fossils found in Hells Canyon outcrops. The Hurwal Formation of Sentinel Peak and Pete's Point in the Wallowa Mountains, for example, is distinct from that found in Hells Canyon in that fossils are present in the Wallowa Mountain olistoliths, or large foreign masses of limestone. The Wallowa Mountain olistoliths originated as shallow water reefs surrounding the island arc subsequently broke off, and slid into adjacent deep basins.

The Coon Hollow formation is the major Jurassic formation in the study area representing rocks formed during submerged volcanic activity, erosion, and sedimentation followed by subsidence and the deposition of sediments from deep water turbidity currents around the island arc. The Coon Hollow formation in Hells Canyon follows a depositional gradient of rock types corresponding to the mechanisms previously mentioned. From top to bottom, rock types include tuffaceous rocks, conglomerate and sandstone, to calcareous sandstone, and siltstone.

Intrusive bodies are common throughout the Blue Mountains, including dikes of basalt, andesite, dacite, and rhyolite; and granodiorite plutons such as the Wallowa batholith in the Wallowa Mountains, and the Bald Mountain batholith in the Elkhorn Mountains (Orr and Orr 1999, Pohs 2000). Through a process termed back-arc extension, the sinking of the subduction plate near the coast of Oregon and Washington caused the overriding plate to extend, which in turn caused fissures to develop in the Earth's crust (Pohs 2000). This event, which is thought to have occurred during the Miocene Epoch, led to the release of lava flows known as the Columbia River Basalt Group (CRB) that cover hundreds of square miles in the inland Northwest. The group consists of reddish brown horizontally layered lavas common at higher elevations in Hells Canyon, covering many peaks in the Wallowa Mountains, and most of the ridgetops of the western ranges in the Blue Mountains. Around the same time as the CRB eruptions, smaller and equally important eruptions in the southern Blue Mountains occurred where Sawtooth Crater, Strawberry Volcano, and Dry Mountain evolved as three separate volcanic centers (Orr and Orr 1999). Strawberry volcano extruded some of the thickest and most extensive andesitic lavas in eastern Oregon covering an area of 3800 km^2.

The Pleistocene Epoch was characterized by glaciation of the high elevations in the Blue Mountains (Pohs 2000). Classic U-shaped glacial valleys and cirque lakes are found throughout the subalpine and alpine areas of northeastern Oregon.

The extremely steep canyon walls in Hells Canyon often result in landslides and slumping (Vallier 1998). Deposits from these events often temporarily dam the Snake River and its tributaries. Massive flood events are also common in Hells Canyon resulting in "blowouts" that demonstrate the powerful mechanisms by which canyons are formed. One particular catastrophic flood, the Bonneville flood, occurred when ancient Lake Bonneville drained out of Red Rock Pass in Idaho nearly 14,500 years ago. Clearly, this event played a major role in the formation of Hells Canyon as evidenced by the many depositional and erosional features observed in Hells Canyon today.

Natural History: Subalpine

The Strawberry, Elkhorn, and Wallowa mountain ranges represent the southern, central, and portions of the northern Blue Mountain provinces in northeastern Oregon, respectively. Although there are many similarities between the floras of these three regions, there are some differences as well. These differences are in large part due to the location of these ranges relative to large-scale weather patterns and geology. The two major weather patterns influencing the Blue Mountains Province are the Great Basin and Columbia River storm patterns. Glaciers have also played a large role in shaping these mountains. Their fingerprints can be seen throughout all three mountain ranges mentioned above, although they are most pronounced in the Elkhorn and Wallowa Mountains (Orr and Orr 1999).

The Strawberry Mountains are the most southwestern range in the province. Therefore these mountains are the most influenced by the Great Basin weather patterns resulting in a drier and warmer temperature relative to the other ranges in the province. Also, the Strawberry Mountains lie in the rain shadow of the Cascade Mountains. Water vapor transported easterly across the Cascades rises in altitude cooling along the way. The cooler water vapor condenses into liquid water and precipitates on the western slope of the Cascades. The now drier air mass moves east past Bend, Oregon, resulting in the more arid landscape of central Oregon. Another critical feature of the Strawberry Mountains is the lower elevation (generally <2300 m) compared to the Elkhorn and Wallowa Mountains (approximately 3100 m) also resulting in a warmer climate. Lastly, the extent of glacial activity was small owing to the warmer and drier climate. The vegetation is a reflection of the geology and climate. The riparian zones in the Strawberry Mountains are very narrow and steep, usually occurring midslope along springs. Many of these springs are ephemeral and dry up later in the summer. Arrowleaf groundsel (*Senecio triangularis*) and Pacific onion (*Allium validum*) are two species commonly associated with these ephemeral springs. The warmer climate of the Strawberry Mountains results in species such as mountain alder (*Alnus incana*) occurring above 1800 m, whereas in the Wallowa Mountains, mountain alder is replaced with Sitka alder (*Alnus sinuate*) above 1800 m. The decreased glacial activity resulted in only a few broad U-shaped valleys; therefore, large open meadows are rare in the Strawberry Mountains.

The Wallowa Mountains are the most northeasterly mountains in the province. Storm patterns rolling up the Columbia River basin hit the Wallowa Mountains on the northwest side and are pushed up and cooled with the result that a large amount of precipitation is dropped. Some parts of the Wallowa Mountains receive up to 180 cm of precipitation each year (Pohs 2000). The result is much more lush vegetation than occurs in the Strawberry Mountains. Glacial activity was also at its highest in the Wallowa Mountains; classic U-shaped glacial valleys and cirque lakes are found throughout. The Wallowa Mountains were carved by nine major glaciers in a concentric pattern corresponding to the major drainages of the present day: Minam, Imnaha, Bear, Lostine, Hurricane, Pine, Wallowa, East Eagle, and Eagle. Permanent snow patches still exist in the Wallowa Mountains, such as on Glacier Peak in the Lakes Basin area. Large open meadows thick with willows and sedges are common throughout the range. Many small lakes freckle the landscape, some of them above 2500 m. Seeps and springs are also common in the Wallowa Mountains and are commonly associated with sedges (*Carex utriculata*, *Eleocharis pauciflora*) and willows (*Salix boothi*). The Wallowa Mountains are somewhat of a crossroads for plant species, including species more representative of the central Rocky Mountains and those of maritime western Oregon and Washington. An example is the occurrence of Pacific yew (*Taxus brevifolia*), a species more commonly associated with the west coast of Oregon and Washington. In summary, the Wallowa Mountains are higher, colder, and wetter than the Strawberry Mountains, and owing to a combination of higher precipitation, and diverse topography and geology, have greater plant species diversity than those of the Strawberry Mountains.

The Elkhorn Mountains have characteristics of both the Strawberry and Wallowa Mountains. The elevation and glacial activity are more like the Wallowa Mountains, but the Elkhorn Mountains are drier and warmer (receiving about 100 cm of precipitation each year (Pohs 2000). Owing to their more southerly location, the Elkhorn Mountains miss the Columbia River storm patterns and are influenced more by Great Basin weather systems. Still, large meadows, seeps, and lakes are common in the Elkhorn Mountains, and the vegetation is most like that of the Wallowa Mountains with the exception of the maritime influence. One interesting similarity between the Wallowa and Elkhorn Mountains relates to the high elevations of both of these mountain ranges. Some species occurring at high elevations (>2500 m) in the Wallowa and Elkhorn Mountains are found at lower elevations (600 to 900 m) further north such as in southeast Alaska. Plants, including arctic willow (*Salix arctica*) and pink mountainheath (*Phyllodoce empetriformis*), respond inversely to latitude and elevation (i.e., as latitude increases, elevation decreases).

Natural History: Deep Canyons and Midelevation Benches

The deep canyons and midelevation benches of the Wallowa-Whitman, Umatilla, and Malheur National Forests, similar to the mountainous regions of the Blue Mountains Province, are influenced by a number of climatic, geographic, and geologic factors. The degree to which each of these factors influences each national forest is reflected in the flora. Three major weather patterns influence the deep canyons of the Blue Mountains Province: the Great Basin, Rocky Mountain, and Columbia River storm patterns.

Hells Canyon, on the extreme eastern border of the Blue Mountains Province, is home to the Snake River and some of the most rugged wilderness in the contiguous United States. Hells Canyon drops 2500 m in approximately 8.8 km (from the top of He Devil Mountain in the Seven Devils, to the depths of the Snake River at Granite Rapids) making it the deepest canyon in the United States (Orr and Orr 1999). The steep nature of the canyon and exposed bedrock result in steep, constrained tributaries with an associated riparian area that is confined to the relatively narrow canyon bottoms. Hells Canyon is on the western edge of the Rocky Mountain storm system, resulting in large snow accumulations in the high country surrounding the Snake River. Large spring floods in the tributaries from these melting snows provide a very dynamic physical setting. The morphology of these streams is straight, steep, and narrow (5 to 25 m); therefore backwaters, channel migrations, and large areas with hydric soil conditions are rare.

Hells Canyon has a very arid climate, with annual precipitation as low as 38 cm, primarily because of where it is located: directly east of, and in the rain shadow of, the Wallowa Mountain Range (SCAS 2000). The vegetation mirrors these physical characteristics including species found throughout the Rocky Mountains and Great Basin.

The Blue Mountains province is an extremely diverse area, both florally and geologically. The three major mountain ranges lie along a longitudinal-latitudinal gradient from extremely dry and warm in the southwest to cool and wet in the northeast. The topography and vegetation of the deep canyons of the three national forests reflect a combination of climatic, geographic, and geologic factors resulting in two distinct groups: (1) arid and geologically constrained riparian areas in Hells Canyon and the Malheur National Forest, (2) mesic and relatively unconstrained riparian areas (Umatilla National Forest).

The Umatilla National Forest, to the northwest of Hells Canyon, is primarily influenced by Columbia River storms and is much more mesic than either Hells Canyon or the Malheur National Forest. Average annual rainfall reaches 100 cm in some sections of the forest. The vegetation includes Rocky Mountain and Great Basin species as well as species common to western Oregon and Washington, including red alder (*Alnus rubra*), wildginger (*Asarum caudatum*), and devilsclub (*Oplopanax horridus*). The geology is such that large (3^{rd}- to 5^{th}-order) streams with wide riparian areas (10 to 150 m) are common. These streams are actively meandering, forming backwaters, large cobble and sandbars. The resulting riparian landscape is more topographically diverse than that of the Hells Canyon tributaries.

The climate of the Malheur National Forest is very arid, similar to that of Hells Canyon, but lacking the Rocky Mountain storm influence. The climate is controlled primarily by the rain shadow of the Cascade Mountains to the west and Great Basin storm systems. The vegetation therefore has a strong Great Basin influence.

Field Methods

Data collection sites were sampled by field reconnaissance beginning at the mouth of a drainage and working upward in elevation. Fluvial landforms and the respective vegetation were observed along streams, rivers, and lake basins. Based on these observations, plots were established in assemblages of vegetation that were representative of a particular landform along a stream reach (Kovalchik 1987). A stream reach is defined as a section of stream that is environmentally consistent (i.e. gradient, valley width, valley shape, bed material, bedrock, etc.). Universal Transverse Mercator (UTM) coordinates were obtained for each site by using a global positioning system. Site locations were further documented with permanent angle irons at plot center, aluminum reference signs on nearby trees, and by noting the location on a U.S. Geological Survey topographic quadrangle map. Cross-sectional and plane-view sketches were made of the stream and valley bottom shape. Valley landform descriptors (valley shape, gradient, width, and side-slope gradient), aspect, slope, microtopography, and fluvial surface (gravelbar, floodplain, terrace, etc.) were recorded for each plot.

Herbaceous and shrub plots measured 5 by 10 m and were arranged to avoid sampling the boundaries of plant associations. Canopy coverage for vascular plants, mosses, and liverworts was recorded in increments of 1, 3, 5, and 10 percent and every 5 percent thereafter. Ground cover of surface features (submergence, bare ground, gravel, rock, bedrock, moss, and litter) were recorded by using the same method. Plants not identified in the field were collected for later identification. Plants were identified to lowest possible taxonomic level.

Percentage cover of vegetation at forested sites was estimated across a 375-m-square plot. Basal area tallies of tree species were obtained by using a 20 BAF (basal area factor) prism and a variable-sized circular plot design. A site tree, representative of the size and age of the principal tree species in the stand, was identified, and height, age, and diameter at breast height (d.b.h) were recorded. Shrubs and herbs were sampled as described above.

Snags were tallied by using a 20 BAF prism including the following information for each snag: d.b.h, height, condition class, and evidence of cavities, feeding, or nesting activity. A 9- by 2.5-m downed log transect, positioned lengthwise north-south, was sampled inside the plot including the following: species, diameter (at midpoint), size class, decay condition class, and length.

Soils were sampled with an 8-cm-diameter auger or by digging a pit. Soil was sampled to a depth of 1 m, or until further digging was physically impossible, or the water table was reached. Soils saturated throughout the growing season and soils with rock fragments completely covering the surface were not sampled by the pit method; rather, the surface horizon soil texture/rock fragment size (gravel, cobble, stone, boulder) and notes were recorded regarding the nature of soil saturation and rock fragments. Soil horizons were identified and depths of each recorded. Depth to water table was noted. Soil horizon and redoximorphic feature (if present) color were recorded for each soil horizon. Soil texture, percentage of rock fragments, size and amount of roots, and pH were also recorded.

Use, management, and disturbance observations were recorded at each site, including fire, insects, disease, livestock grazing, indications of wildlife and human use, and flooding. Productivity at each plot was estimated by (1) recording the average herbaceous, shrub, and tree heights and (2) collecting forage species in a 0.5-m-radius plot to ground level. Forage was later dried and weighed and expressed in kilograms of forage per hectare.

Office Methods

All statistical analyses were conducted in R: a language and environment for statistical computing (R Development Core Team 2004 on the World Wide Web at http://www.r-project.org/).

Classification

The vegetation data were initially separated by life form into forested (≥10 percent coverage of tree species on the landform of interest), shrub (<10 percent tree and ≥10 percent shrub cover), and herbaceous (<10 percent tree and shrub cover) plots. The foliar coverage data were entered into a spreadsheet, and a Bray/Curtis similarity matrix was calculated from the raw coverage data. The fixed clustering algorithms, PAM (Kaufman and Rousseeuw 1990) and OptPart (source code at http://ecology.msu.montana.edu/labdsv/R/lab13/lab13.html) implemented in R were used to cluster the plots within each life-form class. The optimal number of clusters was determined by iteratively clustering at a variety of cluster numbers and choosing the number of clusters that simultaneously optimized the ratio of within-cluster to between-cluster similarity, constancy/coverage results, and also corresponded to observations made by the researcher in the field. The results of the two cluster algorithms were compared based upon the ratio of within-cluster to between-cluster similarities, species composition within each cluster, and the results of a tree classifier (see below).

During this initial clustering, only species that occurred within the life form of the given life-form class were used. For example, in the set of forested plots, only trees were used to cluster the data into preliminary clusters. The original clusters were examined to determine if two or more clusters were similar enough to combine for the second round of clustering. The decision to merge was based on results obtained by using the partana function (source code at http://ecology.msu.montana.edu/labdsv/R/lab13/lab13.html), which calculates the ratio of within-cluster to between-cluster similarities.

After the initial clustering, species that occurred at greater than 5 percent cover were placed back in the data set, and each of the above clusters containing more than 10 plots was clustered independently to determine within-type variation based on understory species. Species occurring at less than or equal to 5 percent coverage were excluded from this second round of clustering in order to reduce the complexity of the data set and optimize the clustering ratio. The assumption was made that the species occurring at less than or equal to 5 percent cover were not important in distinguishing between clusters when using an abundance-based dissimilarity measure. In some cases, when it was difficult to decide whether or not to split a group, the overstory species were removed and the original clusters were clustered with all (including ≤5 percent) understory species. The above technique is similar to that used by Padgett et al. (1989) and Manning and Padgett (1995) where the understory species were clustered separately in order to elucidate understory and environmental relationships.

The last step in the clustering procedure involved "fine-tuning" of the clusters by hand. Individual plots were examined to determine the adequacy of a given plot's membership in a cluster based on species composition, autecology, and environmental characteristics. Plots that did not fit into a cluster after the second round of clustering, and clusters with fewer than five plots were grouped together and clustered separately.

Ordinations were calculated for each life-form group and used to visualize the clusters in multidimensional space. Environmental variables were tested against the ordination axes by using generalized additive models to determine environmental gradients important to the structuring of the vegetation in each life-form group.

The clusters developed by using PAM and OptPart were then tested against the environmental variables by using a tree classifier (Ripley 2004). The trees were cross-validated, and misclassification rates and confusion matrices were calculated for each set of life-form clusters. At this point, the decision was made to use the results obtained from the PAM analysis for the tree and shrub clusters and the results from the OptPart analysis for the herbaceous clusters.

Comparing Adjacent Riparian and Wetland Classifications

Adjacent riparian and wetland classifications refer to riparian and wetland plant classifications developed for neighboring geographic regions. Coverage and constancy data for eight adjacent classifications, including Crawford (2003), Crowe and Clausnitzer (1997), Hansen et al. (1995), Kovalchik (1987), Kovalchik and Clausnitzer (2004), Manning and Padgett (1995), Padgett et al. (1989), and Youngblood et al. (1985) were collected from appendices and computerized databases. Each distinct community type was given an eight-letter code, and an importance value was calculated for each species as (constancy x average cover)/100. The same procedure was followed for the plant associations and community types described in the present classification effort, and these data were added to a cumulative community type data set.

Next, the importance data were subject to a log transformation [log(importance)+1] as this was thought to be the best balance between importance of a species in a vegetation type and presence or absence of that species. Lastly, the log-transformed importance data were used to calculate a Bray/Curtis similarity matrix.

Within the similarity matrix, the similarity vector of each of the vegetation types described in this guide was sorted from most to least similar. The top 10 most floristically similar vegetation types from adjacent classifications, based on the above similarity analysis, were identified and further scrutinized. Species lists and importance values for each of the potentially similar vegetation types were compared with the species list for each respective northeastern Oregon deep canyon and subalpine riparian and wetland vegetation type based on importance value of indicator species, and the community as a whole.

Types given the same name (i.e., same indicator species) or one similar to those described in the present classification effort were included as examples of that type in adjacent areas. Types that did not have the same or similar name but were similar floristically were included in the "Floristically Similar Types" paragraph of the same section.

Quantitative data were unavailable for Diaz and Mellon (1996), Miller (1976), Padgett (1981), Jankovsky-Jones et al. (2001), and Viereck et al. (1992); therefore, these classifications were not included in the compositional similarity analysis. The vegetation types composing the above five classifications were compared to the northeastern Oregon deep canyon and subalpine riparian and wetland vegetation types by hand by using constancy/coverage tables, and the results were noted in the "Adjacent Riparian/Wetland Classification" sections of each typal description.

Calculation of Available Water Capacity

Available water capacity (AWC) is an estimate of the water available to plants between permanent wilting point and field capacity **after** hydric soils have drained owing to gravity, and is measured as *n* units of water per 1 unit of soil. Available water capacity for mineral soil horizons was obtained from the USDA Soil Conservation Service, California Technical Note 15 (see app. E) (Boettinger 2003).

Available water capacity for organic soil horizons was calculated by the following method. Boelter (1969) provided regression equations for calculating water content from fiber content of organic soils. Equations were provided for 0.1-bar and 15-bar suctions (permanent wilting point). No equations were provided for field capacity (0.33 bar); therefore, water content at 0.1 bar was calculated as an estimate of field capacity for organic soils. Available water capacity at different fiber contents was estimated by calculating the water content across the full range of fiber contents for each type of organic material (fibric [67, 74, 81, 88, 95, 100 percent]; hemic [33, 40, 47, 54, 61, 66 percent]; sapric [1, 8, 15, 22, 29, 32 percent]) at both 0.1- and 15-bar suctions. The difference in water content between 0.1 and 15 bar was calculated and then averaged across the six values of fiber content. The AWC estimates for sapric fiber contents were obtained three ways: by averaging the values for all six fiber contents, by averaging values for 8 through 32 percent, and by averaging values for 15 through 32 percent. The decision was made to use the results obtained without 1 and 8 percent fiber contents as such low-fiber-content soils are technically closer to loams and silt loams than to organic soil. The results are displayed in table 1.

Table 1—Available water capacity (AWC) of organic soils

Texture	AWC	Range
	- - - *cm water/cm soil* - - -	
Fibric	0.20	0.005–0.38
Hemic	.46	.39–.51
Sapric	.50	.47–.51

The AWC for each soil was estimated by calculating AWC for each horizon to 1-m depth. The assumption for soils sampled to less than 1 m was that the final horizon extended to a depth of 1 m. The AWC for each horizon was calculated as follows:

$$\text{Horizon thickness (cm)} \times \text{AWC (cm/cm)} \times (1 - \text{Fraction Rock Fragments}) = \text{Horizon AWC (cm)}$$

Total AWC for the soil pit (centimeters of water per meter of soil) was calculated by summing all horizon AWC values for a given soil to a depth of 1 m. Available water capacities for soils saturated throughout the growing season (not sampled by soil pit) were based on the AWC of surface horizon textures, and sites completely covered with rock fragments were set at the lowest total AWC (1.0 cm/m), both calculated to a 1-m depth.

Calculation of Percentage of Rock Fragments

Calculation of percentage of rock fragments began with making the pit depth relative to 1 m, similar to the calculation of AWC. Percentage of rock fragments for each soil horizon was calculated as follows:

$$\text{Horizon thickness} \times \text{Fraction Rock Fragments} = \text{Horizon Percentage of Rock Fragments}$$

Total percentage of rock fragments to 1 m was calculated by summing all horizon percentage of rock fragments to a depth of 1 meter. Percentage of rock fragments for soils saturated throughout the growing season (not sampled by soil pit) were set at zero percent, and those of sites completely covered with rock fragments were set at 100 percent.

Taxonomy

Plant taxonomy follows Hitchcock and Cronquist (1973) with the exception of *Carex utriculata* for *C. rostrata*. Owing to the difficulty in differentiating *Veratrum californicum* Dur. (California false hellebore) from *V. viride* Ait. (green false hellebore), both of which occur in the Blue Mountains, the two species were lumped to the genus level for analysis and typal description in the guide.

Most plant identification was by the field researcher; for particularly difficult identifications, specimens were sent to a specialist at the Rocky Mountain Herbarium in Laramie, Wyoming, for identification. Plant codes follow the USDA Plants Database (USDA NRCS 2002b). Voucher specimens are being stored at the USDA Forest Service Wallowa-Whitman National Forest office in Baker City, Oregon, under the direction of Dr. David Swanson.

All plants encountered in the field were identified to the lowest possible taxonomic level. Subspecies and varieties were identified whenever possible, but were not used in the data analysis or type descriptions (see app. G for subspecies and variety data).

Indicator Species

Plant ecologists are primarily interested in the environmental factors influencing the distribution of plant species across a landscape. Mathematical models are often used to aid ecologists in recognizing the relationships between plants and the environment. As elaborate as these mathematical tools have become, there seems to be no mathematical model that embodies all of the environmental factors influencing the presence of a plant species, other than the plants themselves. Indicator species are plants that designate thresholds of environmental change along gradients (Johnson, 2004a). The plants selected to define plant associations and community types are those deemed most diagnostic of a particular environment. A plant species may occur across an environmental gradient, but the optimal growth conditions for a species usually constitute a narrow range within that gradient. During the classification process, cutoff values of percentage of cover for indicator species are used to place sample plots in vegetation types. The presence of an indicator species in a sample plot above the cutoff level implies optimal growth conditions for that species. Priority is given to indicators of cool, moist environments, and the classification scheme is a reflection thereof.

Vegetation Key: Overview

A critical component of the classification process was a seamless linkage between the midmontane and deep canyon/subalpine classifications of northeastern Oregon. The two classifications provide a classification of northeastern Oregon riparian and wetland plant associations, community types, and communities across an elevation gradient ranging from canyon bottoms to glacial cirque basins. Rather than developing two separate vegetation keys for each classification, the vegetation keys have been combined into one comprehensive key. A number of vegetation types occur in both classifications. In such cases, the page number in Crowe and Clausnitzer (1997) where the shared types occur has been indicated (shown as CC p. 38). In the case of types occurring in both classifications, the user is encouraged to read through both descriptions in order to gain a sense of the range of environmental and floristic conditions of a vegetation type.

The combination of the two vegetation keys into one comprehensive key was in most cases straightforward. However, some confusion may arise in the case of the willow/mesic forb and Lemmon's willow/mesic forb types; therefore some clarification may be in order. The willow/mesic forb plant community type described on page 82 of this classification features Booth's or undergreen willows as indicator species. The willow/mesic forb community type described on page 116 of Crowe and Clausnitzer (1997) features a variety of indicator species, including Booth's, Geyer, Bebb's, Lemmon's and rigid willow, or bog birch. As a consequence of combining the two vegetation keys, the willow/mesic forb plant community type of Crowe and Clausnitzer (1997) falls under the same lead as the willow/mesic forb plant community type described on page 82 for Booth's willow. Similarly, the Lemmon's willow/mesic forb plant community type described on page 90 of this classification falls under the same lead as the willow/mesic forb community type of Crowe and Clausnitzer (1997).

Using the Vegetation Key

If you (1) are standing in a deep canyon or subalpine riparian zone or wetland in the Blue Mountains region of Oregon, (2) are interested in identifying an assemblage of vegetation as a classified vegetation type, and (3) have this guide with you, then you should begin with the vegetation key.

First, locate a relatively homogenous patch of vegetation that is obviously associated with a specific land form (see "Glossary"). Next, go to the life-form key and determine the principal life form at the site. Plots for forested sites should be roughly 375 m^2 (about 1/10 acre) in size and circular (11.3-m radius). Plots for shrub and herbaceous sites should be a 50 m^2 area of any shape. Lastly, using the life-form key, select the appropriate portion of the key for a given life form and work your way through.

Two options exist for highly disturbed sites that do not fit in this classification:

(1) use the vegetation key to match remnant patches of native vegetation (if such patches exist) as closely as possible to a classified type, and
(2) use the environmental key to determine possible vegetation potentials for the site.

A Note Regarding the Vegetation Key

The vegetation key provided below was developed for efficient field identification of **the vegetation types described in this guide**. The key is **not** the classification, and users are advised to thoroughly read the description of a vegetation type upon identification of a type when using the key. The cutoff values for percentage cover in the key are general guidelines and may have no ecological basis. The user should be keenly aware of the relative importance of the indicator species present at a site and give priority to those indicator species most representative of the landform at large (most vigorous growth, not isolated to microsites, etc.).

The classification provided is not exhaustive of the possible deep canyon and subalpine riparian and wetland vegetation types of the Blue Mountains. An effort was made to sample only relatively undisturbed sites, and the boundaries between relatively distinct vegetation types, or ecotones, were avoided. Therefore, it is possible that users of this key will encounter unclassified vegetation types in the field. The "environment key" is provided to aid in recognition of the possible vegetation potentials at obviously disturbed sites.

If the vegetation key fails, it may be that the vegetation type is an upland type or that it is a riparian/wetland type that does not fit in the study area described above. In this case, the reader is referred to the following references:

Upland—

- *The Grand Fir Series of Northeastern Oregon and Southeastern Washington: Successional Stages and Management Guide* (Clausnitzer 1993)
- *Alpine and Subalpine Vegetation of the Wallowa, Seven Devils, and Blue Mountains* (Johnson 2004a)
- *Plant Associations of the Blue and Ochoco Mountains* (Johnson and Clausnitzer 1992)
- *Plant Associations of the Wallowa-Snake Province* (Johnson and Simon 1987)

Riparian/Wetland—

- *A Riparian Vegetation Classification of the Columbia Basin, Washington* (Crawford 2003)
- *Mid-Montane Wetland Plant Associations of the Malheur, Umatilla, and Wallowa-Whitman National Forests* (Crowe and Clausnitzer 1997)
- *Riparian and Wetland Plant Associations of Southwestern Idaho* (Jankovsky-Jones et al. 2001)
- *Riparian Zone Associations of the Deschutes, Ochoco, Fremont, and Winema National Forests* (Kovalchik 1987)
- *Classification and Management of Aquatic, Riparian, and Wetland Sites on the National Forests of Eastern Washington: Series Descriptions* (Kovalchik and Clausnitzer 2004)

Life-Form Key

1a. Greater than or equal to 10 percent tree cover .... **A. Forested Plant Associations, Plant Community Types, and Plant Communities** (p. 11)

1b. Less than 10 percent tree cover **2**

2a. Greater than or equal to 10 percent shrub cover .... **B. Shrub Plant Associations, Plant Community Types, and Plant Communities** (p. 17)

2b. Less than or equal to 10 percent shrub cover .... **C. Herbaceous Plant Associations, Plant Community Types, and Plant Communities** (p. 26)

A. Key to Forested Plant Associations, Plant Community Types, and Plant Communities

1a. **Subalpine fir** (*Abies lasiocarpa*) present and reproducing successfully with cover ≥5 percent .... **Subalpine Fir Series 2**

2a. Aquatic sedge (*Carex aquatilis*) cover ≥25 percent .... **Subalpine Fir/Aquatic Sedge Plant Community Type** (CC p. 38)

2b. Aquatic sedge cover <25 percent **3**

3a. Labrador tea (*Ledum glandulosum*) cover ≥25 percent .... **Subalpine Fir–Engelmann Spruce/Labrador Tea–Floodplain Plant Association** (p. 38)

3b. Labrador tea cover <25 percent **4**

4a. Holm's Rocky Mountain sedge (*Carex scopulorum*) cover ≥25 percent .... **Subalpine Fir/Bog Blueberry/Holm's Sedge Plant Community Type** (CC p. 39)

4b. Holm's Rocky Mountain sedge cover <25 percent **5**

5a. Rusty menziesia (*Menziesia ferruginea*) cover ≥25 percent .... **Subalpine Fir–Engelmann Spruce/Rusty Menziesia–Floodplain Plant Association** (p. 40)

5b. Rusty menziesia cover <25 percent **6**

6a. Big huckleberry (*Vaccinium membranaceum*) cover ≥25 percent .... **Subalpine Fir/Big Huckleberry–Floodplain Plant Association** (p. 42)

6b. Big huckleberry cover <25 percent **7**

7a. Bluejoint reedgrass (*Calamagrostis canadensis*) cover ≥25 percent .... **Subalpine Fir/Bluejoint Reedgrass Plant Community Type** (CC p. 38)

7b. Bluejoint reedgrass cover <25 percent **8**

8a. Ladyfern (*Athyrium filix-femina*) cover ≥5 percent .... **Subalpine Fir/Ladyfern Plant Association** (CC p. 34)

8b. Ladyfern cover <5 percent **9**

9a. Arrowleaf groundsel (*Senecio triangularis*) cover ≥25 percent .... **Subalpine Fir/Arrowleaf Groundsel Plant Association** (CC p. 36 and refer to page 46)

9b. Arrowleaf groundsel cover <5 percent **10**

10a. Soft-leaved sedge (*Carex disperma*) cover ≥25 percent .... **Subalpine Fir/Soft-Leaved Sedge Plant Community Type** (CC p. 38)

10b. Soft-leaved sedge cover <25 percent .... Depauperate or undefined type or not Subalpine Fir series

1b. Subalpine fir cover <5 percent and/or not reproducing successfully **11**

11a. **Engelmann spruce** (*Picea engelmannii*) present and reproducing successfully with cover ≥5 percent .... **Engelmann Spruce Series 12**

12a. Holm's Rocky Mountain sedge (*Carex scopulorum*) cover ≥25 percent.. **Engelmann Spruce–Subalpine Fir/ Holm's Rocky Mountain Sedge Plant Association** (p. 44)

12b. Holm's Rocky Mountain sedge cover <25 percent **13**

13a. Ladyfern (*Athyrium filix-femina*) cover ≥5 percent .... **Engelmann Spruce/Ladyfern Plant Community Type** (CC p. 42)

13b. Ladyfern cover <5 percent **14**

14a. Arrowleaf groundsel (*Senecio triangularis*) cover ≥5 percent .... **Engelmann Spruce–Subalpine Fir/ Arrowleaf Groundsel Plant Association** (p. 46 and CC p. 44)

14b. Arrowleaf groundsel cover <5 percent **15**

15a. Common horsetail (*Equisetum arvense*) cover ≥5 percent .... **Engelmann Spruce/Common Horsetail Plant Association** (p. 48 and CC p. 46)

15b. Common horsetail cover <5 percent **16**

16a. Soft-leaved sedge (*Carex disperma*) cover ≥25 percent .... **Engelmann Spruce/Soft-Leaved Sedge Plant Association** (CC p. 46)

16b. Soft-leaved sedge cover <25 percent **17**

17a. Red-osier dogwood (*Cornus stolonifera*) cover ≥25 percent .... **Engelmann Spruce/Red-Osier Dogwood Plant Association** (CC p. 46)

17b. Red-osier dogwood cover <25 percent **18**

18a. Columbia brome (*Bromus vulgaris*) cover ≥5 percent .... **Engelmann Spruce/Columbia Brome Plant Community Type** (CC p. 47)

18b. Columbia brome cover <5 percent **19**

19a. Drooping woodreed (*Cinna latifolia*) cover ≥25 percent .... **Engelmann Spruce/Drooping Woodreed Plant Community** (CC p. 47)

19b. Drooping woodreed cover <25 percent .... Depauperate or undefined type or not Engelmann Spruce series

11b. Engelmann Spruce cover <5 percent and/or not reproducing successfully **20**

20a. **Lodgepole pine** (*Pinus contorta*) present and reproducing successfully with cover ≥5 percent .... **Lodgepole Pine Series 21**

21a. Aquatic sedge (*Carex aquatilis*) cover ≥25 percent .... **Lodgepole Pine/Aquatic Sedge Plant Association** (CC p. 50)

21b. Aquatic sedge cover <25 percent **22**

22a. Holm's Rocky Mountain (*Carex scopulorum*) sedge cover ≥25 percent ....**Lodgepole Pine/Holm's Rocky Mountain Sedge Plant Community** (p. 63)

22b. Holm's Rocky Mountain sedge cover <25 percent **23**

23a. Tufted hairgrass (*Deschampsia cespitosa*) cover ≥25 percent ....**Lodgepole Pine/Tufted Hairgrass Plant Association** (CC p. 50)

23b. Tufted hairgrass cover <25 percent **24**

24a. Woolly sedge (*Carex lanuginosa*) cover ≥25 percent .... **Lodgepole Pine/Woolly Sedge Plant Community** (CC p. 51)

24b. Woolly sedge cover <25 percent **25**

25a. Mountain alder (*Alnus incana*) cover ≥25 percent ....**Lodgepole Pine/Mountain Alder/ Mesic Forb Plant Community** (CC p. 51)

25b. Mountain alder cover <25 percent **26**

26a. Bluejoint reedgrass (*Calamagrostis canadensis*) cover ≥25 percent ....**Lodgepole Pine/Bluejoint Reedgrass Plant Community** (CC p. 51)

26b. Bluejoint reedgrass cover <25 percent **27**

27a. Kentucky bluegrass (*Poa pratensis*) cover ≥25 percent ....**Lodgepole Pine/Kentucky Bluegrass Plant Community Type** (CC p. 51)

27b. Kentucky bluegrass cover <25 percent ....Depauperate or undefined type or not Lodgepole Pine series

20b. Lodgepole pine cover <5 percent and/or not reproducing successfully **28**

28a. **Grand fir** (*Abies grandis*) present and reproducing successfully with cover ≥5 percent ....**Grand Fir Series 29**

29a. Ladyfern (*Athyrium filix-femina*) cover ≥5 percent .... **Grand Fir/Ladyfern Plant Association** (CC p. 54)

29b. Ladyfern cover <5 percent **30**

30a. Oakfern (*Gymnocarpium dryopteris*) cover ≥5 percent .... **Grand Fir/Oakfern Plant Association** (CC p. 56)

30b. Oakfern cover <5 percent **31**

31a. Pacific yew (*Taxus brevifolia*) AND twinflower (*Linnaea borealis*) present ....**Grand Fir/Pacific Yew/Twinflower–Floodplain Plant Association** (p. 49)

31b. Pacific yew and/or twinflower absent **32**

32a. Black hawthorn (*Crataegus douglasii*) cover ≥10 percent and Dewey sedge (*Carex deweyana*) present ....**Grand Fir/Black Hawthorn/Dewey Sedge Plant Association** (p. 51)

32b. Black hawthorn cover <10 percent and/or Dewey sedge absent **33**

33a. Rocky Mountain maple (*Acer glabrum*) and/or mallow ninebark (*Physocarpus malvaceus*) present .... **Grand Fir/Rocky Mountain Maple–Floodplain Plant Association** (p. 54 and CC p. 58)

33b. Rocky Mountain maple and/or mallow ninebark absent **34**

34a. Common snowberry (*Symphoricarpos albus*) cover ≥25 percent .... **Grand Fir/Common Snowberry-Floodplain Plant Association** (CC p. 60)

34b. Common snowberry cover <25 percent **35**

35a. Woolly sedge (*Carex lanuginosa*) cover ≥25 percent .... **Grand Fir/Woolly Sedge Plant Community** (CC p. 60)

35b. Woolly sedge cover <25 percent **36**

36a. Tufted hairgrass (*Deschampsia cespitosa*) cover ≥5 percent .... **Western White Pine/Tufted Hairgrass Plant Community** (CC p. 61)

36b. Tufted hairgrass cover <5 percent .... Depauperate or undefined type or not Grand Fir series

28b. Grand fir cover <5 percent and/or not reproducing successfully **37**

37a. **Douglas-fir** (*Pseudotsuga menziesii*) present and reproducing successfully with cover ≥5 percent .... **Douglas-Fir Series 38**

38a. False bugbane (*Trautvetteria caroliniensis*) cover ≥5 percent .... **Douglas-Fir/False Bugbane Plant Community Type** (CC p. 68)

38b. False bugbane cover <5 percent **39**

39a. Rocky Mountain maple (*Acer glabrum*) and/or mallow ninebark (*Physocarpus malvaceus*) present .... **Douglas-Fir/Rocky Mountain Maple–Mallow Ninebark–Floodplain Plant Association** (p. 56 and CC p. 64)

39b. Rocky Mountain maple and mallow ninebark absent **40**

40a. Common snowberry (*Symphoricarpos albus*) cover ≥5 percent .... **Douglas-Fir/Common Snowberry–Floodplain Plant Association** (p. 58 and CC p. 66)

40b. Common snowberry cover <5 percent .... Depauperate or undefined type or not Douglas-Fir series

37b. Douglas-fir cover <5 percent and/or not reproducing successfully **41**

41a. **Ponderosa pine** (*Pinus ponderosa*) present and reproducing successfully with cover ≥5 percent .... **Ponderosa Pine Series 42**

42a. Black hawthorn (*Crataegus douglasii*) cover ≥25 percent .... **Ponderosa Pine/Black Hawthorn Plant Community** (p. 62)

42b. Black hawthorn cover <25 percent **43**

43a. Common snowberry (*Symphoricarpos albus*) cover ≥5 percent .... **Ponderosa Pine/Common Snowberry–Floodplain Plant Association** (p. 60 and CC p. 72)

43b. Common snowberry cover <5 percent **44**

44a. Kentucky bluegrass (*Poa pratensis*) cover ≥25 percent .... **Ponderosa Pine/Kentucky Bluegrass Plant Community Type** (CC p. 74)

44b. Kentucky bluegrass cover <25 percent .... Depauperate or undefined type or not Ponderosa Pine series

41b. Ponderosa pine cover <5 percent and/or not reproducing successfully **45**

45a. Quaking aspen (*Populus tremuloides*) present and reproducing successfully with cover ≥5 percent .... **Quaking Aspen Series 46**

46a. Aquatic sedge (*Carex aquatilis*) cover ≥25 percent .... **Quaking Aspen/Aquatic Sedge Plant Community Type** (CC p. 84)

46b. Aquatic sedge cover <25 percent **47**

47a. Woolly sedge (*Carex lanuginosa*) cover ≥25 percent .... **Quaking Aspen/Woolly Sedge Plant Association** (CC p. 78)

47b. Woolly sedge cover <25 percent **48**

48a. Bluejoint reedgrass (*Calamagrostis canadensis*) cover ≥25 percent .... **Quaking Aspen/Bluejoint Reedgrass Plant Community Type** (CC p. 84)

48b. Bluejoint reedgrass cover <25 percent **49**

49a. Mountain alder (*Alnus incana*) cover ≥25 percent **50**

50a. Red-osier dogwood (*Cornus stolonifera*) cover ≥25 percent .... **Quaking Aspen/Mountain Alder–Red-Osier Dogwood Plant Community** (CC p. 84)

50b. Red-osier dogwood cover <25 percent **51**

51a. Common snowberry (*Symphoricarpos albus*) cover ≥25 percent .... **Quaking Aspen/Mountain Alder–Common Snowberry Plant Community** (CC p. 84)

51b. Common snowberry cover <25 percent **49b**

49b. Mountain alder cover <25 percent **52**

52a. Common snowberry cover ≥5 percent .... **Quaking Aspen/Common Snowberry Plant Community Type** (CC p. 80)

52b. Common snowberry cover <5 percent **53**

53a. Kentucky bluegrass (*Poa pratensis*) cover ≥25 percent .... **Quaking Aspen/Kentucky Bluegrass Plant Community Type** (CC p. 82)

53b. Kentucky bluegrass cover <25 percent **54**

54a. Mesic forbs with highest combined foliar cover, graminoids depauperate or isolated to microsites .... **Quaking Aspen/Mesic Forb Plant Community Type** (CC p. 84)

54b. Mesic forbs scarce .... Depauperate or undefined type or not Quaking Aspen series

45b. Quaking aspen cover <5 percent and/or not reproducing successfully **55**

55a. Black cottonwood (*Populus trichocarpa*) present and reproducing successfully with cover ≥5 percent .... **Black Cottonwood Series 56**

56a. Pacific willow (*Salix lasiandra*) and rigid willow (*S. rigida*) cover ≥25 percent .... **Black Cottonwood/Pacific Willow Plant Association** (CC p. 88)

56b. Pacific willow and rigid willow cover <25 percent **57**

57a. Mountain alder (*Alnus incana*) and/or red-osier dogwood (*Cornus stolonifera*) cover ≥25 percent .... **Black Cottonwood/ Mountain Alder–Red-Osier Dogwood Plant Association** (p. 64 and CC p. 90)

57b. Mountain alder and/or red-osier dogwood cover <25 percent **58**

58a. Rocky Mountain maple (*Acer glabrum*) cover ≥25 percent .... **Black Cottonwood/Rocky Mountain Maple Plant Community Type** (p. 68 and CC p. 92)

58b. Rocky Mountain maple cover <25 percent **59**

59a. Common snowberry (*Symphoricarpos albus*) cover ≥5 percent .... **Black Cottonwood/Common Snowberry Plant Community Type** (p. 66 and CC p. 94)

59b. Common snowberry cover <5 percent .... Depauperate or undefined type or not Black Cottonwood series

55b. Black cottonwood cover <5 percent and/or not reproducing successfully **60**

60a. Red alder (*Alnus rubra*) present and reproducing successfully with cover ≥5 percent .... **Red Alder Series 61**

61a. Ladyfern (*Athyrium filix-femina*) cover ≥5 percent .... **Red Alder/Ladyfern Plant Community Type** (CC p. 100)

61b. Ladyfern cover <5 percent **62**

62a. Sweet coltsfoot (*Petasites frigidus* var. *palmatus*) cover ≥5 percent .... **Red Alder/Sweet Coltsfoot Plant Community Type** (CC p. 100)

62b. Sweet coltsfoot cover <5 percent **63**

63a. Creeping buttercup (*Ranunculus repens*) cover ≥1 percent on gravel or cobble bar ....**Red Alder/Alluvial Bar Plant Community Type** (CC p. 100)

63b. Creeping buttercup absent or fluvial surface not a gravel or cobble bar **64**

64a. Red-osier dogwood (*Cornus stolonifera*) cover ≥25 percent .... **Red Alder/Red-Osier Dogwood Plant Community** (CC p. 100)

64b. Red-osier dogwood cover <25 percent **65**

65a. Pacific ninebark (*Physocarpus capitatus*) cover ≥25 percent .... **Red Alder/Pacific Ninebark Plant Association** (CC p. 98)

65b. Pacific ninebark cover <25 percent **66**

66a. Common snowberry (*Symphoricarpos albus*) cover ≥25 percent AND Dewey sedge (*Carex deweyana*) present .... **Red Alder/Common Snowberry/ Dewey Sedge Plant Community Type** (p. 69 and CC p. 100)

66b. Common snowberry cover <25 percent .... Depauperate or undefined type or not Red Alder series

60b. Red alder cover <5 percent and/or not reproducing successfully **67**

67a. **White alder** (*Alnus rhombifolia*) present and reproducing successfully with cover ≥5 percent .... **White Alder Series 68**

68a. Blackberry (*Rubus* spp.) species (specifically Himalayan (*R. discolor*) and/or cutleaf (*R. lacinatus*)) with combined cover ≥25 percent .... **White Alder/Blackberry Plant Community Type** (p. 74)

68b. Blackberry species combined cover <25 percent **69**

69a. Mesic shrub species combined cover ≥25 percent .... **White Alder/Mesic Shrub Plant Community Type** (p. 72)

69b. Mesic shrub species combined cover <25 percent .... Depauperate or undefined type or not White Alder series

67b. White alder cover <5 percent and/or not reproducing successfully .... Undefined type or repeat forested key or try shrub or herbaceous keys

B. Key to Shrubby Plant Associations, Plant Community Types, and Plant Communities

1a. **Willow** *(Salix)* species cover >25 percent .... **Willow Series 2**

2a. Arctic willow (*Salix arctica*) (often <10 cm tall) cover ≥25 percent .... **Arctic Willow Plant Association** (p. 76)

2b. Arctic willow cover <25 percent **3**

3a. Booth's willow (*Salix boothii*) cover ≥25 percent **4**

4a. Aquatic sedge (*Carex aquatilis*) cover ≥25 percent .... **Willow/Aquatic Sedge Plant Association** (p. 88 and CC p. 108)

4b. Aquatic sedge cover <25 percent **5**

5a. Inflated sedge (*Carex vesicaria*) cover ≥25 percent .... **Booth's Willow/Inflated Sedge Plant Community** (p. 88)

5b. Inflated sedge cover <25 percent **6**

6a. Holm's Rocky Mountain sedge (*Carex scopulorum*) cover ≥25 percent .... **Booth's Willow/Holm's Rocky Mountain Sedge Plant Association** (p. 78)

6b. Holm's Rocky Mountain sedge cover <25 percent **7**

7a. Bluejoint reedgrass (*Calamagrostis canadensis*) cover ≥25 percent .... **Willow/Bluejoint Reedgrass Plant Association** (p. 84)

7b. Bluejoint reedgrass cover <25 percent **8**

8a. Mesic forbs with highest combined foliar cover, graminoids depauperate or isolated to microsites .... **Willow/Mesic Forb Plant Community Type** (p. 82 and CC p. 116)

8b. Mesic forbs scarce .... Depauperate or undefined Booth's Willow type

3b. Booth's willow cover <25 percent **9**

9a. Farr's willow (*Salix farriae*) cover ≥25 percent **10**

10a. Aquatic sedge (*Carex aquatilis*) cover ≥25 percent .... **Willow/Aquatic Sedge Plant Association** (p. 88)

10b. Aquatic sedge cover <25 percent **11**

11a. Pacific onion (*Allium validum*) cover ≥25 percent .... **Farr's Willow/Pacific Onion Plant Community** (p. 89)

11b. Pacific onion cover <25 percent .... Depauperate or undefined Farr's Willow type

9b. Farr's willow cover <25 percent **12**

12a. Undergreen willow (*Salix commutata*) cover ≥25 percent **13**

13a. Bladder sedge (*Carex utriculata*) cover ≥25 percent .... **Undergreen Willow/Bladder Sedge Plant Community Type** (p. 89 and CC p. 116)

13b. Bladder sedge cover <25 percent **14**

14a. Holm's Rocky Mountain sedge (*Carex scopulorum*) cover ≥25 percent .... **Undergreen Willow/Holm's Rocky Mountain Sedge Plant Association** (p. 80 and CC p. 104)

14b. Holm's Rocky Mountain sedge cover <25 percent **15**

15a. Bluejoint reedgrass (*Calamagrostis canadensis*) cover ≥25 percent .... **Willow/Bluejoint Reedgrass Plant Association** (p. 84)

15b. Bluejoint reedgrass cover <25 percent **16**

16a. Mesic forbs with highest combined foliar cover, graminoids depauperate or isolated to microsites .... **Willow/Mesic Forb Plant Community Type** (p. 82)

16b. Mesic forbs scarce **17**

17a. Clustered field sedge (*Carex praegracilis*) cover ≥25 percent .... **Undergreen Willow/Clustered Field Sedge Plant Community** (CC p. 116)

17b. Clustered field sedge cover <25 percent .... Depauperate or undefined Undergreen Willow type

12b. Undergreen willow cover <25 percent **18**

18a. Drummond's willow (*Salix drummondiana*) cover ≥25 percent **19**

19a. Arrowleaf groundsel (*Senecio triangularis*) cover ≥5 percent .... **Drummond's Willow/Arrowleaf Groundsel Plant Community** (p. 90)

19b. Arrowleaf groundsel cover <5 percent **20**

20a. Mesic forbs with highest combined foliar cover, graminoids depauperate or isolated to microsites .... **Willow/Mesic Forb Plant Community Type** (p. 82)

20b. Mesic forbs scarce .... Depauperate or undefined Drummond's Willow type

18b. Drummond's willow cover <25 percent **21**

21a. Eastwood (*S. eastwoodiae*) and Tweedy's (*S. tweedyi*) willow cover ≥25 percent and aquatic sedge (*Carex aquatilis*) cover ≥25 percent .... **Eastwood Willow–Tweedy's Willow/ Aquatic Sedge Plant Community** (CC p. 116)

21b. Eastwood and Tweedy's willow cover <25 percent and/or aquatic sedge absent **22**

22a. Geyer willow (*S. geyeriana*), Bebb willow (*S. bebbiana*), Lemmon's willow (*S. lemmonii*), rigid willow and/or bog birch (*Betula glandulosa*) cover ≥25 percent **23**

23a. Bladder sedge (*Carex utriculata*) cover ≥25 percent .... **Willow/Bladder Sedge Plant Association** (CC p. 106)

23b. Bladder sedge cover <25 percent **24**

24a. Aquatic sedge (*Carex aquatilis*) cover ≥25 percent .... **Willow/Aquatic Sedge Plant Association** (CC p. 108)

24b. Aquatic sedge cover <25 percent **25**

25a. Woolly sedge (*Carex lanuginosa*) cover ≥25 percent .... **Willow/Woolly Sedge Plant Association** (CC p. 110)

25b. Woolly sedge cover <25 percent **26**

26a. Kentucky bluegrass (*Poa pratensis*) cover ≥25 percent .... **Willow/Kentucky Bluegrass Plant Community Type** (CC p. 112)

26b. Kentucky bluegrass cover <25 percent **27**

27a. Bluejoint reedgrass (*Calamagrostis canadensis*) cover ≥25 percent .... **Willow/Bluejoint Reedgrass Plant Community** (CC p. 116)

27b. Bluejoint reedgrass cover <25 percent **28**

28a. Mesic forbs with highest combined foliar cover, graminoids depauperate or isolated to microsites .... **Willow/Mesic Forb Plant Community Type** (p. 90 and CC p. 116)

28b. Mesic forbs scarce .... Depauperate or undefined Geyer/Booth/Bebb/ Lemmon/Rigid Willow/Bog Birch Community

22b. Geyer willow, Bebb willow, Lemmon willow, rigid willow and/or bog birch <25 percent cover **29**

29a. Coyote willow (*S. exigua*) cover ≥5 percent .... **Coyote Willow Plant Association** (p. 86 and CC p. 114)

29b. Coyote willow <5 percent **30**

30a. Rigid willow (*S. rigida*) cover ≥5 percent ....**Rigid Willow Plant Community Type** (CC p. 117)

30b. Rigid willow cover <5 percent **31**

31a. Scouler's willow (*S. scouleriana*) and blue wildrye (*Elymus glaucus*) cover ≥25 percent .... **Scouler's Willow/Blue Wildrye Plant Community** (CC p. 117)

31b. Scouler's willow cover and/or blue wildrye cover <25 percent **32**

32a. Sitka willow (*Salix sitchensis*) cover ≥25 percent AND common horsetail (*Equisetum arvense*) cover ≥5 percent .... **Sitka Willow/Common Horsetail Plant Community** (p. 91)

32b. Sitka willow cover <25 percent and/or common horsetail cover <5 percent .... Depauperate or undefined type or not Willow series

1b. Willow species cover ≥25 percent **33**

33a. **Low shrub species** (refer to "Glossary" p. 164 for list of low shrub species considered here) cover >25 percent ....**Low Shrub Series 34**

34a. Alpine laurel (*Kalmia microphylla*) cover ≥25 percent AND black alpine sedge (*Carex nigricans*) present .... **Alpine Laurel/Black Alpine Sedge Plant Association** (p. 92)

34b. Alpine laurel cover <25 percent and/or black alpine sedge absent **35**

35a. Pink mountainheath (*Phyllodoce empetriformis*) cover ≥25 percent AND black alpine sedge and/or Drummond's rush (*Juncus drummondii*) present .... **Pink Mountainheath Mounds Plant Association** (p. 94)

35b. Pink mountainheath cover <25 percent and/or black alpine sedge and Drummond's rush absent **36**

36a. Labrador tea (*Ledum glandulosum*) cover ≥25 percent and Holm's Rocky Mountain sedge (*Carex scopulorum*) present .... **Labrador Tea/Holm's Rocky Mountain Sedge Plant Community** (p. 96)

36b. Labrador tea cover <25 percent and/or Holm's Rocky Mountain sedge absent **37**

37a. Shrubby cinquefoil (*Potentilla fruiticosa*) cover ≥10 percent **38**

38a. Tufted hairgrass (*Deschampsia cespitosa*) cover ≥10 percent .... **Shrubby Cinquefoil/Tufted Hairgrass Plant Association** (CC p. 156)

38b. Tufted hairgrass cover <10 percent **39**

39a. Bog birch (*Betula glandulosa*) present ....**Shrubby Cinquefoil-Bog Birch Plant Community Type** (p. 96)

39b. Bog birch absent **40**

40a. Kentucky bluegrass (*Poa pratensis*) or other nonnative grasses or "weedy" forbs present .... **Shrubby Cinquefoil/Kentucky Bluegrass Plant Community Type** (CC p. 156)

40b. Kentucky bluegrass or other species mentioned above absent **37b**

37b. Shrubby cinquefoil cover <10 percent **41**

41a. Silver sagebrush (*Artemisia cana*) cover ≥25 percent **42**

42a. Tufted hairgrass (*Deschampsia cespitosa*) cover ≥10 percent .... **Silver Sagebrush/Tufted Hairgrass Plant Association** (CC p. 159)

42b. Tufted hairgrass cover <10 percent **43**

43a. Kentucky bluegrass (*Poa pratensis*) or other nonnative grasses or “weedy” forbs present .... **Silver Sagebrush/ Kentucky Bluegrass Plant Community Type** (CC p. 159)

43b. Kentucky bluegrass or other species mentioned above absent **44**

44a. Cusick’s bluegrass (*Poa cusickii*) cover ≥25 percent .... **Silver Sagebrush/Cusick’s Bluegrass Plant Community Type** (CC p. 166)

44b. Cusick’s bluegrass absent **41b**

41b. Silver sagebrush cover <25 percent **45**

45a. Mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) ≥25 percent cover **46**

46a. Cusick’s bluegrass (*Poa cusickii*) cover ≥5 percent .... **Mountain Big Sagebrush/ Cusick’s Bluegrass Plant Association** (CC p. 162)

46b. Cusick’s bluegrass cover <5 percent .... Try upland associations in Blue Ochoco and Blue Mountain Alpine Guide

45b. Mountain big sagebrush cover <25 percent .... Depauperate or undefined low shrub type

33b. Low shrub species cover <25 percent **47**

47a. Sitka alder (*Alnus sinuata*) cover ≥25 percent .... **Sitka Alder Series 48**

48a. Ladyfern (*Athyrium filix-femina*) cover ≥5 percent .... **Sitka Alder/Ladyfern Plant Association** (p. 99 and CC p. 122)

48b. Ladyfern cover <5 percent **49**

49a. Drooping woodreed (*Cinna latifolia*) cover ≥5 percent .... **Sitka Alder/Drooping Woodreed Plant Association** (p. 99 and CC p. 124)

49b. Drooping woodreed cover <5 percent **50**

50a. Mesic forbs with highest combined foliar cover, graminoids depauperate or isolated to microsites .... **Sitka Alder/Mesic Forb Plant Community Type** (p. 97 and CC p. 146)

50b. Mesic forbs scarce .... Depauperate or undefined Sitka Alder type

47b. Sitka alder cover <25 percent **51**

51a. Mountain alder (*Alnus incana*) cover ≥25 percent .... **Mountain Alder Series 52**

52a. Big-leaved sedge (*Carex amplifolia*) cover ≥25 percent .... **Mountain Alder/Big-Leaved Sedge Plant Association** (CC p. 126)

52b. Big-leaved sedge cover <25 percent **53**

53a. Bladder sedge (*Carex utriculata*) cover ≥25 percent .... **Mountain Alder/Bladder Sedge Plant Association** (CC p. 128)

53b. Bladder sedge cover <25 percent **54**

54a. Aquatic sedge (*Carex aquatilis*) cover ≥25 percent .... **Mountain Alder/Aquatic Sedge Plant Community** (CC p. 146)

54b. Aquatic sedge cover <25 percent **55**

55a. Woodrush sedge (*Carex luzulina*) cover ≥25 percent .... **Mountain Alder/Woodrush Sedge Plant Community** (CC p. 146)

55b. Woodrush sedge cover <25 percent **56**

56a. Woolly sedge (*Carex lanuginosa*) cover ≥25 percent .... **Mountain Alder/Woolly Sedge Plant Association** (CC p. 146)

56b. Woolly sedge cover <25 percent **57**

57a. Bluejoint reedgrass (*Calamagrostis canadensis*) cover ≥25 percent .... **Mountain Alder/Bluejoint Reedgrass Plant Association** (CC p. 147)

57b. Bluejoint reedgrass cover <25 percent **58**

58a. Small-fruit bulrush (*Scirpus microcarpus*) cover ≥25 percent ....**Mountain Alder/Small-Fruit Bulrush Plant Community Type** (CC p. 147)

58b. Small-fruit bulrush cover <25 percent **59**

59a. Ladyfern (*Athyrium filix-femina*) cover ≥5 percent .... **Mountain Alder/Ladyfern Plant Association** (p. 100 and CC p. 130)

59b. Ladyfern cover <5 percent **60**

60a. Tall mannagrass (*Glyceria elata*) cover ≥10 percent .... **Mountain Alder/Tall Mannagrass Plant Association** (p. 104 and CC p. 132)

60b. Tall mannagrass cover <10 percent **61**

61a. Red-osier dogwood (*Cornus stolonifera*) cover ≥25 percent .... **Mountain Alder–Red-Osier Dogwood/ Mesic Forb Plant Association** (p. 102 and CC p. 134)

61b. Red-osier dogwood cover <25 percent **62**

62a. Currant species (*Ribes* spp.) cover ≥25 percent .... **Mountain Alder–Currants/Mesic Forb Plant Association** (CC p. 136)

62b. Currant species cover <25 percent **63**

63a. Common horsetail (*Equisetum arvense*) cover ≥25 percent ....**Mountain Alder/Common Horsetail Plant Association** (p. 104 and CC p. 138)

63b. Common horsetail cover <25 percent **64**

64a. Oakfern (*Gymnocarpium dryopteris)* cover ≥25 percent .... **Mountain Alder/Oakfern Plant Community Type** (CC p. 148)

64b. Oakfern cover <25 percent **65**

65a. Common cowparsnip (*Heracleum lanatum*) cover ≥25 percent .... **Mountain Alder/Common Cowparsnip Plant Community Type** (CC p. 148)

65b. Common cowparsnip cover <25 percent **66**

66a. Densely-tufted sedge (*Carex lenticularis* var. *lenticularis*) cover ≥25 percent .... **Mountain Alder/Densely-Tufted Sedge Plant Community** (CC p. 147)

66b. Densely-tufted sedge cover <25 percent **67**

67a. Common snowberry (*Symphoricarpos albus*) cover ≥25 percent .... **Mountain Alder–Common Snowberry Plant Association** (p. 105 and CC p. 140)

67b. Common snowberry cover <25 percent **68**

68a. Dewey sedge (*Carex deweyana*) cover ≥5 percent .... **Mountain Alder/Dewey Sedge Plant Community Type** (p. 105 and CC p. 142)

68b. Dewey sedge cover <5 percent **69**

69a. Kentucky bluegrass (*Poa pratensis*) cover ≥25 percent .... **Mountain Alder/Kentucky Bluegrass Plant Community Type** (CC p. 144)

69b. Kentucky bluegrass absent .... Depauperate or undefined Mountain Alder type

51b. Mountain alder cover <25 percent **70**

70a. **Other tall shrub species** (refer to "Glossary" p. 164 for list of other tall shrub species considered here) cover ≥25 percent .... **Other Tall Shrub Series 71**

71a. Currant species (*Ribes* spp.) (specifically prickly (*R. lacustre*) and stinking (*R. hudsonianum*) currant) cover ≥25 percent **72**

72a. Drooping woodreed (*Cinna latifolia*) cover ≥10 percent .... **Currants/Drooping Woodreed Plant Community Type** (CC p. 150)

72b. Drooping woodreed cover <10 percent **73**

73a. Tall mannagrass (*Glyceria elata*) cover ≥10 percent .... **Currants/Tall Mannagrass Plant Community Type** (CC p. 164)

73b. Tall mannagrass cover <10 percent **74**

74a. Mesic forbs with highest combined foliar cover, graminoids depauperate or isolated to microsites .... **Currants/Mesic Forb Plant Community Type** (CC p. 164)

74b. Mesic forbs scarce .... Depauperate or undefined Currant community

71b. Currant species cover <25 percent **75**

75a. Twinberry honeysuckle (*Lonicera involucrata*) cover ≥25 percent AND ladyfern (*Athyrium filix-femina*) present .... **Twinberry Honeysuckle/Ladyfern Plant Community** (p. 120)

75b. Twinberry honeysuckle cover <25 percent and/or ladyfern absent **76**

76a. Water birch (*Betula occidentalis*) cover ≥25 percent **77**

77a. "Wet" sedge (aquatic (*Carex aquatilis*), big-leaved (*C. amplifolia*), bladder (*C. utriculata*), and/or Cusick's (*C. cusickii*) sedge) cover ≥ 25 percent .... **Water Birch/Wet Sedge Plant Community Type** (p. 120 and CC p. 165)

77b. "Wet" sedge cover <25 percent **78**

78a. Reed canarygrass (*Phalaris arundinacea*) cover ≥25 percent .... **Water Birch/Reed Canarygrass Plant Community** (p. 121)

78b. Reed canarygrass cover <25 percent **79**

79a. Mesic forbs with highest combined foliar cover, graminoids depauperate or isolated to microsites .... **Water Birch/Mesic Forb Plant Community Type** (p. 106 and CC p. 164)

79b. Mesic forbs scarce .... Depauperate or undefined Water Birch community

76b. Water birch cover <25 percent **80**

80a. Alder-leaved buckthorn (*Rhamnus purshiana*) cover ≥25 percent and mesic forbs with highest combined foliar cover (≥25 percent), graminoids depauperate or isolated to microsites .... **Alder-Leaved Buckthorn/Mesic Forb Plant Community Type** (CC p. 165)

80b. Alder-leaved buckthorn cover <25 percent and/or mesic forbs scarce **81**

81a. Red-osier dogwood (*Cornus stolonifera*) cover ≥25 percent **82**

82a. Brook saxifrage (*Saxifraga arguta*) cover ≥25 percent and sideslope seep or spring habitat .... **Red-Osier Dogwood/Brook Saxifrage Plant Community Type** (CC p. 166)

82b. Brook saxifrage cover <25 percent and sideslope seep or spring habitat **83**

83a. Ladyfern (*Athyrium filix-femina*) cover ≥25 percent .... **Red-Osier Dogwood/ Ladyfern Plant Association** (p. 121)

83b. Brook saxifrage or ladyfern cover <25 percent or streamside habitat (not sideslope seep or spring) .... **Red-Osier Dogwood Plant Association** (p. 108 and CC p. 152)

81b. Red-osier dogwood cover <25 percent **85**

84a. Black hawthorn (*Crataegus douglasii*) cover ≥25 percent and mesic forbs with highest combined foliar cover, graminoids depauperate or isolated to microsites .... **Black Hawthorn/Mesic Forb Plant Community Type** (p. 110 and CC p. 154)

84b. Black hawthorn cover <25 percent and/or mesic forbs scarce **86**

85a. Western serviceberry (*Amelanchier alnifolia*) cover ≥25 percent .... **Western Serviceberry Plant Community Type** (CC p. 166)

85b. Western serviceberry cover <25 percent **87**

86a. Common snowberry (*Symphoricarpos albus*) cover ≥25 percent .... **Common Snowberry Plant Community Type** (p. 112)

86b. Common snowberry cover <25 percent **88**

87a. Rocky Mountain maple (*Acer glabrum*) cover ≥25 percent .... **Rocky Mountain Maple Plant Community Type** (p. 114)

87b. Rocky Mountain maple cover <25 percent **89**

88a. Ninebark (*Physocarpus* spp.) cover ≥25 percent **90**

89a. Pacific ninebark (*P. capitatus*) as primary ninebark species .... **Pacific Ninebark Plant Community** (p. 122)

89b. Mallow ninebark (*P. malvaceus*) as primary ninebark species .... **Mallow Ninebark–Common Snowberry Plant Community Type** (p. 122)

88b. Ninebark cover <25 percent **91**

90a. Netleaf hackberry (*Celtis reticulata*) cover ≥25 percent **92**

91a. Introduced brome species (*Bromus* spp.) (specifically cheatgrass (*B. tectorum*) and ripgut brome (*B. rigidus*)) cover ≥5 percent .... **Netleaf Hackberry/Brome Plant Community Type** (p. 116)

91b. Introduced brome species cover <5 percent .... Try upland associations in Wallowa-Snake Guide

90b. Netleaf hackberry cover ≥25 percent **93**

92a. Lewis' mock orange (*Philadelphus lewisii*) cover ≥25 percent and mesic forbs with highest combined foliar cover, graminoids depauperate or isolated to microsites .... **Lewis' Mock Orange/Mesic Forb Plant Community Type** (p. 118)

92b. Lewis' mock orange cover <25 percent and/or mesic forbs scarce **94**

93a. Thimbleberry (*Rubus parviflorus*) cover ≥25 percent .... **Thimbleberry Plant Community Type** (p. 123)

93b. Thimbleberry cover <25 percent **94**

94a. Barton's raspberry (*Rubus bartonianus*) cover ≥25 percent .... **Barton's Raspberry Plant Community** (p. 123)

94b. Barton's raspberry cover <25 percent **95**

95a. Himalayan blackberry (*Rubus discolor*) cover ≥25 percent .... **Himalayan Blackberry Plant Community** (p. 124)

95b. Himalayan blackberry cover <25 percent .... Depauperate or undefined Tall Shrub type

70b. Other tall shrub species cover <25 percent .... Undefined shrub type or repeat shrub key or try herbaceous key

C. Key to Herbaceous Plant Associations, Plant Community Types, and Plant Communities

1a. **Individual wet graminoid species** (refer to “Glossary” p. 164 for list of wet graminoid species considered here) >25 percent cover and not isolated to microsites .... **Wet Graminoid Series 2**

2a. Aquatic sedge (*Carex aquatilis*) cover ≥25 percent ....**Aquatic Sedge Plant Association** (p. 125 and CC p. 174)

2b. Aquatic sedge cover <25 percent **3**

3a. Widefruit sedge (*Carex eurycarpa*) cover ≥25 percent ....**Widefruit Sedge Plant Association** (p. 135)

3b. Widefruit sedge cover <25 percent **4**

4a. Silvery sedge (*Carex canescens*) cover ≥25 percent .... **Silvery Sedge Plant Community Type** (CC p. 199)

4b. Silvery sedge cover <25 percent **5**

5a. Cusick’s sedge (*Carex cusickii*) over ≥25 percent .... **Cusick’s Sedge Plant Association** (CC p. 176)

5b. Cusick’s sedge cover <25 percent **6**

6a. Bladder sedge (*Carex utriculata*) cover ≥25 percent .... **Bladder Sedge Plant Association** (p. 127 and CC p. 178)

6b. Bladder sedge cover <25 percent **7**

7a. Slender sedge (*Carex lasiocarpa*) cover ≥25 percent ....**Slender Sedge Plant Community** (CC p. 200)

7b. Slender sedge cover <25 percent **8**

8a. Inflated sedge (*Carex vesicaria*) cover ≥25 percent ....**Inflated Sedge Plant Association** (p. 129 and CC p. 180)

8b. Inflated sedge cover <25 percent **9**

9a. Mud sedge (*Carex limosa*) cover ≥25 percent .... **Mud Sedge Plant Association** (p. 135)

9b. Mud sedge cover <25 percent **10**

10a. Sierra hare sedge (*Carex leporinella*) cover ≥25 percent .... **Sierra Hare Sedge Plant Association** (p. 136)

10b. Sierra hare sedge cover <25 percent **11**

11a. Few-flowered spikerush (*Eleocharis pauciflora*) cover ≥25 percent ....**Few-Flowered Spikerush Plant Association** (p. 131 and CC p. 199)

11b. Few-flowered spikerush cover <25 percent **12**

12a. Delicate spikerush (*Eleocharis bella*) cover ≥25 percent .... **Delicate Spikerush Plant Community** (CC p. 200)

12b. Delicate spikerush cover <25 percent **13**

13a. Lakeshore sedge (*Carex lenticularis*) cover ≥25 percent ....**Lakeshore Sedge Plant Association** (p. 136 and CC p. 184)

13b. Lakeshore sedge cover <25 percent **14**

14a. Creeping spikerush (*Eleocharis palustris*) cover ≥25 percent .... **Creeping Spikerush Plant Association** (CC p. 182)

14b. Creeping spikerush cover <25 percent **15**

15a. Short-beaked sedge (*Carex simulata*) cover ≥25 percent .... **Short-Beaked Sedge Plant Community Type** (CC p. 200)

15b. Short-beaked sedge cover <25 percent **16**

16a. Saw-beak sedge (*Carex stipata*) cover ≥25 percent .... **Saw-Beak Sedge Plant Community Type** (CC p. 200)

16b. Saw-beak sedge cover <25 percent **17**

17a. Woolly sedge (*Carex lanuginosa*) ≥25 percent .... **Woolly Sedge Plant Association** (CC p. 186)

17b. Woolly sedge cover <25 percent **18**

18a. Small-fruit bulrush (*Scirpus microcarpus*) cover ≥25 percent .... **Small-Fruit Bulrush Plant Association** (p. 133 and CC p. 206)

18b. Small-fruit bulrush cover <25 percent **19**

19a. Big-leaved sedge (*Carex amplifolia*) cover ≥25 percent (usually occurs where water source is groundwater spring) .... **Big-Leaved Sedge Plant Association** (p. 137 and CC p. 204)

19b. Big-leaved sedge cover <25 percent **20**

20a. Torrent sedge (*Carex nudata*) cover ≥25 percent and occurring on large rocks along edge of stream .... **Torrent Sedge Plant Community Type** (CC p. 212)

20b. Torrent sedge cover <25 percent and/or setting different than above **21**

21a. Tall mannagrass (*Glyceria elata*) cover ≥25 percent .... **Tall Mannagrass Plant Association** (CC p. 208)

21b. Tall mannagrass cover <25 percent .... Depauperate or undefined wet graminoid type

1b. Individual wet graminoid species cover <25 percent and/or isolated to microsites **22**

22a. **Individual moist graminoid species** (refer to “Glossary” p. 164 for list of moist graminoid species considered here) cover ≥25 percent and not isolated to microsites .... **Moist Graminoid Series 23**

23a. Holm’s Rocky Mountain sedge (*Carex scopulorum*) cover ≥25 percent .... **Holm’s Rocky Mountain Sedge Plant Association** (p. 138 and CC p. 170)

23b. Holm’s Rocky Mountain sedge cover <25 percent **24**

24a. Northern singlespike sedge (*Carex scirpoidea*) cover ≥25 percent and brook saxifrage (*Saxifraga arguta*) present and headwater spring habitat .... **Northern Singlespike Sedge–Brook Saxifrage–Spring Plant Association** (p. 140)

24b. Northern singlespike sedge cover <25 percent and/or brook saxifrage absent and/or setting different than above **25**

25a. Woodrush sedge (*Carex luzulina*) cover ≥25 percent .... **Woodrush Sedge Plant Association** (p. 142 and CC p. 172)

25b. Woodrush sedge cover <25 percent **26**

26a. Black alpine sedge (*Carex nigircans*) cover ≥25 percent .... **Black Alpine Sedge Plant Association** (p. 144)

26b. Black alpine sedge cover <25 percent **27**

27a. Sheldon's sedge (*Carex sheldonii*) cover ≥25 percent .... **Sheldon's Sedge Plant Community Type** (CC p. 201)

27b. Sheldon's sedge cover <25 percent **28**

28a. Clustered field sedge (*Carex praegracilis*) cover ≥25 percent .... **Clustered Field Sedge Plant Community Type** (CC p. 199)

28b. Clustered field sedge cover <25 percent **29**

29a. Bluejoint reedgrass (*Calamagrostis canadensis*) cover ≥25 percent .... **Bluejoint Reedgrass Plant Association** (p. 146 and CC p. 188)

29b. Bluejoint reedgrass cover <25 percent **30**

30a. Tufted hairgrass (*Deschampsia cespitosa*) cover ≥25 percent .... **Tufted Hairgrass Plant Association** (p. 148 and CC p. 190)

30b. Tufted hairgrass cover <25 percent **31**

31a. Smooth-stemmed sedge (*Carex laeviculmis*) cover ≥25 percent .... **Smooth-Stemmed Sedge Plant Community** (CC p. 212)

31b. Smooth-stemmed sedge cover <25 percent **32**

32a. Drooping woodreed (*Cinna latifolia*) cover ≥25 percent .... **Drooping Woodreed Plant Community** (CC p. 212)

32b. Drooping woodreed cover <25 percent **33**

33a. Weak alkaligrass (*Puccinellia pauciflora*) cover ≥25 percent .... **Weak Alkaligrass Plant Community Type** (CC p. 212)

33b. Weak alkaligrass cover <25 percent **34**

34a. Blue wildrye (*Elymus glaucus*) cover ≥25 percent AND common cowparsnip (*Heracleum lanatum*) present .... **Common Cowparsnip–Blue Wildrye Plant Community** (p. 157)

34b. Blue wildrye cover <25 percent and/or common cowparsnip absent **35**

35a. Basin wildrye (*Elymus cinereus*) cover ≥25 percent .... **Basin Wildrye Plant Community Type** (p. 148)

35b. Basin wildrye cover <25 percent **36**

36a. Star sedge (*Carex muricata*) cover ≥25 percent .... **Star Sedge Plant Community Type** (p. 149 and CC p. 199)

36b. Star sedge cover <25 percent **37**

37a. Jones' sedge (*Carex jonesii*) cover ≥25 percent .... **Jones' Sedge Plant Community** (p. 149)

37b. Jones' sedge cover <25 percent **38**

38a. Nebraska sedge (*Carex nebrascensis*) cover ≥25 percent .... **Nebraska Sedge Plant Community Type** (p. 150 and CC p. 192)

38b. Nebraska sedge cover <25 percent **39**

39a. Smallwing sedge (*Carex microptera*) cover ≥25 percent .... **Smallwing Sedge Plant Community Type** (p. 151)

39b. Smallwing sedge cover <25 percent **40**

40a. Brown sedge (*Carex subfusca*) cover ≥25 percent .... **Brown Sedge Plant Community** (p. 150)

40b. Brown sedge cover <25 percent **41**

41a. Baltic rush (*Juncus balticus*) cover ≥25 percent .... **Baltic Rush Plant Community Type** (p. 151 and CC p. 194)

41b. Baltic rush cover <25 percent **42**

42a. Thin bentgrass (*Agrostis diegoensis*) cover ≥25 percent .... **Thin Bentgrass Plant Community Type** (CC p. 201)

42b. Thin bentgrass cover <25 percent **43**

43a. Kentucky bluegrass (*Poa pratensis*) and/or creeping bentgrass (*Agrostis stolonifera*) cover ≥25 percent .... **Kentucky Bluegrass Plant Community Type** (CC p. 196)

43b. Kentucky bluegrass and/or creeping bentgrass cover <25 percent **44**

44a. Meadow foxtail (*Alopecurus pratensis*) cover ≥25 percent ....**Meadow Foxtail Plant Community Type** (CC p. 202)

44b. Meadow foxtail cover <25 percent ....Depauperate of undefined moist graminoid type

22b. Individual moist graminoid species cover <25 percent and/or isolated to microsites **45**

45a. **Individual forb species** (refer to "Glossary" p. 164 for list of forb species considered here) cover >25 percent ....**Forb Series 46**

46a. Narrowleaf bur-reed (*Sparganium angustifolium*) cover ≥25 percent .... **Narrowleaf Bur-Reed Plant Association** (p. 156)

46b. Narrowleaf bur-reed cover <25 percent **47**

47a. Rocky Mountain pond-lily (*Nuphar polysepala*) cover ≥25 percent .... **Rocky Mountain Pond-Lily Plant Association** (p. 156)

47b. Rocky Mountain pond-lily cover <25 percent **48**

48a. Buckbean (*Menyanthes trifoliata*) cover ≥25 percent .... **Buckbean Plant Community** (CC p. 200)

48b. Buckbean cover <25 percent **49**

50a. Common cattail (*Typha latifolia*) cover ≥25 percent .... **Common Cattail Plant Community** (p. 157 and CC p. 202)

50b. Common cattail cover <25 percent **51**

51a. Pacific onion (*Allium validum*) cover ≥25 percent AND Holm's Rocky Mountain sedge (*Carex scopulorum*) present .... **Pacific Onion–Holm's Rocky Mountain Sedge Plant Association** (p. 152 and CC p. 213)

51b. Pacific onion cover <25 percent and/or Holm's Rocky Mountain sedge absent **52**

52a. Arrowleaf groundsel (*Senecio triangularis*) cover ≥25 percent **53**

53a. Purple monkeyflower (*Mimulus lewisii*) present .... **Arrowleaf Groundsel–Purple Monkeyflower Plant Association** (p. 154)

53b. Purple monkeyflower absent .... **Arrowleaf Groundsel Plant Association** (CC p. 212)

52b. Arrowleaf groundsel cover <25 percent **54**

54a. Maidenhair fern (*Adiantum pedatum*) cover ≥25 percent .... **Maidenhair Fern Plant Community Type** (CC p. 213)

54b. Maidenhair fern cover <25 percent **55**

55a. Common cowparsnip (*Heracleum lanatum*) cover ≥25 percent and blue wildrye (*Elymus glaucus*) present .... **Common Cowparsnip–Blue Wildrye Plant Community** (p. 157)

55b. Common cowparsnip cover <25 percent and/or blue wildrye absent **56**

56a. Brook saxifrage (*Saxifraga arguta*) cover ≥25 percent .... **Brook Saxifrage Plant Community Type** (CC p. 213)

56b. Brook saxifrage cover <25 percent **57**

57a. Common horsetail (*Equisetum arvense*) cover ≥25 percent .... **Common Horsetail Plant Association** (CC p. 210)

57b. Common horsetail cover <25 percent **58**

58a. American speedwell (*Veronica americana*) cover ≥25 percent .... **American Speedwell Plant Community Type** (CC p. 213)

58b. American speedwell cover <25 percent **59**

59a. False hellebore (*Veratrum* spp.) cover ≥25 percent .... **False Hellebore Plant Community Type** (p. 158 and CC p. 201)

59b. False hellebore cover <25 percent **60**

60a. Western coneflower (*Rudbeckia occidentalis*) cover ≥25 percent .... **Western Coneflower Plant Community Type** (p. 158)

60b. Western coneflower cover <25 percent **61**

61a. White sagebrush (*Artemisia ludoviciana*) cover ≥25 percent .... **White Sagebrush Plant Community Type** (p. 159)

61b. White sagebrush cover <25 percent .... Depauperate or undefined forb type

45b. Individual forb species cover <25 percent .... Depauperate or undefined type, or rerun appropriate life-form key with cutoff levels reduced as follows: 25 percent = 10 percent; 10 percent = 5 percent; 5 percent = present (and reproducing for tree species), or try the Environment Key.

Environment Key: Overview

The environment key is provided (1) to reduce the number of possible vegetation types based on a given set of environmental attributes, (2) for office users who are interested in identifying the set of vegetation types that might occur at sites located on topographic maps or geographic information system data, and (3) for the identification of potential vegetation types at disturbed sites.

The environment key is a dichotomous key based on the environmental data collected during the field sampling effort. The key is fashioned after the results of a tree classifier and also reflects the knowledge of, and observations made by, the field researcher. The key is dichotomous, but given the environmental amplitude shown by many of the vegetation types, terminal nodes may result in more than one possible vegetation type. The environment key is not exhaustive of the possible environmental conditions present in the Blue Mountains. Lastly, brackets [ ] around a type indicate a sample size of one.

Environment Key

1a. Elevation <1600 m **2**

2a. Elevation <700 m (* indicates types found mainly in Hells Canyon) **3**

3a. Soil texture coarser than sandy loam and/or rock fragments >40 percent **4**

4a. Floodplains **5**

5a. Floodplains found only between Hells Canyon Dam and Steep Creek in Hells Canyon Wilderness .... [RUBA]*

5b. All floodplains........ POTR15/ALIN2-COST4
POTR15/SYAL
POTR15/ACGL
COST4
ALRH2/RUBUS
[RUDI2]

4b. Other landforms **6**

6a. Rocky bars .... ALRH2/MESIC SHRUB*
ALRH2/RUBUS*

6b. Terraces **7**

7a. Boulders covering soil surface ... ACGL*
PHLE4/MESIC FORB

7b. Boulders not covering soil surface, rock fragments typically >40 percent ... CERE2/BROMU*
POTR15/SYAL
POTR15/ACGL
BEOC2/MESIC FORB*
PHLE4/MESIC FORB
SYAL
RUPA

3b. Principal soil texture sandy loam or finer, rock fragments <40 percent ... **8**

8a. Elevation <550 m ... **9**

9a. Terraces ... CERE2/BROMU*
BEOC2/MESIC FORB*
PHLE4/MESIC FORB
SYAL
RUPA

9b. Floodplain ... ALRH2/MESIC SHRUB*

8b. Elevation ≥550 m ... **10**

10a. Valley gradient ≤3 percent ... **11**

11a. Landform slope <2 percent ... PSME/ACGL-PHMA5–FLOODPLAIN
POTR15/SYAL
[PIPO/CRDO2]

11b. Landform slope ≥2 percent ... ABGR/CRDO2/CADE9
CRDO2/MESIC FORB
POTR15/ACGL
POTR15/SYAL

10b. Valley gradient >3 percent ... POTR15/ALIN2-COST4
COST4

2b. Elevation ≥700 m ... **12**

12a. North Fork Umatilla and Wenaha-Tucannon Wilderness ... **13**

13a. Soil completely saturated for most to all of the year ... **14**

14a. Springs ... ALIN2/CADE9
ALIN2/ATFI
BEOC2/WET SEDGE
COST4/ATFI
CAAM10

14b. Streambanks, floodplains, swales, and seasonal channels ... **15**

15a. Soil texture coarser than very fine sandy loam, coarse fragments >15 percent ... ALIN2/ATFI
ALIN2/EQAR
CAAQ

15b. Soil texture very fine sandy loam or finer, coarse fragments <15 percent ... SCMI2

13b. Soil not completely saturated for any part of the year; or if so, saturated for only a short period early in the growing season ... **16**

16a. Floodplains and rocky bars ... **17**

17a. Landform slope <3 percent ALRU2/SYAL/CADE9
ALIN2/CADE9
ALIN2-COST4/MESIC FORB
ALIN2-SYAL
[SASI2/EQAR]
[PHCA11]

17b. Landform slope ≥3 percent .... ABGR/ACGL–FLOODPLAIN
ABGR/CRDO2/CADE9

16b. Terraces **18**

18a. Elevation ≤730 m .... ABGR/ACGL–FLOODPLAIN

18b. Elevation >730 m PSME/ACGL-PHMA5–FLOODPLAIN
PSME/SYAL–FLOODPLAIN
ABGR/TABR2/LIBO3–FLOODPLAIN

12b. Hells Canyon Wilderness and National Recreation Area **19**

19a. Swales .... [TYLA]

19b. Other landforms **20**

20a. Soil texture coarser than fine sandy loam
and/or coarse fragments >20 percent **21**

21a. Floodplains and rocky bars **22**

22a. Elevation ≤915 m .... ALRH2/MESIC SHRUB
ALRH2/RUBUS
PSME/ACGL-PHMA5–FLOODPLAIN

22b. Elevation >915 m .... SAEX
POTR15/ALIN2-COST4
ABGR/CRDO2/CADE9
ABGR/TABR2/LIBO3–FLOODPLAIN

21b. Terraces **23**

23a. Southerly aspects .... PIPO/SYAL–FLOODPLAIN
POTR15/SYAL

23b. Northerly aspects .... PSME/SYAL–FLOODPLAIN
ABGR/ACGL–FLOODPLAIN
ABGR/TABR2/LIBO3–FLOODPLAIN

20b. Soil texture fine sandy loam or finer
and/or rock fragments ≤20 percent **24**

24a. Less than 5 percent rock fragments PHMA5-SYAL
[ELCI2]

24b. Greater than or equal to 5 percent rock fragments **25**

25a. Landform slope <3 percent .... SYAL

25b. Landform slope ≥3 percent **26**

26a. Valley gradient <3 percent **27**

27a. Soil texture coarser than
very fine sandy loam .... CRDO2/MESIC FORB
RUPA

27b. Soil texture very fine
sandy loam or finer .... PIPO/SYAL–FLOODPLAIN

26b. Valley gradient ≥ 3 percent .... PSME/SYAL–FLOODPLAIN
ABGR/CRDO2/CADE9

1b. Elevation ≥1600 m **28**

28a. Elevation <2130 m **29**

29a. Soil texture coarser than very fine sandy loam and/or rock fragments >20 percent **30**

30a. Streambanks and floodplains **31**

31a. Elevation <1900 m .... ALSI3/MESIC FORB
ALSI3/ATFI
[LOIN5/ATFI]

31b. Elevation ≥1900 m .... PIEN-ABLA/SETR
ALIN2/GLEL [Strawberry Mountain Wilderness]
SACO2/CASC12
[CALE8]
[SALE/MESIC FORB]

30b. Other landforms **32**

32a. Terraces and moist meadow .... ABLA/VAME–FLOODPLAIN
ABLA-PIEN/MEFE–FLOODPLAIN [Seven Devils Mountains]
POFR4-BEGL
ABLA-PIEN/LEGL–FLOODPLAIN SALIX/CACA4
[JUBA]

32b. Rocky bars .... SAEX
[ARLU]

29b. Soil texture fine sandy loam or finer **33**

33a. Landform slope <3 percent **34**

34a. Soil not completely saturated for any part of the year; or if so, saturated for only a short period early in the growing season **35**

35a. Landform slope ≤1 percent CASC12
DECE
[CAMI7]

35b. Landform slope >1 percent **36**

36a. Strawberry Mountain Wilderness CACA4
[CASU6]

36b. Wallowa-Whitman National Forest PIEN-ABLA/CASC12
CACA4
[CANE2]
[HELA4-ELGL]

34b. Soil completely saturated for most to all of the year **37**

37a. Strawberry Mountain Wilderness ALIN2/GLEL
SCMI2
CAMU7

37b. Wallowa-Whitman National Forest ALSI3/CILA2
ELPA6
CALU7
CAMU7

33b. Landform slope ≥3 percent **38**

38a. Steep headwater basins and springs of the Strawberry Mountain Wilderness CASC10-SAAR13

38b. Wallowa-Whitman National Forest **39**

39a. Seepy slopes .... CAUT
ALSI3/CILA2
[PIEN/EQAR]
[SACO2/CAUT]

39b. Other landforms **40**

40a. Rocky bars, cobbly/bouldery stream channels, and springs SETR-MILE2

40b. Streambanks and floodplains .... SALIX/ MESIC FORB
SACO2/CASC12
[SADR/SETR]

28b. Elevation ≥2130 m **41**

41a. Cirque basins above 2,300 m elevation with sedimentary geology in the Eagle Cap Wilderness SAAR27
[SAFA/ALVA]

41b. Other sites that do not fit the above criteria **42**

42a. Sites with mineral soils, organic surface layer ≤20 cm **43**

43a. Less than or equal to 15 percent rock fragments **44**

44a. Soil texture coarser than very fine sandy loam **45**

45a. Soil not completely saturated for any part of the year, or if so, saturated for only a short period early in the growing season KAMI/CANI2
POFR4-BEGL
SALIX/CACA4

45b. Soil completely saturated for most to all of the year CASC12
SALIX/CAAQ
SACO2/CASC12

44b. Soil texture very fine sandy loam or finer **46**

46a. Soil not completely saturated for any part of the year; or if so, saturated for only a short period early in the growing season **47**

47a. Soil mounds (<1 m tall) present .... PHEM MOUNDS

47b. Soil mounds absent **48**

48a. Lake edges, periphery of meadows, floodplains .... ABLA-PIEN/LEGL–FLOODPLAIN
ABLA/MEFE–FLOODPLAIN [Seven Devils Mountains]
KAMI/CANI2
ALVA-CASC12

48b. Moist meadows ALVA-CASC12
CANI2
CACA4
DECE
[CAJO]

46b. Soil completely saturated for most to all of the year SABO2/CASC12
CASC12
CALE9
[SABO2/CAVE6]

43b. Greater than 15 percent rock fragments **49**

49a. Landform slope >15 percent SETR-MILE2

49b. Landform slope ≤15 percent .... ABLA/VAME–FLOODPLAIN

42b. Sites with organic soils, organic surface layer >20 cm AND/OR soil surface submerged throughout the year **50**

50a. Soil surface submerged throughout the year **51**

51a. Wet meadows and cirque basins ELPA6
CALU7

51b. Other landforms **52**

52a. Lake edges .... CAAQ
CAUT
CAVE6
[CALI7]
[CAEU2]

52b. Lakes SPAN2
NUPO2

50b. Soil surface not submerged throughout the year **53**

53a. Landform slope <5 percent ELPA6
SABO2/CASC12
[PICO/CASC12]

53b. Landform slope >5 percent CASC12
ALVA-CASC12

Contents of Vegetation Type Descriptions

A descriptive section for each plant association and community type that includes the following:

Nomenclature/title—The name given to the vegetation type with principal (typal) species first followed by subordinate species of different floristic layers (separated by a backslash) and/or coprincipal species of the same floristic layer (separated by a dash). Landforms may be included in the title if the vegetation type was observed to have a strong affinity to a particular landform.

Latin title—The Latin names of the indicator species.

Ecoclass code—United States Forest Service codes for plant associations and community types.

Title code—A shorthand version of the title consisting of the USDA Plants Database code for the typal species.

Sample size (n =)—The number of sample plots used to describe a vegetation type.

Physical environment—A description of the environmental attributes typical of a vegetation type, including landform, elevation, valley descriptors, and soil characteristics.

Environment table—A summary table of quantitative environmental data.

Vegetation composition—Includes the **principal species** table and a **descriptive section** regarding floristic attributes of the vegetation type.

> **Principal species**—A table including the common and Latin names, **constancy**, **percentage cover**, and **range of cover** for the characteristic species (≥20 percent constancy) of a vegetation type (please see app. B for complete constancy/coverage tables).
>
> > **Constancy (CON)**—A percentage of plots where a species occurs in a vegetation type.
> >
> > **Cover (COV)**—The average percentage cover of a species **on the plots where it is present** [when it occurs] in a vegetation type.
>
> **Range of cover (MIN/MAX)**—The minimum and maximum coverage of a species **when it occurs** in a vegetation type.
>
> **Descriptive section**—A description of the floristic attributes of a vegetation type including **adjacent vegetation types.**
>
> **Adjacent vegetation types**—A list of possible riparian, wetland, and upland vegetation types and associated landforms directly adjacent to the vegetation type being described. This is not a closed list, other possible adjacent vegetation types may exist (not to be confused with "Adjacent Riparian/Wetland Classifications," see below).

Management considerations—A section describing implications of resource management. Topics include disturbance events, life histories, forestry, livestock grazing, wildlife use, fisheries, and successional relationships.

> **Stand characteristics**—Summary tables for the forested vegetation types, includes **basal area** and **site tree** tables.
>
> > **Basal Area**—Includes basal area, range of basal area, average diameter at breast height (d.b.h), minimum d.b.h., and maximum d.b.h. for each tree species associated with forested types.
> >
> > **Site Tree**—An individual tree that is characteristic of the age and size class of a forested stand. Description includes the average d.b.h., average age, and average height of the site trees of each tree species associated with forested vegetation types.

USDI Fish and Wildlife Service wetlands classification—The Cowardin et al. (1979) wetland classification for each plant association and community type.

Adjacent riparian/wetland classifications—Section describing the occurrence(s) of the same or **floristically similar** vegetation types found in riparian and wetland classifications developed for **neighboring geographic regions**.

Floristically similar vegetation types—Adjacent vegetation types that are compositionally similar (based on compositional similarity analysis of the vegetation data) to those described in the present classification.

Subalpine Fir-Engelmann Spruce/Labrador Tea–Floodplain Plant Association

Abies lasiocarpa-Picea engelmannii/Ledum glandulosum

CES610 ABLA-PIEN/LEGL–FLOODPLAIN N = 7

Aaron Wells

Aaron Wells

Landform environment (n = 7)		Mean	Range
Elevation (m)		2134	1637–2348
Plot slope (percent)		7	<1–20
Aspect	All		

Valley environment (n = 7)		Mode	Range
Valley gradient (percent)		<1	<1–>8
Valley width (m)		10–30	10–>300
Valley aspect	All		

Soil surface cover (n = 7)	Mean	Range
Submerged (percent)	7	0–40
Bare ground	6	0–30
Gravel	0	
Rock	3	0–10
Bedrock	0	
Litter	54	20–85
Moss	30	10–70

Soil profile characteristics (n = 6)			
Parent material	Mazama ash, colluvium, quartz diorite		
Great group(s)	Cryaquands, Cryaquents, Cryaquepts, Cryofluvents, Cryorthents		
		Mean	**Range**
Water table depth (cm)			29–>73
Rock fragments (percent)		8	0–39
Available water capacity of pit (cm/m)		11	6–16
pH (n = 6)		5.65	5.08–6.14
Depth to redoximorphic features (cm)			7–30
Occurrence of redoximorphic features (percentage of soils)		67	
Surface organic layer (cm)			0–20
Surface layers			
Thickness (cm)			12–51
Texture(s)[a]	L, SICL, SIL, SL		
Redoximorphic features	Depletions, iron oxide concentrations		
Subsurface layers			
Thickness (cm)			10–64
Texture(s)[a]	L, SICL, SIL, SL, S		
Redoximorphic features	Depletions, iron oxide concentrations		

[a] See "Soil Texture Codes" section.

Physical environment—

The subalpine fir-Engelmann spruce/Labrador tea–floodplain plant association was found in moist to wet forested basins mostly above 2134 m elevation, with the exception of plot WW1651 located along the Minam River in the Eagle Cap Wilderness, with an elevation of 1637 m. Typical valleys were of very low to low gradient (<1 to 3 percent), U-shaped, and of different widths. Soils were somewhat poorly drained and typically had low amounts of rock fragments. Upper soil horizon textures ranged from silt loam to silty clay loam, whereas lower horizon textures ranged from sandy loam to silt loam. The water table was generally shallow (30 cm or less) and redoximorphic features were common within the same depth range.

Vegetation composition—

Engelmann spruce and subalpine fir co-occur in the overstory with the occasional white bark pine. Subalpine fir, when it occurs in the overstory, tends to have greater basal area than Engelmann spruce (average of 18 vs. 12 m^2/ha). Subalpine fir is always found strongly reproducing in the understory.

Labrador tea forms a thick shrub layer where it is also common to find pink mountainheath and alpine spicy-wintergreen. Grouse huckleberry, when found in the shrub layer, is indicative of the drier end of the ABLA-PIEN/LEGL environmental tolerance gradient and was often observed growing on hummocks.

Subalpine fleabane, explorer's gentian, and high mountain cinquefoil are common species found in the herbaceous

Principal species			CON	COV	MIN	MAX
				Percent		
Primary overstory trees:						
ABLA	Subalpine fir	*Abies lasiocarpa*	85	14	2	45
PIEN	Engelmann spruce	*Picea engelmannii*	100	10	1	40
Subordinate overstory trees:						
ABLA	Subalpine fir	*Abies lasiocarpa*	71	10	5	30
Understory trees:						
ABLA	Subalpine fir	*Abies lasiocarpa*	100	18	5	50
PIEN	Engelmann spruce	*Picea engelmannii*	42	3	1	5
Shrubs:						
GAHU	Alpine spicywintergreen	*Gaultheria humifusa*	42	5	1	10
LEGL	Labrador tea	*Ledum glandulosum*	100	55	35	80
PHEM	Pink mountainheath	*Phyllodoce empetriformis*	85	7	3	15
VASC	Grouse huckleberry	*Vaccinium scoparium*	85	13	2	30
Forbs:						
ERPE3	Subalpine fleabane	*Erigeron peregrinus*	57	2	1	3
GECA	Explorer's gentian	*Gentiana calycosa*	85	4	1	10
LITE2	Idaho licorice-root	*Ligusticum tenuifolium*	42	2	1	3
POFL3	High mountain cinquefoil	*Potentilla flabellifolia*	71	17	5	35
SECY	Alpine meadow butterweed	*Senecio cymbalarioides*	42	2	1	3
VIOLA	Violet	*Viola*	42	2	1	5
Sedges and other grasslikes:						
CALU7	Woodrush sedge	*Carex luzulina*	42	2	1	3
CASC12	Holm's Rocky Mountain sedge	*Carex scopulorum*	71	27	1	50

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

layer. The presence of Holm's Rocky Mountain sedge and bluejoint reedgrass is suggestive of the wetter end of the ABLA-PIEN/LEGL–FLOODPLAIN environmental tolerance gradient.

Adjacent riparian/wetland vegetation types:
Meadows: PHEM MOUNDS, CASC12
Lake edge: CAUT.

Adjacent upland vegetation type:
Sideslopes: ALBA/VASC.

Stand characteristics—

Species	Basal area		Diameter at breast height (d.b.h.)		
	Average	Range	Average	Minimum	Maximum
	- - - - m^2/ha - - -		- - - - - - - Centimeters - - - - - - -		
ABLA	18	5–37	30.2	12.4	61.0
PIAL	7	5–9	31.8	16.5	54.6
PIEN	12	2–28	43.9	25.7	67.8

Species	Site tree averages		
	d.b.h.	Age	Height
	Centimeters	*Years*	*Meters*
ABLA	29.2	75	13.7
PIEN	40.9	65	17

Management considerations—

Johnson (2004a) described an *Abies lasiocarpa–Picea engelmannii/Ledum glandulosum* plant association for uplands in the Wallowa Mountains featuring the more xeric Ross' sedge in lieu of the more mesic Holm's Rocky Mountain sedge. The ABLA-PIEN/LEGL–FLOODPLAIN plant association is of low timber harvest value owing to the perennially wet/moist soil and low basal area. Deer and elk use is infrequent owing to a scarcity of forage species. Cavity-nesting birds may find suitable nesting and feeding habitat in the numerous snags common to this association.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: forested wetland
Subclass: needle-leaved evergreen
Water regime: (nontidal) seasonally flooded to saturated.

Adjacent riparian/wetland classifications—

Hansen et al. (1995) portrayed a two-phase subalpine fir/Labrador tea type for Montana, a wetter bluejoint reedgrass phase and a drier Labrador tea phase. Kovalchik and Clausnitzer (2004) described a subalpine fir/Labrador tea-grouse huckleberry association for eastern Washington most similar to the drier end of the subalpine fir/Labrador tea type described above.

Floristically similar types include Engelmann spruce–subalpine fir/Holm's Rocky Mountain sedge, subalpine fir–Engelmann spruce/rusty menziesia (p. 40), Engelmann spruce/western singlespike sedge (*Carex scirpoidea* var. *pseudoscirpoidea*) (Kovalchik and Clausnitzer 2004).

Subalpine Fir-Engelmann Spruce/Rusty Menziesia–Floodplain Plant Association

Abies lasiocarpa-Picea engelmannii/Menziesia ferruginea

CES710 ABLA-PIEN/MEFE–FLOODPLAIN N = 3

Aaron Wells

Landform environment (n = 3)		Mean	Range
Elevation (m)		2108	1994–2317
Plot slope (percent)		4	2–6
Aspect	Northerly		

Valley environment (n = 3)		Mode	Range
Valley gradient (percent)		1–3	<1–5
Valley width (m)		30–100	30–300
Valley aspect	Mostly northerly		

Soil surface cover (n = 3)	Mean	Range
Submerged (percent)	0	
Bare ground	0	
Gravel	0	
Rock	2	0–5
Bedrock	0	
Litter	83	75–90
Moss	15	5–25

Soil profile characteristics (n = 3)		Mean	Range
Parent material	Granite		
Great group(s)	Cryorthents, Haplocryalfs, Endoaqualfs		
Water table depth (cm)			61–>100
Rock fragments (percent)		45	18–65
Available water capacity of pit (cm/m)		9	4–11
pH (n = 3)		5.51	5.49–5.55
Depth to redoximorphic features (cm)			21–30
Occurrence of redoximorphic features (percentage of soils)		66	
Surface organic layer (cm)			3–9
Surface layers			
Thickness (cm)			3–4
Texture(s)[a]	FSL, L		
Redoximorphic features	None		
Subsurface layers			
Thickness (cm)			48–>67
Texture(s)[a]	CS, FSL, L, CL		
Redoximorphic features	Depletions		

[a] See “Soil Texture Codes” section.

Physical environment—

The subalpine fir-Engelmann spruce/rusty menziesia–floodplain plant association occurred along high-elevation (1994 to 2317 m) streams, on floodplains and terraces, and along lake edges exclusively in the Seven Devils mountain range. Sample plots were located in U-shaped and flat valleys with low (<1 percent) to moderate (5 percent) gradient. Parent material consisted mainly of granite. Soils were moderately well drained to somewhat poorly drained fine sandy loam to clay loam. The water table ranged from 61 cm to greater than 1 m.

Vegetation composition—

Subalpine fir and Engelmann spruce share the overstory with occasional occurrences of lodgepole pine. Subalpine fir and Engelmann spruce seedlings are always found in the understory tree layer. In the absence of disturbance, subalpine fir will prevail at these sites. In the occurrence of an increase in soil moisture, the advantage would likely shift toward Engelmann spruce, as this species is physiologically better able to cope with saturated conditions. Rusty menziesia forms a dense tall shrub layer with grouse huckleberry below. In wetter versions of this type, bog blueberry can be found in the low shrub layer alongside grouse huckleberry. The typically sparse understory is composed of heartleaf arnica, fireweed, and sidebells wintergreen.

Adjacent riparian/wetland vegetation types:
Floodplains: PIEN-ABLA/SETR
Lakes and lake edges: CAVE6, SPAN2, CAEU2

Adjacent upland vegetation type:
Sideslopes: ABLA/VASC.

Management considerations—

The subalpine fir-Engelmann spruce/rusty menziesia–floodplain plant association is floristically similar to the *Abies lasiocarpa/Menziesia ferruginea* (subalpine fir/rusty menziesia) habitat type-*Menziesia ferruginea* phase, described by Steele et al. (1981) for uplands in central Idaho. Johnson and Simon (1987) and Johnson (2004a) described *Abies lasiocarpa–Picea engelmannii/Mensiesia ferruginea* types for uplands in the Seven Devils

Principal species			CON	COV	MIN	MAX
				Percent		
Primary overstory trees:						
ABLA	Subalpine fir	*Abies lasiocarpa*	100	20	5	40
PICO	Lodgepole pine	*Pinus contorta*	66	12	10	15
PIEN	Engelmann spruce	*Picea engelmannii*	100	27	20	40
Understory trees:						
ABLA	Subalpine fir	*Abies lasiocarpa*	100	5	1	10
PIEN	Engelmann spruce	*Picea engelmannii*	100	9	1	25
Shrubs:						
LOUT2	Utah honeysuckle	*Lonicera utahensis*	66	4	3	5
MEFE	Rusty menziesia	*Menziesia ferruginea*	100	73	60	90
VASC	Grouse huckleberry	*Vaccinium scoparium*	100	30	20	40
VAUL	Bog blueberry	*Vaccinium uliginosum*	66	15	15	15
Forbs:						
ARCO9	Heartleaf arnica	*Arnica cordifolia*	66	3	1	5
EPAN2	Fireweed	*Epilobium angustifolium*	66	1	1	1
PYSE	Sidebells wintergreen	*Pyrola secunda*	66	7	3	10

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Stand characteristics—

	Basal area		Diameter at breast height (d.b.h.)		
Species	Average	Range	Average	Minimum	Maximum
	m²/ha		*Centimeters*		
PIEN	17	14-18	33	20.3	63.5
ABLA	11	5-18	30	15.2	43.2
PICO	20	5-9	30	30.5	33.0

	Site tree averages		
Species	d.b.h.	Age	Height
	Centimeters	*Years*	*Meters*
PIEN	76.2	NA	34
PICO	33.0	NA	23

Mountains of western Idaho that are floristically similar to the association described above. Environmentally, the previously described upland types differ from the riparian/wetland type in that the former are found on more xeric upland slopes, whereas the latter is associated with mesic soils along streams and lakes. The establishment of this type in riparian/wetland sites represents an extension into valley bottoms of the previously documented range in western Idaho.

The abundant snags present in this plant association provide nesting and feeding opportunities for woodpeckers, nuthatches, chickadees, and ruby-crowned kinglets. The large quantity of woody debris produced by these sites enhances stream channels by dampening the effects of high flow periods and providing habitat for salmonids. Logging opportunities are limited by the moist soils and steep terrain typical of this association.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: forested wetland
Subclass: needle-leaved evergreen
Water regime: temporarily to intermittently flooded

Adjacent riparian/wetland classifications—

Hansen et al. (1995) described a subalpine fir/clasping-leaved twisted-stalk (*Streptopus amplexifolius*)-fool's huckleberry (*Menziesia ferruginea*) phase habitat type for Montana. Kovalchik and Clausnitzer (2004) described a variety of subalpine fir/rusty menziesia types for eastern Washington.

There are no floristically similar types.

Subalpine Fir/Big Huckleberry–Floodplain Plant Association

Abies lasiocarpa/Vaccinium membranaceum

CES316 ABLA/VAME–FLOODPLAIN N = 3

E. Crowe

Landform environment (n = 3)		Mean	Range
Elevation (m)		1798	1646–1875
Plot slope (percent)		12	0–35
Aspect	Northerly		

Valley environment (n = 3)		Mode	Range
Valley gradient (percent)		4–5	<1–8
Valley width (m)		30	10–300
Valley aspect	Northerly		

Soil surface cover (n = 2)	Mean	Range
Submerged (percent)	0	
Bare ground	2	0–3
Gravel	0	
Rock	2	0–3
Bedrock	0	
Litter	90	
Moss	7	3–10

Soil profile characteristics (n = 3)		Mean	Range
Parent material	Granite		
Great group(s)	Cryorthents		
Water table depth (cm)			0–>81
Rock fragments (percent)		1	0–2
Available water capacity of pit (cm/m)		9	3–14
pH (n = 2)		5.40	5.31–5.49
Depth to redoximorphic features (cm)		NA	
Occurrence of redoximorphic features (percentage of soils)		0	
Surface organic layer (cm)			0–5
Surface layers			
Thickness (cm)			18–23
Texture(s)[a]	L, VFSL, LS		
Redoximorphic features	None		
Subsurface layers			
Thickness (cm)			13–>59
Texture(s)[a]	SL, VFS		
Redoximorphic features	None		

[a] See “Soil Texture Codes” section.

Physical environment—

The subalpine fir/big huckleberry floodplain plant association was found on a floodplain, a terrace, and a steep, seepy, streambank in the Wallowa Mountains. Elevations were moderate, ranging from 1646 m along the Minam River to 1875 m along Bear Creek. Sample plots were located in U- and V-shaped valleys with low (<1 percent) and high gradient (4 to 8 percent), respectively. Parent material consisted mainly of granite. Soils were well-drained to moderately well-drained sandy loam to loam. The water table ranged from near the surface to greater than 81 cm.

Vegetation composition—

Engelmann spruce and subalpine fir share the overstory. In the absence of disturbance, the potential for the site is subalpine fir, the most shade-tolerant species. Lodgepole pine and western larch are occasionally found in the overstory. Engelmann spruce and subalpine fir both contribute strongly to regeneration in the understory.

Big huckleberry is consistently found in the low shrub layer. The herbaceous layer is composed of a wide variety of species: heartleaf arnica, willowherb, twistedstalk, violets, and wintergreen. Wetter variations of this type may include Labrador tea, Holm’s Rocky Mountain sedge, bladder sedge, tall mannagrass, and Pacific onion.

Adjacent riparian/wetland vegetation types:
Meadows: CACA4, and ALSI3/MESIC FORB.

Adjacent upland vegetation types:
Sideslopes: PICO/VASC, ABLA/VASC, and ABGR/VAME.

Principal species			CON	COV	MIN	MAX
				Percent		
Primary overstory trees:						
ABLA	Subalpine fir	*Abies lasiocarpa*	100	24	5	45
PIEN	Engelmann Spruce	*Picea engelmannii*	100	42	22	65
Understory trees:						
ABLA	Subalpine fir	*Abies lasiocarpa*	100	5	5	6
PIEN	Engelmann Spruce	*Picea engelmannii*	100	3	3	5
Shrubs:						
LOIN5	Twinberry honeysuckle	*Lonicera involucrata*	100	5	1	10
LOUT2	Utah honeysuckle	*Lonicera utahensis*	66	5	5	5
RILA	Prickly currant	*Ribes lacustre*	100	9	3	15
VAME	Big huckleberry	*Vaccinium membranaceum*	100	33	20	50
VAUL	Bog blueberry	*Vaccinium uliginosum*	66	13	10	15
Forbs:						
ARCO9	Heartleaf arnica	*Arnica cordifolia*	66	13	5	20
CLUN2	Queen's cup beadlily	*Clintonia uniflora*	66	3	1	5
EPAN2	Fireweed	*Epilobium angustifolium*	100	2	1	3
FRVE	Woodland strawberry	*Fragaria vesca*	66	6	1	10
LUPO2	Bigleaf lupine	*Lupinus polyphyllus*	100	6	1	15
MECI3	Tall fringed bluebells	*Mertensia ciliata*	66	8	1	15
PERA	Sickletop lousewort	*Pedicularis racemosa*	66	2	1	3
PYSE	Sidebells wintergreen	*Pyrola secunda*	100	9	6	10
STAM2	Claspleaf twistedstalk	*Streptopus amplexifolius*	66	3	1	5
THVE	Veiny meadow-rue	*Thalictrum venulosum*	66	18	15	20
TITR	Threeleaf foamflower	*Tiarella trifoliata*	66	13	10	15
VIOLA	Violet	*Viola*	66	10	5	15
Grasses:						
CACA4	Bluejoint reedgrass	*Calamagrostis canadensis*	66	7	3	10

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Stand characteristics—

	Basal area		Diameter at breast height (d.b.h.)		
Species	Average	Range	Average	Minimum	Maximum
	- - - m^2/ha - - -		- - - - - - - Centimeters - - - - - - -		
ABLA	16	9–25	30.0	15.2	45.7
PIEN	24	14–32	35.1	14.7	64.3
LAOC	2	—	45.7	38.1	53.6
PICO	2	—	53.3	—	—

	Site tree averages		
Species	d.b.h.	Age	Height
	Centimeters	*Years*	*Meters*
ABLA	29.2	90	14
PIEN	41.1	123	14

Management considerations—

Johnson and Simon (1987), Johnson and Clausnitzer (1992), and Johnson (2004a) described a similar type for uplands in the Wallowa, Blue Mountians, and alpine regions of northeastern Oregon, respectively. The two types differ from the riparian/wetland equivalent in that they are found mainly on ridges and xeric slopes resulting in a slightly different species composition than the more mesic type. The abundant snags present in this plant association provide nesting and feeding opportunities for woodpeckers, nuthatches, chickadees, and ruby-crowned kinglets. The large quantity of woody debris produced by these sites enhances stream channels by dampening the effects of high flow periods and providing habitat for salmonids. Logging opportunities are limited by the moist soils and steep terrain typical of this association.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: forested wetland
Subclass: needle-leaved evergreen
Water regime: (nontidal) temporarily flooded.

Adjacent riparian/wetland classifications—

Kovalchik (1987) described an Engelmann spruce/bog blueberry/forb association for central Oregon that is similar to the subalpine fir/bog blueberry/Holm's Rocky Mountain sedge community type of Crowe and Clausnitzer (1997) found in the midmontane wetlands of northeastern Oregon. Kovalchik and Clausnitzer (2004) described a subalpine fir/big huckleberry association for eastern Washington.

Floristically similar types include subalpine fir/sweet-scented bedstraw (*Galium trifolium*) (Hansen et al. 1995).

Engelmann Spruce-Subalpine Fir/Holm's Rocky Mountain Sedge Plant Association

Picea engelmannii-Abies lasiocarpa/Carex scopulorum

CEG201 PIEN-ABLA/CASC12 N = 6

E. Crowe

Landform environment (n = 6)		Mean	Range
Elevation (m)		2080	1890–2142
Plot slope (percent)		2	<1–2
Aspect	All		

Valley environment (n = 4)		Mode	Range
Valley gradient (percent)		<1	<1–5
Valley width (m)		10–30	10–>300
Valley aspect	All		

Soil surface cover (n = 6)	Mean	Range
Submerged (percent)	8	0–40
Bare ground	2	0–5
Gravel	0	
Rock	4	0–25
Bedrock	0	
Litter	46	5–95
Moss	39	0–91

Soil profile characteristics (n = 6)		Mean	Range
Parent material	Mazama ash, moss peat, alluvium		
Great group(s)	Cryaquents, Cryohemists, Cryorthents		
Water table depth (cm)			18–>100
Rock fragments (percent)		8	0–35
Available water capacity of pit (cm/m)		24	5–46
pH (n = 4)		5.32	4.48–5.54
Depth to redoximorphic features (cm)			9–55
Occurrence of redoximorphic features (percentage of soils)		50	
Surface organic layer (cm)			6–80
Surface layers			
Thickness (cm)			1–>50
Texture(s)[a]	L, SIL, SL, hemic		
Redoximorphic features	Depletions		
Subsurface layers			
Thickness (cm)			3–11
Texture(s)[a]	CS, ECS, LCS		
Redoximorphic features	Depletions		

[a] See "Soil Texture Codes" section.

Physical environment—

The Engelmann spruce-subalpine fir/Holm's Rocky Mountain sedge plant association occurred in moist/wet forested basins at edges of subalpine meadows, on a floodplain, and a streambank between 1890 and 2142 m elevation. Sites occurred in very low to moderate gradient (<1 to 5 percent) U- and trough-shaped valleys. Soils were somewhat poorly drained, coarse sand to silty loam below a thick (14 cm ± 9 cm) organic surface layer. The thick organic surface layer increases the available water capacity of the soil and represents an important environmental characteristic distinguishing PIEN/CASC12 from PIEN-ABLA/LEGL. Depth to water table ranged from 18 cm to greater than 1 m, and redoximorphic features were common.

Vegetation composition—

Engelmann spruce is the prevailing overstory tree sometimes accompanied by lodgepole pine. Subalpine fir is rarely found in the overstory, but almost always occurs in the understory often growing on slightly drier hummocks.

Species that may be found in the generally sparse shrub layer include pink mountainheath, grouse huckleberry, bog blueberry, and various willow species. A lack of Labrador tea and a high coverage (62 percent on average) of Holm's Rocky Mountain sedge are the key floristic components distinguishing PIEN/CASC12 from PIEN-ABLA/LEGL.

High mountain cinquefoil is always present in the herbaceous layer and may be accompanied by Canadian burnet, shootingstar, elephanthead lousewort, licorice-root (*Ligusticum* spp.), and tufted hairgrass. Few-flowered spike rush is sometimes present in the wettest portions of this type.

Adjacent riparian/wetland vegetation types:
Meadows: CALU7, CASC12, DECE, CAMU7, ELPA6, and CACA4.
Adjacent upland vegetation type:
Sideslopes: ABLA/VASC.

Principal species			CON	COV	MIN	MAX
				Percent		
Primary overstory trees:						
PIEN	Engelmann spruce	*Picea engelmannii*	83	29	1	70
Subordinate overstory trees:						
PICO	Lodgepole pine	*Pinus contorta*	50	2	1	4
PIEN	Engelmann spruce	*Picea engelmannii*	50	10	4	20
Understory trees:						
ABLA	Subalpine fir	*Abies lasiocarpa*	83	6	1	15
PICO	Lodgepole pine	*Pinus contorta*	50	2	1	4
PIEN	Engelmann spruce	*Picea engelmannii*	66	4	1	10
Shrubs:						
VASC	Grouse huckleberry	*Vaccinium scoparium*	50	3	2	6
Forbs:						
ALVA	Pacific onion	*Allium validum*	50	2	1	3
DOAL	Alpine shootingstar	*Dodecatheon alpinum*	83	1	1	3
DOJE	Sierra shootingstar	*Dodecatheon jeffreyi*	50	1	1	2
EPAL	Pimpernel willowherb	*Epilobium alpinum*	50	9	1	20
LICA2	Canby's licorice-root	*Ligusticum canbyi*	50	3	1	5
MIPE	Fivestamen miterwort	*Mitella pentandra*	83	3	1	10
PEGR2	Elephanthead lousewort	*Pedicularis groenlandica*	50	2	1	3
POFL3	High mountain cinquefoil	*Potentilla flabellifolia*	100	6	1	20
SASI10	Canadian burnet	*Sanguisorba sitchensis*	66	8	1	15
VIOLA	Violet	*Viola*	50	4	1	10
Grasses:						
DECE	Tufted hairgrass	*Deschampsia cespitosa*	66	3	1	10
Sedges and other grasslikes:						
CASC12	Holm's Rocky Mountain sedge	*Carex scopulorum*	100	62	50	75
JUDR	Drummond's rush	*Juncus drummondii*	66	1	1	1

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Stand characteristics—

	Basal area		Diameter at breast height (d.b.h.)		
Species	Average	Range	Average	Minimum	Maximum
	- - - m^2/ha - - -		- - - - - - - Centimeters - - - - - - -		
PIEN	21	2–69	39.1	13.2	102.6
ABLA	5	—	20.8	20.8	20.8
PICO	5	—	22.6	13.7	29.2

	Site tree averages		
Species	d.b.h.	Age	Height
	Centimeters	*Years*	*Meters*
PIEN	48.0	109	16
PICO	33.8	87	10

Management considerations—

Logging opportunities are generally limited, as is the chance of catastrophic wildfire, owing to the perennially wet soils characteristic of these sites. An abundance of forage species and proximity to subalpine meadows make these sites highly suitable for wild ungulate grazing and bedding. When this association occurs on streambanks and floodplains, overhanging vegetation and down woody debris provide habitat for salmonids. In the absence of a large influx of mineral soils, this type represents a climax forest type in the subalpine riparian and wetland areas of northeastern Oregon.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: forested wetland
Subclass: needle-leaved evergreen
Water regime: (nontidal) seasonally flooded to saturated.

Adjacent riparian/wetland classifications—

The Engelmann spruce–subalpine fir/Holm's Rocky Mountain sedge association has not previously been described. Kovalchik and Clausnitzer (2004) described an Engelmann spruce/saw-leaved sedge, a variety of Holm's Rocky Mountain sedge, for eastern Washington.

Floristically similar types include subalpine fir–Engelmann spruce/Labrador tea (p. 38); subalpine fir/bog blueberry/Holm's sedge (*Carex scopulorum*) (Crowe and Clausnitzer 1997); Engelmann spruce/bog blueberry/widefruit sedge (Kovalchik 1987).

Engelmann Spruce-Subalpine Fir/Arrowleaf Groundsel Plant Association

Picea engelmannii-Abies lasiocarpa/Senecio triangularis

CEM201 PIEN-ABLA/SETR N = 9

Aaron Wells

Landform environment (n = 9)		Mean	Range
Elevation (m)		2005	1890–2134
Plot slope (percent)		4	2–22
Aspect	All		

Valley environment (n = 8)		Mode	Range
Valley gradient (percent)		4–5	1–>8
Valley width (m)		10–30	<10–>300
Valley aspect	Mostly northerly		

Soil surface cover (n = 8)	Mean	Range
Submerged (percent)	1	0–5
Bare ground	11	0–40
Gravel	3	0–10
Rock	5	0–10
Bedrock	0	
Litter	59	10–90
Moss	19	4–85

Soil profile characteristics (n = 9)		Mean	Range
Parent material	Mazama ash, alluvium, colluvium		
Great group(s)	Cryaquands, Cryaquents, Cryofluvents, Cryohemists, Haplocryands		
Water table depth (cm)			41–>100
Rock fragments (percent)		43	0–100
Available water capacity of pit (cm/m)		12	1–46
pH (n = 8)		6.21	5.53–7.00
Depth to redoximorphic features (cm)			7–17
Occurrence of redoximorphic features (percentage of soils)		33	
Surface organic layer (cm)			0–50
Surface layers			
Thickness (cm)			6–50
Texture(s)[a]	L, SIL, SL, cobble		
Redoximorphic features	None		
Subsurface layers			
Thickness (cm)			22–85
Texture(s)[a]	L, LCS, SIL, SL, S		
Redoximorphic features	Depletions		

[a] See “Soil Texture Codes” section.

Physical environment—

The Engelmann spruce-subalpine fir/arrowleaf groundsel plant association was found on floodplains, terraces, and springs between 1890 and 2134 m elevation throughout the Blue Mountains. Sample plots were located in U-shaped (glacial), V-shaped, and flat valleys with low to moderate gradient (1 to 5 percent) over a large range in width. Plot slope averaged 4 percent (±2.4) with two plots having a slope of 22 percent and 14 percent, both of which were located at springs in the Strawberry Mountain Wilderness. Soils were well-drained to moderately well-drained, very gravelly/cobbly loamy sands to silt loams. The water table ranged from 41 cm to greater than 1 m with occasional redoximorphic features. Annual flood scour was common at these sites and represents the major environmental factor differentiating the PIEN-ABLA/SETR from the ABLA/VAME plant association.

Vegetation composition—

Engelmann spruce or subalpine fir often co-occur in the overstory layers of this association. Foliar cover and basal area tend to be relatively low for both species. Lodgepole pine is occasionally found in the overstory. Both Engelmann spruce and subalpine fir are common in the understory canopy layers.

The shrub layer is generally sparse and may consist of prickly currant, twinberry honeysuckle, and grouse huckleberry. The predominance of arrowleaf groundsel and, to a lesser degree, brook saxifrage, and the relative absence of big huckleberry are the key understory characteristics distinguishing the PIEN-ABLA/SETR from the ABLA/VAME plant association.

Other important understory species include tall fringed bluebells, fringed grass of Parnassus, and Sitka valerian.

Adjacent upland vegetation type:
Sideslopes: ABLA/VASC.

Principal species			CON	COV	MIN	MAX
				Percent		
Primary overstory trees:						
ABLA	Subalpine fir	*Abies lasiocarpa*	77	24	5	80
PIEN	Engelmann spruce	*Picea engelmannii*	55	18	3	40
Subordinate overstory trees:						
ABLA	Subalpine fir	*Abies lasiocarpa*	55	5	3	10
PIEN	Engelmann spruce	*Picea engelmannii*	55	4	1	5
Understory trees:						
ABLA	Subalpine fir	*Abies lasiocarpa*	77	9	1	20
PIEN	Engelmann spruce	*Picea engelmannii*	77	7	1	20
Shrubs:						
LOIN5	Twinberry honeysuckle	*Lonicera involucrata*	55	5	1	10
RILA	Prickly currant	*Ribes lacustre*	55	10	3	20
VASC	Grouse huckleberry	*Vaccinium scoparium*	66	10	1	20
Forbs:						
ACCO4	Columbian monkshood	*Aconitum columbianum*	77	9	1	25
ARCO9	Heartleaf arnica	*Arnica cordifolia*	55	3	1	10
ASFO	Alpine leafybract aster	*Aster foliaceus*	44	2	1	5
EPAN2	Fireweed	*Epilobium angustifolium*	44	3	1	10
ERPE3	Subalpine fleabane	*Erigeron peregrinus*	66	6	1	15
HELA4	Common cowparsnip	*Heracleum lanatum*	44	8	3	15
MECI3	Tall fringed bluebells	*Mertensia ciliate*	55	12	10	15
PAFI3	Fringed grass of Parnassus	*Parnassia fimbriata*	66	4	1	15
POPU3	Jacob's-ladder	*Polemonium pulcherrimum*	44	2	1	3
PYSE	Sidebells wintergreen	*Pyrola secunda*	66	1	1	3
SAAR13	Brook saxifrage	*Saxifraga arguta*	77	7	1	15
SETR	Arrowleaf groundsel	*Senecio triangularis*	100	26	5	60
STAM2	Claspleaf twistedstalk	*Streptopus amplexifolius*	44	2	1	3
THOC	Western meadow-rue	*Thalictrum occidentale*	55	18	15	25
VASI	Sitka valerian	*Valeriana sitchensis*	44	4	1	10
VIOLA	Violet	*Viola*	44	1	1	1

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Stand characteristics—

	Basal area		Diameter at breast height (d.b.h.)		
Species	Average	Range	Average	Minimum	Maximum
	- - - m^2/ha - - -		- - - - - - - Centimeters - - - - - - -		
PIEN	10	2–23	44.7	17.0	66.8
ABLA	9	5–18	29.0	18.3	48.8
PICO	9	5–14	32.5	15.2	46.5

	Site tree averages		
Species	d.b.h.	Age	Height
	Centimeters	*Years*	*Meters*
PIEN	41.7	99	26.5
ABLA	41.7	99	12.8

Management considerations—

The Engelmann spruce-subalpine fir/arrowleaf groundsel plant association is typified by annual flood scour and deposition. As in the ABLA/VAME-FLOODPLAIN plant association, snags are common and provide nesting and feeding habitat for various cavity-nesting birds. Downed wood and standing live vegetation help to slow floodwaters and provide habitat for salmonids. Elk and deer use is generally low at these sites with the exception of the Strawberry Mountain Wilderness where, late in the summer, watering holes become few and far between. Sites located at perennial springs (MW2401, MW2441, MW1891) can, during these drought periods, become high-impact areas. Johnson (2004a) described an *Abies lasiocarpa-Picea engelmannii*/*Senecio triangularis* miscellaneous type that occurred on stream terraces in the Wallowa Mountains within the same elevation range as the above association.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: forested wetland
Subclass: needle-leaved evergreen
Water regime: (nontidal) seasonally flooded to saturated.

Adjacent riparian/wetland classifications—

Crowe and Clausnitzer (1997) described separate Engelmann spruce/arrowleaf groundsel and subalpine fir/arrowleaf groundsel plant associations for the mid-montane riparian/wetland of northeastern Oregon.

A floristically similar type is conifer/*Aconitum columbianum* (Columbian monkshood) (Padgett et al. 1989).

Miscellaneous Engelmann Spruce Type

Engelmann Spruce/Common Horsetail Plant Association

Picea engelmannii/Equisetum arvense

CEM211 PIEN/EQAR N = 1

This association was located on a steep (15 percent), seepy slope at 1982 m elevation in the Eagle Cap Wilderness. Soils were very poorly drained, organic-rich loam. Depth to water table was 14 cm in mid-July.

Engelmann spruce forms a sparse overstory (25 percent) with subalpine fir in the understory. Undergreen willow, wax currant, and prickly currant occurred sporadically throughout the shrub layer. Common horsetail overshadows a rich herbaceous layer including brook saxifrage, arrow-leaf groundsel, glaucus willowherb, western meadow-rue, muskflower, Pacific onion, common cowparsnip, Columbian monkshood, tall mannagrass, and bladder sedge.

Engelmann spruce growing on these seepy slopes may be more susceptible to spruce budworm (*Choristoneura occidentalis* Freeman) attack than those found in drier environments.

Adjacent riparian/wetland types:
Seeps: CAUT.
Gravel/cobble bars: SAEX.

This type has been described by Crowe and Clausnitzer (1997), Kovalchik (1987), Kovalchik and Clausnitzer (2004), and Padgett et al. (1989).

Grand Fir/Pacific Yew/Twinflower–Floodplain Plant Association

Abies grandis/Taxus brevifolia/Linnaea borealis

CWF424 ABGR/TABR2/LIBO3–FLOODPLAIN N = 5

Aaron Wells

Physical environment—

The grand fir/Pacific yew/twinflower–floodplain plant association occurred on low-elevation (759 to 1079 m) alluvial terraces along streams in the Umatilla National Forest and Hells Canyon. Sample sites occurred in low (1 to 3 percent) to moderate (4 to 5 percent) gradient, flat canyons. Valley aspects were north in Hells Canyon and north and west at the two Umatilla sites. Soils were moderately well-drained loams and silt loams, often overlying a very gravelly/cobbly, slowly permeable layer of sandy clay. Depth to water table was always greater than 60 cm.

Vegetation composition—

Grand fir is present in all canopy layers with Pacific yew always present. Grand fir seedlings are always found in the understory along with occasional Engelmann spruce and Pacific yew seedlings. Engelmann spruce is not likely to achieve climax status at these sites given the environmental limitations resulting from the relatively low elevations.

Rocky Mountain maple, prickly currant, and western serviceberry are always found in the tall shrub layer. Hollyleaved barberry, alder-leaved buckthorn, oceanspray, roses, Utah honeysuckle, and common snowberry are less frequent members of the low and tall shrub layers. Twinflower is consistently found trailing across the ground.

A variety of herbaceous species can be found here including wintergreens, Piper's anemone, queen's cup beadlily, starry false Solomon's seal, western rattlesnake plantain, Columbia brome, western fescue, and Alaska oniongrass. Moist site indicator forbs include bunchberry dogwood, British Columbia wildginger, enchanter's nightshade, and heartleaf minerslettuce. Some of the ferns encountered include oakfern, western brackenfern, mountain woodfern, and western swordfern.

Landform environment (n = 5)		Mean	Range
Elevation (m)		877	759–1079
Plot slope (percent)		2	1–2.5
Aspect	Mostly northerly		

Valley environment (n = 5)		Mode	Range
Valley gradient (percent)		1–3	1–5
Valley width (m)		30–100	30–300
Valley aspect	Northerly		

Soil surface cover (n = 5)	Mean	Range
Submerged (percent)	0	
Bare ground	0	
Gravel	0	
Rock	0	
Bedrock	0	
Litter	60	12–95
Moss	39	5–85

Soil profile characteristics (n = 5)			
Parent material	Alluvium, colluvium		
Great group(s)	Udorthents, Udifluvents		
		Mean	**Range**
Water table depth (cm)			>60
Rock fragments (percent)		57	45–70
Available water capacity of pit (cm/m)		7	4–9
pH (n = 4)		5.86	5.69–6.1
Depth to redoximorphic features (cm)		NA	
Occurrence of redoximorphic features (percentage of soils)		0	
Surface organic layer (cm)			0–8
Surface layers			
Thickness (cm)			6–53
Texture(s)[a]	CL, SIL, L		
Redoximorphic features	None		
Subsurface layers			
Thickness (cm)			33–>159
Texture(s)[a]	SC, SIL, L, SL, LS, S		
Redoximorphic features	None		

[a] See "Soil Texture Codes" section.

Stand characteristics—

	Basal area		Diameter at breast height (d.b.h.)		
Species	Average	Range	Average	Minimum	Maximum
	- - - m^2/ha - - -		- - - - - - - Centimeters - - - - - - -		
ABGR	35	16–55	57.4	33.0	102.1

	Site tree averages		
Species	d.b.h.	Age	Height
	Centimeters	*Years*	*Meters*
ABGR	51.1	91	33

Principal species			CON	COV	MIN	MAX
				Percent		
Primary overstory trees:						
ABGR	Grand fir	*Abies grandis*	100	54	27	85
Subordinate overstory trees:						
ABGR	Grand fir	*Abies grandis*	40	13	6	20
Understory trees:						
ABGR	Grand fir	*Abies grandis*	100	13	2	45
PIEN	Engelmann spruce	*Picea engelmannii*	40	10	5	15
Shrubs:						
ACGL	Rocky Mountain maple	*Acer glabrum*	100	6	1	10
AMAL2	Western serviceberry	*Amelanchier alnifolia*	80	3	1	5
BEAQ	Hollyleaved barberry	*Berberis aquifolium*	40	38	20	55
HODI	Oceanspray	*Holodiscus discolor*	60	5	5	5
LIBO3	Twinflower	*Linnaea borealis*	100	14	2	30
LOUT2	Utah honeysuckle	*Lonicera utahensis*	40	3	1	5
PAMY	Oregon boxleaf	*Paxistima myrsinites*	40	3	1	5
PHLE4	Lewis' mock orange	*Philadelphus lewisii*	40	4	3	5
RHPU	Alder-leaved buckthorn	*Rhamnus purshiana*	80	12	1	32
RIBES	Currant	*Ribes*	40	2	1	3
RILA	Prickly currant	*Ribes lacustre*	80	4	1	10
ROGY	Dwarf rose	*Rosa gymnocarpa*	60	4	1	10
ROWO	Woods' rose	*Rosa woodsii*	40	20	15	25
RUPA	Thimbleberry	*Rubus parviflorus*	40	23	1	45
SYAL	Common snowberry	*Symphoricarpos albus*	60	38	3	60
TABR2	Pacific yew	*Taxus brevifolia*	100	24	1	40
Forbs:						
ADBI	American trailplant	*Adenocaulon bicolor*	80	6	1	10
ANPI	Piper's anemone	*Anemone piperi*	100	3	1	5
ARCO9	Heartleaf arnica	*Arnica cordifolia*	40	3	1	5
ARMA18	Largeleaf sandwort	*Arenaria macrophylla*	40	3	3	3
ASCA2	British Columbia wildginger	*Asarum caudatum*	60	8	5	10
CIAL	Enchanter's nightshade	*Circaea alpine*	40	21	1	40
CLUN2	Queen's cup beadlily	*Clintonia uniflora*	80	9	1	20
COMA4	Summer coralroot	*Corallorrhiza maculata*	40	1	1	1
DIHO3	Drops of gold	*Disporum hookeri*	60	8	5	10
FRVE	Woodland strawberry	*Fragaria vesca*	60	3	1	5
GATR2	Threepetal bedstraw	*Galium trifidum*	60	4	1	10
GOOB2	Western rattlesnake plantain	*Goodyera oblongifolia*	40	2	1	3
MOCO4	Heartleaf minerslettuce	*Montia cordifolia*	60	6	1	15
OSCH	Mountain sweetcicely	*Osmorhiza chilensis*	100	7	1	15
SMRA	Feathery false Solomon's seal	*Smilacina racemosa*	40	11	1	20
SMST	Starry false Solomon's seal	*Smilacina stellata*	100	19	3	35
TITR	Threeleaf foamflower	*Tiarella trifoliata*	80	6	1	15
VICA4	Canadian white violet	*Viola canadensis*	60	5	1	10
VIGL	Pioneer violet	*Viola glabella*	40	6	1	10
Grasses:						
BROR2	Orcutt's brome	*Bromus orcuttianus*	40	9	3	15
BRVU	Columbia brome	*Bromus vulgaris*	60	9	7	10
FEOC	Western fescue	*Festuca occidentalis*	40	3	3	3
Sedges and other grasslikes:						
CADE9	Dewey sedge	*Carex deweyana*	40	4	3	5
Ferns and horsetails:						
ATFI	Ladyfern	*Athyrium filix-femina*	40	2	1	2
GYDR	Oakfern	*Gymnocarpium dryopteris*	40	1	1	1
POMU	Western swordfern	*Polystichum munitum*	40	2	2	3

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Management considerations—

Johnson and Simon (1987) and Johnson and Clausnitzer (1992) described similar communities for sideslopes and toeslopes associated with springs and seepage. The grand fir/Pacific yew/twinflower–floodplain plant association differs in that it is located on alluvial terraces in valley bottoms. These productive alluvial forests of moderate terrain have the potential for timber harvest, but care should be taken to determine the appropriate treatment, as Pacific yew is sensitive to light and temperature changes resulting from overstory canopy removal (Johnson and Simon 1987).

Pacific yew is highly preferred by deer and elk as a browse species and can be reduced significantly in areas of high ungulate density. These multilayered forests provide habitat for songbirds. Listen long enough and you're sure to hear the conspicuous song of the hermit thrush and winter wren along with other passerines. The grand fir/Pacific yew/twinflower–floodplain plant association represents a climax association in stream bottoms of the Blue Mountains.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: forested wetland
Subclass: needle-leaved evergreen
Water regime: temporarily to intermittently flooded.

Adjacent riparian/wetland classifications—

The grand fir/Pacific yew/twinflower–floodplain plant association has not previously been described for riparian zones. Johnson and Simon (1987) described this type for uplands in the Blue Mountains, Oregon. Miller (1976) described a white alder-grand fir community type found along the Salmon River in western Idaho that often features Pacific yew in the tall shrub layer. Twinflower did not occur at the sites sampled.

Floristically similar types include grand fir/oakfern, and grand fir/ladyfern (Crowe and Clausnitzer 1997).

Grand Fir/Black Hawthorn/Dewey Sedge Plant Association

Abies grandis/Crataegus douglasii/Carex deweyana

CWS423 ABGR/CRDO2/CADE9 N = 5

Aaron Wells

Landform environment (n = 5)		Mean	Range
Elevation (m)		880	665–1104
Plot slope (percent)		5	1–10
Aspect	Mostly southerly		

Valley environment (n = 5)		Mode	Range
Valley gradient (percent)		1–3	1–>8
Valley width (m)		30–100	<10–300
Valley aspect	Mostly southerly		

Soil surface cover (n = 5)	Mean	Range
Submerged (percent)	2	0–10
Bare ground	2	0–5
Gravel	0	
Rock	0	
Bedrock	0	
Litter	77	22–100
Moss	18	0–65

Soil profile characteristics (n = 5)			
Parent material	Basalt, alluvium		
Great group(s)	Udifluvents, Udorthents, Fluvaquents		
		Mean	**Range**
Water table depth (cm)			30–>100
Rock fragments (percent)		10	0–36
Available water capacity of pit (cm/m)		8	5–11
pH (n = 2)		6.37	6.26–6.47
Depth to redoximorphic features (cm)		52	
Occurrence of redoximorphic features (percentage of soils)		20	
Surface organic layer (cm)		None	
Surface layers			
Thickness (cm)			13–71
Texture(s)[a]	SL, L, SIL		
Redoximorphic features	Concentrations		
Subsurface layers			
Thickness (cm)			20–>44
Texture(s)[a]	SL, cobbles, boulders		
Redoximorphic features	None		

[a] See "Soil Texture Codes" section.

Physical environment—

The grand fir/black hawthorn/Dewey sedge plant association occurred on floodplains and terraces in Hells Canyon and the Wenaha-Tucannon Wilderness. Sites were located at higher elevations in Hells Canyon (945 to 1104 m) than in the Wenaha-Tucannon Wilderness (665 to 683 m), reflecting the warmer and drier conditions in Hells Canyon. Stream valleys were low gradient (1 to 3 percent) flat and box-shaped in the Wenaha-Tucannon Wilderness, and steeper (4 to >8 percent) and V-shaped in Hells Canyon. Soils were typically weakly developed Fluvaquents, Udifluvents and Udorthents, moderately well-drained to somewhat poorly drained, sandy loams to loams over cobbles and boulders.

Vegetation composition—

Grand fir always occurs as a subordinate overstory or understory tree, but rarely as a primary overstory tree. Black cottonwood is often found residually as a primary overstory tree, emphasizing the fluvial nature of this association, and decreases in importance as age of landform increases.

Black hawthorn and common snowberry are always found in the low shrub layer. Common snowberry can be an important component of the understory especially at drier (terraces), warmer (south-facing) sites. Red-osier dogwood, when it occurs, is found growing along the stream channel and other microsites that experience regular flood activity.

Dewey sedge, a tufted graminoid, always occurs in the herbaceous layer. Blue wildrye, roughfruit fairybells, false bugbane, and a variety of mesic forbs represent the typically scattered herbaceous layer. Western coneflower and bull thistle, both weedy species, are indicative of livestock activity sometimes encoutered at these sites.

Adjacent riparian/wetland vegetation types:

Streambanks: ALIN2/GLEL, ALIN2/CADE9, and CRDO2/MESIC FORB

Floodplains and terraces: ABGR/ACGL–FLOODPLAIN, PSME/ACGL-PHMA5–FLOODPLAIN, and ALRU2/SYAL.

Adjacent upland vegetation types:

Sideslopes: ABGR/ACGL and PSME/PHMA5.

Principal species			CON	COV	MIN	MAX
				Percent		
Primary overstory trees:						
POTR15	Black cottonwood	*Populus trichocarpa*	40	60	60	60
Subordinate overstory trees:						
ABGR	Grand fir	*Abies grandis*	60	23	20	25
Understory trees:						
ABGR	Grand fir	*Abies grandis*	80	4	2	7
Shrubs:						
AMAL2	Western serviceberry	*Amelanchier alnifolia*	80	6	1	10
COST4	Red-osier dogwood	*Cornus stolonifera*	40	6	3	10
CRDO2	Black hawthorn	*Crataegus douglasii*	100	41	10	85
PHLE4	Lewis' mock orange	*Philadelphus lewisii*	60	26	3	40
RILA	Prickly currant	*Ribes lacustre*	40	2	1	3
ROGY	Dwarf rose	*Rosa gymnocarpa*	40	6	1	10
RUPA	Thimbleberry	*Rubus parviflorus*	60	13	1	36
SYAL	Common snowberry	*Symphoricarpos albus*	100	33	3	70
Forbs:						
ADBI	American trailplant	*Adenocaulon bicolor*	60	1	1	1
CIAL	Enchanter's nightshade	*Circaea alpina*	40	10	5	15
CIVU	Bull thistle	*Cirsium vulgare*	40	1	1	1
DITR2	Roughfruit fairybells	*Disporum trachycarpum*	40	4	3	5
GATR2	Threepetal bedstraw	*Galium trifidum*	100	3	1	5
OSCH	Mountain sweetcicely	*Osmorhiza chilensis*	80	1	1	1
OSOC	Western sweetcicely	*Osmorhiza occidentalis*	40	3	1	5
RUOC2	Western coneflower	*Rudbeckia occidentalis*	40	2	1	2
SMRA	Feathery false Solomon's seal	*Smilacina racemosa*	40	3	1	5
SMST	Starry false Solomon's seal	*Smilacina stellata*	40	20	10	30
THOC	Western meadow-rue	*Thalictrum occidentale*	60	25	1	65
TRCA	False bugbane	*Trautvetteria caroliniensis*	40	1	1	1
VIGL	Pioneer violet	*Viola glabella*	40	1	1	1
VIOLA	Violet	*Viola*	40	3	1	5
Grasses:						
ELGL	Blue wildrye	*Elymus glaucus*	60	9	3	20
FESU	Bearded fescue	*Festuca subulata*	60	18	5	40
MESU	Alaska oniongrass	*Melica subulata*	40	3	1	5
Sedges and other grasslikes:						
CADE9	Dewey sedge	*Carex deweyana*	100	12	1	25

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Stand characteristics—

Species	Basal area		Diameter at breast height (d.b.h.)		
	Average	Range	Average	Minimum	Maximum
	- - - *m²/ha* - - -		- - - - - - - *Centimeters* - - - - - - -		
ABGR	22	5–55	42.2	20.3	83.8
POTR15	8	7–9	63.0	33.0	81.3

Species	Site tree averages		
	d.b.h.	Age	Height
	Centimeters	*Years*	*Meters*
ABGR	36.8	46.7	20
POTR15	49.5	53	21

Management considerations—

The grand fir/black hawthorn/Dewey sedge plant association is the most fluvially active association within the grand fir series. Flooding and temporary inundation of the soil surface is common, making this association important for stream shading, streambank stability, and a source of coarse woody debris. Logging is not recommended at these sites owing to the high moisture status of the soils and adjacency to the stream channel. Cattle grazing may have less deleterious effects than logging, given the low level of soil development, especially if limited to a few weeks following the spring flood event.

Black hawthorn is a valuable source of food and cover for wildlife. Fruits are eaten by blue and sharp-tailed grouse, mule deer, and small mammals. The dense branching in a hawthorn thicket provides good nesting for black-billed magpies and thrushes, long-eared owls, and other birds (Crowe and Clausnitzer 1997).

Common snowberry is browsed by deer, elk, and cattle. It is a nutritious species for cattle late in the season but probably sustains the least damage if grazed in spring. Common snowberry reproduces by rhizomes and can increase or decrease following heavy grazing depending on the season and yearly moisture condition (Snyder 1991). Average forage was approximately 672 (<112 to 1680) kg/ha.

A severe enough forest fire may kill the black hawthorn and release the understory layer resulting in higher forage biomass and a possible shift to Rocky Mountain maple and common snowberry in the shrub layer. Dewey sedge, a tuft-forming species, is fire tolerant, and will regenerate strongly after light/moderate ground fires (USDA NRCS 2002b). Dewey sedge is of low forage value to domestic and wild ungulates.

The grand fir/black hawthorn/Dewey sedge plant association has the potential to shift to the grand fir/Rocky Mountain maple–common snowberry plant association given a reduction in soil moisture combined with fire. Conversely, the grand fir/Rocky Mountain maple–common snowberry plant association has the potential to shift to grand fir/black hawthorn/Dewey sedge plant association given an increase in soil moisture. Dense understory thickets of black hawthorn can occur for long periods, often until a disturbance event, such as a fire, shifts the competitive advantage to other species.

USDI Fish and Wildlife Service wetlands classification—

System:	palustrine
Class:	forested wetland
Subclass:	needle-leaved evergreen
Water regime:	(nontidal) seasonally to temporarily flooded.

Adjacent riparian/wetland classifications—

The grand fir/black hawthorn/Dewey sedge plant association has not previously been described.

Floristically similar types include black cottonwood/mountain alder–red-osier dogwood; grand fir/common snowberry, and black cottonwood/common snowberry (Crowe and Clausnitzer 1997).

Grand Fir/Rocky Mountain Maple–Floodplain Plant Association

Abies grandis/Acer glabrum

CWS543 ABGR/ACGL–FLOODPLAIN N = 12

Aaron Wells

Landform environment (n = 12)		Mean	Range
Elevation (m)		809	707–1021
Plot slope (percent)		2	0.5–5
Aspect	All		

Valley environment (n = 12)		Mode	Range
Valley gradient (percent)		1–3	<1–5
Valley width (m)		30–100	10–300
Valley aspect	Mostly northerly		

Soil surface cover (n = 12)	Mean	Range
Submerged (percent)	0	
Bare ground	1	0–5
Gravel	1	0–10
Rock	3	0–10
Bedrock	0	
Litter	57	6–95
Moss	39	5–90

Soil profile characteristics (n = 12)			
Parent material	Mazama ash, alluvium, colluvium		
Great group(s)	Hapludalfs, Hapludands, Hydrudands, Udifluvents, Udorthents		
		Mean	**Range**
Water table depth (cm)			91–>104
Rock fragments (percent)		47	1–100
Available water capacity of pit (cm/m)		7	1–15
pH (n = 7)		6.18	5.85–6.53
Depth to redoximorphic features (cm)		NA	
Occurrence of redoximorphic features (percentage of soils)		0	
Surface organic layer (cm)			0–23
Surface layers			
Thickness (cm)			6–>50
Texture(s)[a]	SIL, L, SL, loamy ash, cobbles		
Redoximorphic features	None		
Subsurface layers			
Thickness (cm)			15–>91
Texture(s)[a]	CL, SCL, SL, LS, S, silty ash		
Redoximorphic features	None		

[a] See “Soil Texture Codes” section.

Physical environment—

The grand fir/Rocky Mountain maple–floodplain plant association occurred on floodplains and terraces at lower elevations (707 to 1021 m) throughout the Umatilla National Forest and occasionally in Hells Canyon (Wallowa-Whitman National Forest). Sites occurred in mainly low-gradient (1 to 3 percent) flat and V-shaped valleys.

Hells Canyon represents the extreme dry end of the grand fir environmental tolerance gradient, where special environmental conditions are required for it to occur. Stream valleys in Hells Canyon containing grand fir were generally of northerly aspect (Cherry Creek), were located at higher than average elevation within the drainage (1000 m–Lake Fork), or were located along cold air drainages. The niche for grand fir in the Umatilla National Forest, where grand fir can be found at a greater variety of sites, is much broader owing to the wetter/cooler environment relative to Hells Canyon.

Soils were typically well-drained, very gravelly/cobbly, fine sandy loams to silt loams. Depth to water table was generally deep (>1 m), and redoximorphic features were rare.

Vegetation composition—

Grand fir occurs in all canopy layers and is sometimes joined in the overstory by Douglas-fir, black cottonwood, and red alder. The last two species decrease in importance as age of landform increases (i.e., terraces, old vs. floodplains, young).

A diverse shrub layer represented by Rocky Mountain maple and common snowberry may also include Lewis' mock orange, western serviceberry, thimbleberry, and black hawthorn.

A rich understory layer of mesic forbs includes such high-constancy species as mountain sweetcicely, starry false Solomon's seal, drops of gold, American trailplant, western rattlesnake plantain, heartleaf arnica, queen's cup beadlily, threepetal bedstraw, blue wildrye, and Dewey sedge. The occurrence of British Columbia wildginger, claspleaf twistedstalk, false bugbane, pioneer violet, and western swordfern are indicative of the moister end of the grand fir series.

Principal species			CON	COV	MIN	MAX
			Percent			
Primary overstory trees:						
ABGR	Grand fir	*Abies grandis*	75	35	8	75
PSME	Douglas-fir	*Pseudotsuga menziesii*	50	21	2	95
Understory trees:						
ABGR	Grand fir	*Abies grandis*	91	10	1	30
Shrubs:						
ACGL	Rocky Mountain maple	*Acer glabrum*	91	22	3	80
AMAL2	Western serviceberry	*Amelanchier alnifolia*	91	5	1	15
COST4	Red-osier dogwood	*Cornus stolonifera*	41	7	1	15
CRDO2	Black hawthorn	*Crataegus douglasii*	50	4	1	10
HODI	Oceanspray	*Holodiscus discolor*	75	12	1	35
PHLE4	Lewis' mock orange	*Philadelphus lewisii*	83	12	2	35
RHPU	Alder-leaved buckthorn	*Rhamnus purshiana*	58	10	1	30
RUPA	Thimbleberry	*Rubus parviflorus*	58	4	1	10
SYAL	Common snowberry	*Symphoricarpos albus*	100	41	6	85
Forbs:						
ADBI	American trailplant	*Adenocaulon bicolor*	66	2	1	5
ARCO9	Heartleaf arnica	*Arnica cordifolia*	41	5	1	15
ARMA18	Largeleaf sandwort	*Arenaria macrophylla*	41	2	1	5
CIAL	Enchanter's nightshade	*Circaea alpine*	58	3	1	5
DIHO3	Drops of gold	*Disporum hookeri*	66	7	1	35
GAAP2	Cleavers	*Galium aparine*	41	6	1	10
OSCH	Mountain sweetcicely	*Osmorhiza chilensis*	66	4	1	10
SMST	Starry false Solomon's seal	*Smilacina stellata*	91	16	1	45
VIOLA	Violet	*Viola*	41	6	1	20
Grasses:						
BRVU	Columbia brome	*Bromus vulgaris*	41	3	1	5
ELGL	Blue wildrye	*Elymus glaucus*	66	4	1	10
MESU	Alaska oniongrass	*Melica subulata*	50	11	2	25
Sedges and other grasslikes:						
CADE9	Dewey sedge	*Carex deweyana*	50	3	1	10
CAGE2	Elk sedge	*Carex geyeri*	50	10	1	30
Ferns and horsetails:						
EQHY	Scouringrush horsetail	*Equisetum hyemale*	41	3	1	10

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Adjacent upland vegetation types:
Sideslopes: PSME/ACGL-PHMA5, ABGR/ACGL, and various AGSP types.

Management considerations—

Floristically similar to grand fir/Rocky Mountain maple plant associations in both Johnson and Simon (1987) and Johnson and Clausnitzer (1992), the grand fir/Rocky Mountain maple–floodplain plant association differs environmentally in that it is found in valley bottoms on low-gradient floodplains and stream terraces.

Deer and elk find browsing (Rocky Mountain maple) and bedding opportunities at these sites. A variety of birds including chickadees, winter wrens, nuthatches, and grouse feed on the abundant fruits found in the shrub layer. Squirrels and chipmunks feed on the winged seeds of Rocky Mountain maple and the deciduous cones of grand fir. These productive alluvial forests, of moderate terrain, have the potential for timber harvest, but care should be taken to determine the appropriate treatment to optimize regeneration (Crowe and Clausnitzer 1997). The grand fir/Rocky Mountain maple–floodplain plant association represents a climax association in valley bottoms of the study area.

Stand characteristics—

	Basal area		Diameter at breast height (d.b.h.)		
Species	Average	Range	Average	Minimum	Maximum
	- - - m^2/ha - - -		- - - - - - - Centimeters - - - - - - -		
ABGR	15	5–28	43.9	12.7	78.7
ALRH2	2	—	27.9	—	—
LAOC	5	—	101.6	—	—
PICO	2	—	43.2	—	—
PIPO	2	—	76.2	50.8	99.1
POTR15	3	2–5	82.0	76.2	89.0
PSME	9	7–12	49.0	22.9	81.3

	Site tree averages		
Species	d.b.h.	Age	Height
	Centimeters	*Years*	*Meters*
ABGR	53.1	75	10
BEPAS	37.1	NA	14
PIPO	116.8	160	34
POTR15	80.5	NA	17
PSME	58.7	97	21

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: forested wetland
Subclass: needle-leaved evergreen
Water regime: (nontidal) temporarily to intermittently flooded.

Adjacent riparian/wetland classifications—

The grand fir/Rocky Mountain maple–floodplain plant association has been described once previously by Crowe and Clausnitzer (1997) as the grand fir/Rocky Mountain maple and grand fir/common snowberry plant associations for the midmotane riparian/wetlands of northeastern Oregon.

Floristically similar types include Douglas-fir/Rocky Mountain maple–mallow ninebark (p. 56); and Douglas-fir/Rocky Mountain maple–mallow ninebark (Crowe and Clausnitzer 1997).

Douglas-Fir/Rocky Mountain Maple-Mallow Ninebark–Floodplain Plant Association

Pseudotsuga menziesii/Acer glabrum–Physocarpus malvaceous

CDS724 PSME/ACGL-PHMA5–FLOODPLAIN N = 23

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Physical environment—

The Douglas-fir/Rocky mountain maple-mallow ninebark–floodplain plant association occurred on floodplains, terraces, and steep streambanks throughout the lower to middle elevations of the study area (616 to 1305 m). Sample plots were located in very narrow (<10 m) to broad (100 to 300 m) flat, V-, and trough-shaped valleys of mostly moderate gradient (4 to 5 percent). Sample plot slopes ranged from 1 to 5 percent on terraces and floodplains to 29 to 80 percent on the steep streambanks of Hells Canyon. Soils were moderately deep (50 to 100 cm) to greater than 1 m, well-drained, gravelly/cobbly/bouldery sandy loams to clay loams.

Vegetation composition—

Douglas-fir is the primary overstory species often co-occurring with one or two large ponderosa pines. Black cottonwood and white alder individuals are occasionally found in the overstory as well. These species represent holdovers from an earlier stage of floodplain development. In the understory can be found young Douglas-fir, sometimes accompanied by grand fir seedlings.

These sites are characterized by a diverse shrub layer including Rocky Mountain maple, mallow ninebark, common snowberry, oceanspray, and Lewis' mock orange. Two earlier successional shrub species, water birch, and red-osier dogwood, are occasionally found in the shrub layer but will gradually dissipate in importance through time.

The herbaceous layer consists of a wide variety of species; some of the more common include heartleaf arnica, false Solomon's seal, mountain sweetcicely, cleavers, minerslettuce, blue wildrye, and Dewey sedge.

Landform environment (n = 23)		Mean	Range
Elevation (m)		924	616–1305
Plot slope (percent)		15	1–80
Aspect	All		

Valley environment (n = 23)		Mode	Range
Valley gradient (percent)		4–5	<1–>8
Valley width (m)		30–100	<10–300
Valley aspect	All		

Soil surface cover (n = 23)	Mean	Range
Submerged (percent)	2	0–12
Bare ground	1	0–10
Gravel	1	0–2
Rock	4	0–10
Bedrock	0	
Litter	66	24–98
Moss	26	0–70

Soil profile characteristics (n = 22)		Mean	Range
Parent material	Mazama ash, alluvium, colluvium, basalt		
Great group(s)	Hapludalfs, Haplustalfs, Paleudalfs, Paleustalfs, Udifluvents, Ustifluvents, Ustorthents		
Water table depth (cm)			>23–137
Rock fragments (percent)		29	0–100
Available water capacity of pit (cm/m)		11	1–17
pH (n = 18)		6.29	5.74–6.80
Depth to redoximorphic features (cm)			NA
Occurrence of redoximorphic features (percentage of soils)		0	
Surface organic layer (cm)			0–22
Surface layers			
Thickness (cm)			4–54
Texture(s)[a]	CL, SICL, SCL, SIL, L, LS, SL, S, cobble		
Redoximorphic features	None		
Subsurface layers			
Thickness (cm)			6–>104
Texture(s)[a]	C, CL, SC, SICL, SCL, SIL, L, SL, LS, S, cobble		
Redoximorphic features	None		

[a] See "Soil Texture Codes" section.

Adjacent riparian/wetland vegetation types:
Floodplains and terraces: PSME/SYAL–FLOODPLAIN and PIPO/SYAL–FLOODPLAIN.

Adjacent upland vegetation types:
Sideslopes: LAOC/mixed shrub, PSME–PIPO/LUPINE, PIPO/AGSP, PIPO/PHMA5, and various AGSP types.

Principal species			CON	COV	MIN	MAX
			Percent			
Primary overstory trees:						
PSME	Douglas-fir	*Pseudotsuga menziesii*	83	42	7	90
Subordinate overstory trees:						
PSME	Douglas-fir	*Pseudotsuga menziesii*	43	8	1	20
Understory trees:						
PSME	Douglas-fir	*Pseudotsuga menziesii*	35	3	1	5
Shrubs:						
ACGL	Rocky Mountain maple	*Acer glabrum*	91	10	2	65
AMAL2	Western serviceberry	*Amelanchier alnifolia*	83	11	1	40
BEOC2	Water birch	*Betula occidentalis*	43	24	5	70
CRDO2	Black hawthorn	*Crataegus douglasii*	52	10	1	25
HODI	Oceanspray	*Holodiscus discolor*	83	15	1	40
PHLE4	Lewis' mock orange	*Philadelphus lewisii*	83	13	1	65
PHMA5	Mallow ninebark	*Physocarpus malvaceus*	57	20	2	65
RHPU	Alder-leaved buckthorn	*Rhamnus purshiana*	61	4	1	15
RUPA	Thimbleberry	*Rubus parviflorus*	48	15	1	60
SPBE2	White spirea	*Spiraea betulifolia*	57	21	1	75
SYAL	Common snowberry	*Symphoricarpos albus*	87	33	2	90
Forbs:						
ARCO9	Heartleaf arnica	*Arnica cordifolia*	61	15	1	75
CIAL	Enchanter's nightshade	*Circaea alpina*	61	15	2	40
GAAP2	Cleavers	*Galium aparine*	74	9	1	45
MOPE3	Perfoliated minerslettuce	*Montia perfoliata*	74	7	1	45
OSCH	Mountain sweetcicely	*Osmorhiza chilensis*	65	5	1	15
SMRA	Feathery false Solomon's seal	*Smilacina racemosa*	91	3	1	10
Grasses:						
ELGL	Blue wildrye	*Elymus glaucus*	65	6	1	30
FEOC	Western fescue	*Festuca occidentalis*	48	8	1	45
Ferns and horsetails:						
CYFR2	Brittle bladderfern	*Cystopteris fragilis*	52	4	1	25

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Stand characteristics—

	Basal area		Diameter at breast height (d.b.h.)		
Species	Average	Range	Average	Minimum	Maximum
	- - - m^2/ha - - -		- - - - - - - Centimeters - - - - - - -		
PSME	11	2–28	54.8	18.5	113.0
ABGR	2	—	43.2	—	—
ALRH2	3	2–5	39.4	33.0	44.9
LAOC	2	—	NA	—	—
PIPO	6	2–18	74.9	33.3	130.3

	Site tree averages		
Species	d.b.h.	Age	Height
	Centimeters	*Years*	*Meters*
PSME	54.8	103	23
ALRH2	38.9	NA	12
PIPO	76.2	139	24
POTR15	73.7	NA	20

Management considerations—

The Douglas-fir/Rocky mountain maple-mallow ninebark–floodplain plant association is floristically similar to the Douglas-fir/Rocky Mountain maple–mallow ninebark plant association of Johnson and Simon (1987) and the Douglas-fir/ninebark plant association of Johnson and Clausnitzer (1992), but is found in valley bottoms on alluvial surfaces rather than in uplands. Flooding is of little importance as a disturbance factor and highly depends on the age of the landform. These sites are important to deer and elk by providing bedding areas, thermal cover, and forage (common snowberry) in winter. Black bear, songbirds, grouse, and rabbits also take refuge here. When cattle are present, use is generally low owing to the low cover of forage species.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: forested wetland
Subclass: needle-leaved evergreen
Water regime: (nontidal) temporarily to intermittently flooded.

Adjacent riparian/wetland classifications—

Crowe and Clausnitzer (1997) and Jankovsky-Jones (2001) described a Douglas-fir/Rocky Mountain maple-mallow ninebark–floodplain plant association for mid-montane riparian areas in northeastern Oregon and riparian areas of southwestern Idaho, respectively.

Floristically similar types include grand fir/Rocky Mountain maple–floodplain (p. 54).

Douglas-Fir/Common Snowberry–Floodplain Plant Association

Pseudotsuga menziesii/Symphoricarpos albus

CDS628 PSME/SYAL–FLOODPLAIN N = 4

Physical environment—

The Douglas-fir/common snowberry–floodplain plant association occurred exclusively on stream terraces throughout the lower elevation (823 to 1159 m) riparian zones of the Blue Mountains. Valleys were moderately steep (4 to 5 percent) and narrow (10 to 30 m) to moderately wide (30 to 100 m). Soils were all deeper than 1 m, fine to medium textured, with a thick (5 to 10 cm) organic layer at the surface. The water table was always below 1 m, and redoximorphic features were never encountered.

Landform environment (n = 4)		Mean	Range
Elevation (m)		964	823–1159
Plot slope (percent)		4	1–9
Aspect	All		

Valley environment (n = 4)		Mode	Range
Valley gradient (percent)		4–5	4–5
Valley width (m)		30–100	10–100
Valley aspect	All		

Soil surface cover (n = 4)	Mean	Range
Submerged (percent)	0	
Bare ground	0	
Gravel	0	
Rock	2	0–3
Bedrock	0	
Litter	93	85–95
Moss	4	0–10

Soil profile characteristics (n = 4)		Mean	Range
Parent material	Mazama ash, alluvium		
Great group(s)	Hapludands, Paleudalfs, Udifluvents, Ustorthents		
		Mean	Range
Water table depth (cm)			>100
Rock fragments (percent)		16	0–50
Available water capacity of pit (cm/m)		12	9–17
pH (n = 4)		6.70	6.30–7.14
Depth to redoximorphic features (cm)		NA	
Occurrence of redoximorphic features (percentage of soils)		0	
Surface organic layer (cm)			5–10
Surface layers			
Thickness (cm)			0–51
Texture(s)[a]	L, LS, cobble		
Redoximorphic features	None		
Subsurface layers			
Thickness (cm)			38–>180
Texture(s)[a]	C, CL, SL, L, cobble		
Redoximorphic features	None		

[a] See “Soil Texture Codes” section.

Vegetation composition—

Douglas-fir is the primary overstory species. Black cottonwood and white alder, two species common to early seral stands of the Douglas-fir/Rocky Mountain maple–mallow ninebark–floodplain plant association, are rarely found in the Douglas-fir/common snowberry–floodplain plant association that is typical of later stages of floodplain development. Douglas-fir seedlings are present and reproducing vigorously at most sites.

Rocky Mountain maple and mallow ninebark are never found in the shrub layer, whereas common snowberry is always present and abundant. Oceanspray, Oregon grape, and white spirea are common species present in mature stands. Crowe and Clausnitzer (1997), in their version of this type, indicate that water birch and black hawthorn are common in seral tall shrub layers. Although these species may be expected to occur, they were not encountered in the later seral sites sampled for the version described here.

The typically sparse herbaceous layer may include heartleaf arnica, false Solomon’s seal (*Smilacina* spp.), mountain sweetcicely, cleavers, perfoliated minerslettuce, blue wildrye, and elk sedge.

Adjacent riparian/wetland vegetation types:
- Floodplains and terraces: PSME/SYAL–FLOODPLAIN, PIPO/SYAL–FLOODPLAIN.

Adjacent upland vegetation types:
- Sideslopes: LAOC/mixed shrub, PSME-PIPO/LUPINE, PIPO/AGSP, PIPO/PHMA5, and various AGSP types.

Stand characteristics—

	Basal area		Diameter at breast height (d.b.h.)		
Species	Average	Range	Average	Minimum	Maximum
	m^2/ha		Centimeters		
PSME	39	25–46	48.5	30.7	102.4
PIPO	6	5–7	84.3	59.4	101.9

	Site tree averages		
Species	d.b.h.	Age	Height
	Centimeters	*Years*	*Meters*
PSME	52.3	58	30

Management considerations—

The Douglas-fir/common snowberry–floodplain plant association is important to deer and elk for providing bedding areas, thermal cover, and forage (common snowberry) in winter. Black bear, songbirds, grouse, and rabbits also take refuge here. Common snowberry is a

Principal species			CON	COV	MIN	MAX
			Percent			
Primary overstory trees:						
PSME	Douglas-fir	*Pseudotsuga menziesii*	100	56	30	90
Subordinate overstory trees:						
PSME	Douglas-fir	*Pseudotsuga menziesii*	50	45	40	20
Understory trees:						
PSME	Douglas-fir	*Pseudotsuga menziesii*	75	15	5	5
Shrubs:						
AMAL2	Western serviceberry	*Amelanchier alnifolia*	50	2	1	3
BERE	Oregon grape	*Berberis repens*	75	2	1	3
HODI	Oceanspray	*Holodiscus discolor*	75	18	5	40
SPBE2	White spirea	*Spiraea betulifolia*	75	17	5	25
SYAL	Common snowberry	*Symphoricarpos albus*	100	63	50	85
Forbs:						
ACMI2	Common yarrow	*Achillea millefolium*	75	1	1	1
ARCO9	Heartleaf arnica	*Arnica cordifolia*	100	10	1	15
FRVE	Woodland Strawberry	*Fragraria vesca*	50	18	1	35
GAAP2	Cleavers	*Galium aparine*	100	5	1	10
MOPE3	Perfoliated minerslettuce	*Montia perfoliata*	100	4	1	5
OSCH	Mountain sweetcicely	*Osmorhiza chilensis*	100	5	1	10
SIME	Menzies' campion	*Silene menziesii*	50	3	1	5
SMRA	Feathery false Solomon's seal	*Smilacina racemosa*	50	2	1	3
SMST	Starry false Solomon's seal	*Smilacina stellata*	50	4	3	5
TAOF	Dandelion	*Taraxacum officinale*	50	3	3	3
TRPE3	Idaho trillium	*Trillium petiolatum*	75	2	1	3
Grasses:						
AREL3	Tall oatgrass	*Arrhenatherum elatius*	50	2	1	3
CARU	Pinegrass	*Calamagrostis rubescens*	50	14	3	25
DAGL	Orchardgrass	*Dactylis glomerata*	50	3	1	5
ELGL	Blue wildrye	*Elymus glaucus*	50	16	1	30
FEOC	Western fescue	*Festuca occidentalis*	75	2	1	5
POPR	Kentucky bluegrass	*Poa pratensis*	50	13	10	15
Sedges and other grasslikes:						
CAGE2	Elk sedge	*Carex geyeri*	75	30	5	65
LUCA2	Field woodrush	*Luzula campestris*	50	8	1	15
Ferns and horsetails:						
CYFR2	Brittle bladderfern	*Cystopteris fragilis*	50	1	1	1

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

highly palatable, and much preferred browse species for wild and domestic ungulates, especially later in the season (USDA NRCS 2002b). However, overuse of the Douglas-fir/common snowberry–floodplain plant association can result in weedy species such as cleavers, chervil, Kentucky bluegrass, Canada thistle, and perfoliated minerslettuce persisting in the herbaceous layer. Common snowberry reproduces mainly by rhizomes and may increase or decrease after heavy grazing, depending on the season and moisture conditions of the soil (Crowe and Clausnitzer 1997).

High-intensity fires may kill common snowberry, whereas low to moderate fires tend to cause vigorous resprouting from rhizomes. The thick shrub layer and abundant berries provide nesting and feeding habitat for songbirds and small mammals. Intense shading by snowberry and dense thickets can result in common snowberry occupying these sites for long periods, often until a disturbance event, such as a fire followed by heavy grazing, shifts the competitive advantage to other species.

The deep, dry soils, orientation away from the stream on broad terraces, and high basal area of Douglas-fir typical of the **later seral stages** of the Douglas-fir/common snowberry–floodplain plant association have the potential for timber harvest but care should be taken in selecting the appropriate treatment to optimize regeneration.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: forested wetland
Subclass: needle-leaved evergreen
Water regime: (nontidal) temporarily to intermittently flooded.

Adjacent riparian/wetland classifications—

Crowe and Clausnitzer (1997) described a Douglas-fir/common snowberry plant association for midmontane riparian areas in northeastern Oregon.

Floristically similar types include Douglas-fir/Rocky Mountain maple–mallow ninebark–floodplain (p. 56); and ponderosa pine/common snowberry–floodplain (p. 60).

Ponderosa Pine/Common Snowberry–Floodplain Plant Association

Pinus ponderosa/Symphoricarpos albus

CPS511 PIPO/SYAL–FLOODPLAIN N = 6

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Landform environment (n = 6)		Mean	Range
Elevation (m)		946	768–1192
Plot slope (percent)		14	3–42
Aspect	Southerly		

Valley environment (n = 6)		Mode	Range
Valley gradient (percent)		4–5	1–5
Valley width (m)		30–100	10–300
Valley aspect	All		

Soil surface cover (n = 6)	Mean	Range
Submerged (percent)	0	
Bare ground	1	0–3
Gravel	0	
Rock	3	0–6
Bedrock	0	
Litter	89	80–100
Moss	8	0–15

Soil profile characteristics (n = 6)			
Parent material	Colluvium, alluvium		
Great group(s)	Haplustalfs, Paleustalfs, Ustifluvents, Ustorthents		
		Mean	**Range**
Water table depth (cm)			89–>94
Rock fragments (percent)		15	1–38
Available water capacity of pit (cm/m)		11	5–16
pH (n = 4)		6.06	5.36–6.43
Depth to redoximorphic features (cm)		18	
Occurrence of redoximorphic features (percentage of soils)		17	
Surface organic layer (cm)			3–15
Surface layers			
Thickness (cm)			11–64
Texture(s)[a]	SL, L, FSCL		
Redoximorphic features	Iron oxide concentrations		
Subsurface layers			
Thickness (cm)			28–>71
Texture(s)[a]	C, FSCL, SICL, SL, S		
Redoximorphic features	Iron oxide concentrations		

[a] See “Soil Texture Codes” section.

Physical environment—

The ponderosa pine/common snowberry–floodplain plant association occurred on floodplains, terraces, and steep streambanks throughout the lower to middle elevations of the study area (768 to 1192 m). Plots were located primarily in Hells Canyon (Wallowa-Whitman National Forest), with one plot along the north fork of the John Day River (Umatilla National Forest). The PIPO/SYAL plant association occurred in narrow (10 to 30 m) to broad (100 to 300 m) V- and trough-shaped valleys of low to moderate gradient (1 to 5 percent) and southerly aspect. Soils were typically well-drained, gravelly/cobbly sandy loam to sandy clay loam. Depth to water table was generally greater than 89 cm with few to no redoximorphic features.

Vegetation composition—

Ponderosa pine forms the overstory tree layers with an occasional Douglas-fir. Douglas-fir is sometimes found in the understory, but, given the southerly aspect of these sites, is not likely to reach potential status owing to the relatively low drought tolerance of Douglas-fir. Common snowberry is always present in the shrub layer along with high-frequency species such as western serviceberry, oceanspray, black hawthorn, and white spirea.

The herbaceous layer is composed of a variety of forbs, grasses, and sedges in low abundance including heartleaf arnica, cleavers, mountain sweetcicely, and Back’s sedge. Back’s sedge, a Pacific Northwest Region (Region 6) sensitive species, can often be found at low abundance in the understory of the PIPO/SYAL plant association.

Adjacent riparian/wetland vegetation types:
- Floodplains and terraces:
  - PSME/SYAL–FLOODPLAIN,
  - PSME/ACGL-PHMA5–FLOODPLAIN.

Adjacent upland vegetation types:
- Sideslopes: PIPO/AGSP, and various AGSP types.

Principal species			CON	COV	MIN	MAX
				Percent		
Primary overstory trees:						
PIPO	Ponderosa pine	*Pinus ponderosa*	100	60	25	95
Shrubs:						
AMAL2	Western serviceberry	*Amelanchier alnifolia*	66	25	3	60
CRDO2	Black hawthorn	*Crataegus douglasii*	66	29	5	90
HODI	Oceanspray	*Holodiscus discolor*	50	45	15	75
PHLE4	Lewis' mock orange	*Philadelphus lewisii*	50	7	2	10
SPBE2	White spirea	*Spiraea betulifolia*	66	15	10	25
SYAL	Common snowberry	*Symphoricarpos albus*	100	28	1	50
Forbs:						
GAAP2	Cleavers	*Galium aparine*	50	11	3	15
TRDU	Yellow salsify	*Tragopogon dubius*	50	3	1	5
Grasses:						
ELGL	Blue wildrye	*Elymus glaucus*	50	4	3	5
Sedges and other grasslikes:						
CAGE2	Elk sedge	*Carex geyeri*	66	14	2	25

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Stand characteristics—

	Basal area		Diameter at breast height (d.b.h.)		
Species	Average	Range	Average	Minimum	Maximum
	- - - m^2/ha - - -		- - - - - - - Centimeters - - - - - - -		
PIPO	27	21–32	61.5	20.3	128.0
PSME	3	2–5	59.4	29.7	99.1

	Site tree averages		
Species	d.b.h.	Age	Height
	Centimeters	*Years*	*Meters*
PIPO	87.6	116	41

Management considerations—

Floristically similar to the ponderosa pine/common snowberry plant association found in uplands (Johnson and Clausnitzer 1992, Johnson and Simon 1987), the ponderosa pine/common snowberry–floodplain plant association is differentiated by its location in valley bottoms and the presence of mesic species including cleavers, mountain sweetcicely, and Back's sedge. The ponderosa pine/common snowberry–floodplain plant association rarely experiences flooding, and, owing to a moister microclimate, is slightly less prone to forest fires than upland stands.

Ponderosa pine/common snowberry floodplains, terraces, and streambanks provide shelter for deer, elk, and grouse, while songbirds enjoy the vertical strata above. The affiliation of Back's sedge with the PIPO/SYAL-FLOODPLAIN association points to the importance of these sites as refugia for this Region 6 sensitive species. Overuse by cattle eventually leads to an herbaceous layer overtaken by Kentucky bluegrass (Kovalchik 1987).

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: forested wetland
Subclass: needle-leaved evergreen
Water regime: (nontidal) intermittently flooded.

Adjacent riparian/wetland classifications—

The ponderosa pine/common snowberry–floodplain association has been described by Crowe and Clausnitzer (1997) and Kovalchik (1987) for midmontane riparian areas of northeastern Oregon and wetland and riparian sites of central Oregon, respectively. Jankovsky-Jones et al. (2001) noted that although no ponderosa pine types were sampled in southwestern Idaho riparian/wetlands, they expected such types to occur.

Floristically similar types include Douglas-fir/Rocky Mountain maple–mallow ninebark (p. 56), black cottonwood/Rocky Mountain maple (p. 68); Douglas-fir/common snowberry–floodplain, grand fir/common snowberry (Crowe and Clausnitzer 1997).

Miscellaneous Ponderosa Pine Type

Ponderosa Pine/Black Hawthorn Plant Community

Pinus ponderosa/Crataegus douglasii

CPS722 PIPO/CRDO2 N = 1

The ponderosa pine/black hawthorn plant community was found on a gentle (1 percent) terrace of Lightning Creek in Hells Canyon National Recreation Area at 567 m. Soil great groups were Ustifluvents and were well drained, moderately deep to cobbles/boulders, and silt loam/loam in texture.

Ponderosa pine forms the overstory with a thick shrub layer beneath featuring black hawthorn, water birch, chokecherry, alder-leaved buckthorn, red-osier dogwood, poison ivy, and a variety of other shrubs at low abundance.

Cheatgrass and Canadian white violet compose the herbaceous layer with trace amounts of cleavers, chervil, lesser burdock, enchanter's nightshade, and Dewey sedge among others. The abundance of weedy and invasive species suggests that this site has been heavily grazed in the past. In the absence of grazing, the understory would most likely feature Dewey sedge along with a rich mixture of mesic forbs.

Adjacent riparian/wetland vegetation type:
Floodplains: POTR15/ALIN2-COST4.

The ponderosa pine/black hawthorn plant community has not previously been described. Floristically similar types include ponderosa pine/Kentucky bluegrass (Crowe and Clausnitzer 1997); ponderosa pine/red-oiser dogwood, ponderosa pine/common chokecherry (Hansen et al. 1995).

Lodgepole Pine/Holm's Rocky Mountain Sedge Plant Community

Pinus contorta/Carex scopulorum

CLM118 PICO/CASC12 N = 1

This community was sampled in a moist meadow at 2274 m in the Seven Devils Mountains. Soils were poorly drained organic Cryofibrists. Depth to water table near the end of August was 33 cm.

Lodgepole pine was found in all tree canopy layers with a variety of other conifer species including subalpine fir, Engelmann spruce, and whitebark pine. Rose meadowsweet is found throughout the shrub layer along with alpine laurel, grouse huckleberry, rusty menziesia, pink mountainheath, and alpine spicywintergreen. Holm's Rocky Mountain sedge forms a thick herbaceous layer with scattered forbs and graminoids such as subalpine fleabane, explorer's gentian, sheep sedge, black alpine sedge, and bladder sedge.

Total forage biomass was 358 kg/ha. This community provides feeding and nesting opportunities for golden-crowned kinglets, mountain chickadees, Stellar's jay, and dark-eyed juncos. This community also provides important habitat for amphibians. Manning and Padgett (1995) described a lodgepole pine/Holm's Rocky Mountain sedge community type similar to the community described above with gooseberry currant and twinberry honeysuckle in the shrub layer rather than rose meadowsweet.

Black Cottonwood/Mountain Alder–Red-Osier Dogwood Plant Association

Populus trichocarpa/Alnus incana-Cornus stolonifera

HCS113 POTR15/ALIN2-COST4 N = 7

Aaron Wells

Landform environment (n = 7)		Mean	Range
Elevation (m)		847	561–1561
Plot slope (percent)		9	2–30
Aspect	All		

Valley environment (n = 7)		Mode	Range
Valley gradient (percent)		4–5	1–>8
Valley width (m)		30–100	<10–>300
Valley aspect	All		

Soil surface cover (n = 6)	Mean	Range
Submerged (percent)	3	0–8
Bare ground	3	0–15
Gravel	1	0–5
Rock	20	3–70
Bedrock	0	
Litter	51	10–86
Moss	19	0–67

Soil profile characteristics (n = 6)		Mean	Range
Parent material	Basalt		
Great group(s)	Fluvaquents, Udorthents		
Water table depth (cm)			0–>53
Rock fragments (percent)		55	0–100
Available water capacity of pit (cm/m)		9	1–32
pH (n = 2)		6.65	6.37–6.92
Depth to redoximorphic features (cm)			18–75
Occurrence of redoximorphic features (percentage of soils)		29	
Surface organic layer (cm)			0–26
Surface layers			
Thickness (cm)			10–15
Texture(s)[a]	SIL, L, SL, cobbles		
Redoximorphic features	None		
Subsurface layers			
Thickness (cm)			38–>155
Texture(s)[a]	SIL, L, SL, LS, cobbles, boulders		
Redoximorphic features	Iron oxide concentrations		

[a] See “Soil Texture Codes” section.

Physical environment—

The black cottonwood/mountain alder–red-osier dogwood plant association occurred almost exclusively on floodplains (with the exception of one plot located on a streambank) throughout the lower reaches of the study area (<1100 m) with one sample plot occurring at 1561 m. Sample sites occurred in V- and trough-shaped, and flat valleys of moderately high (4 to 5 percent) to high (6 to >8 percent) gradient. Soils ranged from shallow (<25 cm) excessively-drained sands over cobbles and boulders on annual floodplains to moderately deep to deep, moderately well-drained, very gravelly/cobbly, loams to silty clay loams on infrequently flooded floodplains.

Vegetation composition—

The overstory is primarily composed of black cottonwood and may include ponderosa pine and white alder. The understory can be quite diverse including white alder, ponderosa pine, and grand fir. The shrub layer contains a mixture of shrub species namely red-osier dogwood and mountain alder.

Red-osier dogwood and mountain alder tend to be the first to take hold on rocky, annually flooded sites often co-occurring with black cottonwood seedlings. The tall shrub layer shifts to black hawthorn and common snowberry on less frequently flooded sites, farther from the stream channel, with deeper well-developed soils, where red-oiser dogwood and mountain alder decrease in abundance. As in the PSME/ACGL-PHMA5-SYAL–FLOODPLAIN plant association, the presence of red-osier dogwood and mountain alder mark an earlier seral stage characterized by regular flood events and more mesic soil conditions.

Other shrub species often encountered include western serviceberry, Rocky Mountain maple, Lewis’ mock orange, water birch, oceanspray, and blackberries. Herbaceous species may include threepetal bedstraw, Canadian white violet, false Solomon’s seal, western meadow-rue, blue wildrye, and Dewey sedge.

Principal species			CON	COV	MIN	MAX
				Percent		
Primary overstory trees:						
POTR15	Black cottonwood	*Populus trichocarpa*	85	27	15	45
Subordinate overstory trees:						
POTR15	Black cottonwood	*Populus trichocarpa*	42	8	3	15
Understory trees:						
POTR15	Black cottonwood	*Populus trichocarpa*	71	10	1	45
Shrubs:						
ACGL	Rocky Mountain maple	*Acer glabrum*	71	11	2	25
ALIN2	Mountain alder	*Alnus incana*	57	17	1	45
AMAL2	Western serviceberry	*Amelanchier alnifolia*	85	6	2	15
COST4	Red-osier dogwood	*Cornus stolonifera*	85	20	2	65
CRDO2	Black hawthorn	*Crataegus douglasii*	71	13	2	45
HODI	Oceanspray	*Holodiscus discolor*	42	5	1	10
PHLE4	Lewis' mock orange	*Philadelphus lewisii*	71	27	10	65
RHRA6	Poison ivy	*Rhus radicans*	42	27	1	70
RUPA	Thimbleberry	*Rubus parviflorus*	57	19	2	65
SYAL	Common snowberry	*Symphoricarpos albus*	57	14	5	20
Forbs:						
GAAP2	Cleavers	*Galium aparine*	57	5	1	10
URDI	Stinging nettle	*Urtica dioica*	42	1	1	1
Grasses:						
ELGL	Blue wildrye	*Elymus glaucus*	71	5	1	20
POPR	Kentucky bluegrass	*Poa pratensis*	57	4	1	8
Sedges and other grasslikes:						
CADE9	Dewey sedge	*Carex deweyana*	71	4	1	15
Ferns and horsetails:						
EQHY	Scouringrush horsetail	*Equisetum hyemale*	42	2	1	3

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Stand characteristics—

	Basal area		Diameter at breast height (d.b.h.)		
Species	Average	Range	Average	Minimum	Maximum
	- - - m^2/ha - - -		- - - - - - - *Centimeters* - - - - - - -		
POTR15	12	2–25	73.6	22.9	149.4
ABGR	5	—	NA	NA	NA
ALRH2	2	—	40.6	—	—
PIPO	5	—	NA	NA	NA

	Site tree averages		
Species	d.b.h.	Age	Height
	Centimeters	*Years*	*Meters*
POTR15	40.9	NA	11
ALRH2	39.9	28	7

Adjacent riparian/wetland vegetation types:
- Floodplains and terraces: PSME/ACGL-PHMA5–FLOODPLAIN, BEOC2, ALRH2/MESIC SHRUB, and various SALIX/bar types.

Adjacent upland vegetation types:
- Sideslopes: PSME-PIPO/ACGL-PHMA5, ABGR/PHMA5, RHGL/AGSP, and various AGSP types.

Management considerations—

Black cottonwood requires annual flooding for regeneration, colonizing freshly worked alluvium. It is one of a group, along with red and white alder, of important early successional tree species in low- to mid-elevation riparian zones of the Blue Mountains Province. Mountain alder provides nitrogen-rich litter to streams and rivers by converting atmospheric nitrogen into more biologically useful forms. Mountain alder and red-osier dogwood provide shade for the streams and streambank stability at these fluvially active sites.

A variety of bird species including hermit thrushes, orioles, song sparrows, American robins, crows, vireos, warblers, and rufous-sided towhees feed on the abundant berries in the shrub layer. The sound of drumming grouse is common in the spring and early summer months. Large standing dead cottonwoods, common in older stands, provide important habitat for cavity-nesting birds and other wildlife. Fish habitat is improved by shading, streambank stability, and the addition of large woody debris to the stream channel.

Grazing by wild and domestic ungulates is generally low to moderate depending on the density of animals and the time of year. Poison ivy, cleavers, perfoliated minerslettuce, chervil, cheatgrass, and Kentucky bluegrass are disturbance-related species that may receive a competitive advantage when grazing pressure is unsuitably high. Possible successional trajectories: PIPO/SYAL, ABGR/ACGL, and PSME/ACGL-PHMA5.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: forested wetland
Subclass: broad-leaved deciduous
Water regime: (nontidal) seasonally flooded to saturated.

Adjacent riparian/wetland classifications—

The black cottonwood/mountain alder–red-osier dogwood plant association has been described by Crowe and Clausnitzer (1997) for midmontane riparian/wetland sites of northeastern Oregon. Kovalchik and Clausnitzer (2004) also described a black cottonwood/mountain alder–red-osier dogwood type for Washington.

Other floristically similar types include grand fir/black hawthorn/Dewey sedge (p. 51); black cottonwood/Rocky Mountain maple, black cottonwood/common snowberry (Crowe and Clausnitzer 1997); and black cottonwood plant community types (Diaz and Mellon 1996).

Black Cottonwood/Common Snowberry Plant Community Type

Populus trichocarpa/Symphoricarpos albus

HCS312 POTR15/SYAL N = 5

Aaron Wells

Landform environment (n = 5)		Mean	Range
Elevation (m)		782	598–1000
Plot slope (percent)		7	1–25
Aspect	Mostly southerly		

Valley environment (n = 5)		Mode	Range
Valley gradient (percent)		1–3	1–5
Valley width (m)		30–100	30–300
Valley aspect	Southerly		

Soil surface cover (n = 5)	Mean	Range
Submerged (percent)	2	0–10
Bare ground	13	0–60
Gravel	5	0–18
Rock	4	0–15
Bedrock	0	
Litter	63	20–95
Moss	9	0–45

Soil profile characteristics (n = 5)		Mean	Range
Parent material	Basalt		
Great group(s)	Fluvaquents, Udorthents		
Water table depth (cm)			91–>100
Rock fragments (percent)		48	0–100
Available water capacity of pit (cm/m)		8	1–19
pH (n = 4)		6.95	6.54–7.20
Depth to redoximorphic features (cm)		19	
Occurrence of redoximorphic features (percentage of soils)		20	
Surface organic layer (cm)			0–22
Surface layers			
Thickness (cm)			3–31
Texture(s)[a]	SICL, SIL, L		
Redoximorphic features	Iron oxide concentrations		
Subsurface layers			
Thickness (cm)			58–>100
Texture(s)[a]	SICL, FSL, S		
Redoximorphic features	None		

[a] See “Soil Texture Codes” section.

Physical environment—

The black cottonwood/common snowberry plant community type occurred on inactive floodplains and terraces along south-facing drainages throughout the lower reaches of the study area (<1100 m). Sample sites occurred in V- and trough-shaped and flat valleys of low (1 to 3 percent) to moderate (4 to 5 percent) gradient. Soils were typically well-drained, moderately deep to deep, silt loams to loams over sandy loams to sands. Redoximorphic features were rarely found, an indication of the overall more xeric soil conditions of the black cottonwood/common snowberry plant community type relative to the black cottonwood/mountain alder–red-osier dogwood plant association.

Vegetation composition—

The black cottonwood overstory may also include white alder. The understory is often lacking a strong black cottonwood component, a result of the loss of fluvial activity at these sites owing to natural stream downcutting. The absence of red-osier dogwood and mountain alder, and the abundance of common snowberry in the shrub layer also points to this loss of fluvial influence.

Other shrub species often encountered include black hawthorn, Woods’ rose, western serviceberry, and oceanspray. Herbaceous species include blue wildrye, false Solomon’s seal, and tall ragwort.

Adjacent riparian/wetland vegetation types:

Floodplains and terraces: PSME/ACGL-PHMA5–FLOODPLAIN, BEOC2, ALRH2/MESIC SHRUB, and various SALIX/bar types.

Adjacent upland vegetation types:

Sideslopes: PSME-PIPO/ACGL-PHMA5, ABGR/PHMA5, RHGL/AGSP, and various AGSP types.

Management considerations—

A variety of bird species including hermit thrushes, orioles, song sparrows, American robins, crows, vireos, warblers, and rufous-sided towhees feed on the abundant berries in the shrub layer. The sound of drumming grouse is common in spring and early summer months. Large standing dead cottonwoods, common in older stands, provide important habitat for cavity-nesting birds and other wildlife.

Principal species			CON	COV	MIN	MAX
				Percent		
Primary overstory trees:						
POTR15	Black cottonwood	*Populus trichocarpa*	100	49	23	75
Subordinate overstory trees:						
POTR15	Black cottonwood	*Populus trichocarpa*	60	14	7	20
Understory trees:						
POTR15	Black cottonwood	*Populus trichocarpa*	60	1	1	1
Shrubs:						
AMAL2	Western serviceberry	*Amelanchier alnifolia*	60	3	1	5
CRDO2	Black hawthorn	*Crataegus douglasii*	80	35	7	60
HODI	Oceanspray	*Holodiscus discolor*	80	7	1	10
PHLE4	Lewis' mock orange	*Philadelphus lewisii*	80	38	20	50
PHMA5	Mallow ninebark	*Physocarpus malvaceus*	60	4	3	5
PRVI	Chokecherry	*Prunus virginiana*	40	20	10	30
RHPU	Alder-leaved buckthorn	*Rhamnus purshiana*	40	2	1	3
ROWO	Woods' rose	*Rosa woodsii*	60	7	5	10
SYAL	Common snowberry	*Symphoricarpos albus*	100	18	3	35
Forbs:						
ACMI2	Common yarrow	*Achillea millefolium*	40	1	1	1
ANSC8	Chervil	*Anthriscus scandicina*	40	53	45	60
ARMI2	Lesser burdock	*Arctium minus*	40	1	1	1
ASPR	German-madwort	*Asperugo procumbens*	40	1	1	1
CYOF	Gypsyflower	*Cynoglossum officinale*	40	2	1	2
GAAP2	Cleavers	*Galium aparine*	100	15	3	50
HELA4	Common cowparsnip	*Heracleum lanatum*	40	4	3	5
MOPE3	Perfoliated minerslettuce	*Montia perfoliata*	40	11	1	20
OSCH	Mountain sweetcicely	*Osmorhiza chilensis*	40	8	1	15
SESE2	Tall ragwort	*Senecio serra*	40	2	1	2
SMRA	Feathery false Solomon's seal	*Smilacina racemosa*	40	11	1	20
SMST	Starry false Solomon's seal	*Smilacina stellata*	40	6	2	10
STME2	Common chickweed	*Stellaria media*	40	2	1	3
Grasses:						
ELGL	Blue wildrye	*Elymus glaucus*	100	4	2	5
POPR	Kentucky bluegrass	*Poa pratensis*	60	30	10	60
Sedges and other grasslikes:						
CADE9	Dewey sedge	*Carex deweyana*	40	1	1	1

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Stand characteristics—

	Basal area		Diameter at breast height (d.b.h.)		
Species	Average	Range	Average	Minimum	Maximum
	m²/ha		*Centimeters*		
POTR15	10	2–16	40.1	17.8	96.5
ALRH2	2	—	16.5	15.2	17.8
PSME	2	—	55.9	—	—

	Site tree averages		
Species	d.b.h.	Age	Height
	Centimeters	*Years*	*Meters*
POTR15	50.8	34	20
ALRH	17.8	14	10

Grazing by wild and domestic ungulates is generally moderate to high depending on the density of animals and the time of year. Cleavers, perfoliated minerslettuce, chervil, and Kentucky bluegrass are weedy species that may increase in abundance at the expense of common snowberry and native forbs and grasses if grazing pressure is unsuitably high. Possible successional trajectories include PIPO/SYAL.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: forested wetland
Subclass: broad-leaved deciduous
Water regime: (nontidal) temporarily to intermittently flooded.

Adjacent riparian/wetland classifications—

The black cottonwood/common snowberry community type is most similar floristically to Crowe and Clausnitzer's (1997) black cottonwood/common snowberry plant community type, Crawford's (2003) black cottonwood/common snowberry association, and the black cottonwood/common snowberry plant association of Jankovsky-Jones et al. (2001).

Other floristically similar types include black cottonwood/Rocky Mountain maple (p. 68), white alder/mesic shrub (p. 72); Oregon white oak (*Quercus garryana* Dougl.)/Lewis' mock orange-common snowberry (Crawford 2003).

Miscellaneous Black Cottonwood Type

Black Cottonwood/Rocky Mountain Maple Plant Community Type

Populus trichocarpa/Acer glabrum

HCS114 POTR15/ACGL N = 2

The black cottonwood/Rocky Mountain maple plant community type occurred on an inactive floodplain and a stream terrace at elevations between 600 and 800 m. Valley gradients were low (1 to 3 percent) to moderate (4 to 5 percent), and soils were little developed consisting of sands and loams over alluvial gravels, cobbles, and stones. Black cottonwood occurs in all canopy layers, although understory regeneration is often weak. Ponderosa pine (Hells Canyon) or grand fir (Wenaha-Tucannon Wilderness) were also found in the understory suggesting possible successional pathways within each region. Blue wildrye, feathery false Solomon's seal, and Canadian white violet are always found in the herbaceous layer, whereas British Columbia wildginger, common cowparsnip, and enchanter's nightshade are indicative of the more mesic variations of this type. Floristically similar types include black cottonwood/common snowberry (p. 66), grand fir/black hawthorn/Dewey sedge (p. 51), ponderosa pine/common snowberry–floodplain (p. 60); black cottonwood/common snowberry (Crowe and Clausnitzer 1997), black cottonwood/common snowberry (Crawford 2003), and black cottonwood/common snowberry (Jankovsky-Jones et al. 2001). See Crowe and Clausnitzer (1997: 93) for management considerations.

Red Alder/Common Snowberry/Dewey Sedge Plant Community Type

Alnus rubra/Symphoricarpos albus/Carex deweyana

HAS312 ALRU2/SYAL/CADE9 N = 5

Aaron Wells

Physical environment—

The red alder/common snowberry/Dewey sedge plant community type was found principally on low-elevation (600 to 800 m) floodplains and cobble bars in the Umatilla National Forest. This type was never found in Hells Canyon. Sites were located in mostly V-shaped valleys of low (1 to 3 percent) to high gradient (6 to 8 percent) and moderate width (30 to 100 m). Floodplains are typically flooded annually with little soil development. Soils were excessively drained, typically shallow (<50 cm), very gravelly/cobbly sands to loams over cobbles or boulders.

Vegetation composition—

Red alder forms a dense overstory layer and is sometimes accompanied by Douglas-fir or heartleaved paper birch. Red alder, Douglas-fir, grand fir, and ponderosa pine can be found in the understory tree layer.

Common snowberry, Lewis' mock orange, thimbleberry, red-osier dogwood, and Rocky Mountain maple are the more frequent members of the shrub layer. A sparse herbaceous layer includes such mesic species as Dewey sedge, enchanter's nightshade, sweetcicely, false Solomon's seal, common cowparsnip, blue wildrye, and ladyfern.

Adjacent riparian/wetland vegetation types:

Floodplains and terraces:

PSME/ACGL-PHMA5–FLOODPLAIN, ABGR/ACGL–FLOODPLAIN, ABGR/GYDR, PIPO/SYAL–FLOODPLAIN, and various black cottonwood types.

Adjacent upland vegetation types:

Sideslopes: ABGR/ACGL, PSME/SYAL, PIPO/SYAL.

Landform environment (n = 5)		Mean	Range
Elevation (m)		716	616–774
Plot slope (percent)		2	1–6
Aspect	All		

Valley environment (n = 5)		Mode	Range
Valley gradient (percent)		1–3	1–8
Valley width (m)		30–100	30–300
Valley aspect	All		

Soil surface cover (n = 5)	Mean	Range
Submerged (percent)	3	0–15
Bare ground	11	0–30
Gravel	5	0–10
Rock	8	1–15
Bedrock	0	
Litter	62	45–79
Moss	11	5–18

Soil profile characteristics (n = 4)		Mean	Range
Parent material	Alluvium		
Great group(s)	Udifluvents, Udorthents, Endoaquents		
Water table depth (cm)			>46
Rock fragments (percent)		44	2–100
Available water capacity of pit (cm/m)		6	1–14
pH (n =3)		6.53	6.27–6.90
Depth to redoximorphic features (cm)		NA	
Occurrence of redoximorphic features (percentage of soils)		0	
Surface organic layer (cm)		0	
Surface layers			
Thickness (cm)			0–51
Texture(s)[a]	L, SL, cobble		
Redoximorphic features	None		
Subsurface layers			
Thickness (cm)			24–>48
Texture(s)[a]	SL, LS, S, cobble		
Redoximorphic features	None		

[a] See "Soil Texture Codes" section.

Stand characteristics—

	Basal area		Diameter at breast height (d.b.h.)		
Species	Average	Range	Average	Minimum	Maximum
	m^2/ha		*Centimeters*		
ALRU2	28	16–39	21.6	14.2	32.3
ABGR	3	2–5	35.1	16.5	50.5

	Site tree averages		
Species	d.b.h.	Age	Height
	Centimeters	*Years*	*Meters*
ALRU2	27.4	28	20

Principal species			CON	COV	MIN	MAX
				Percent		
Primary overstory trees:						
ALRU2	Red alder	*Alnus rubra*	100	56	15	90
BEPAS	Heartleaved paper birch	*Betula papyrifera* var. *subcordata*	40	18	15	20
PSME	Douglas-fir	*Pseudotsuga menziesii*	40	4	3	5
Subordinate overstory trees:						
BEPAS	Heartleaved paper birch	*Betula papyrifera* var. *subcordata*	60	14	1	20
Understory trees:						
ALRU2	Red alder	*Alnus rubra*	40	6	1	10
ABGR	Grand fir	*Abies grandis*	60	5	1	10
PIPO	Ponderosa pine	*Pinus ponderosa*	40	2	1	3
PSME	Douglas-fir	*Pseudotsuga menziesii*	60	2	1	3
Shrubs:						
ACGL	Rocky Mountain maple	*Acer glabrum*	80	3	1	5
AMAL2	Western serviceberry	*Amelanchier alnifolia*	40	2	1	3
BEOC2	Water birch	*Betula occidentalis*	40	12	3	20
COST4	Red-osier dogwood	*Cornus stolonifera*	60	10	5	20
CRDO2	Black hawthorn	*Crataegus douglasii*	60	18	3	45
HODI	Oceanspray	*Holodiscus discolor*	60	5	1	11
PHLE4	Lewis' mock orange	*Philadelphus lewisii*	100	39	10	80
RHPU	Alder-leaved buckthorn	*Rhamnus purshiana*	80	13	10	15
RILA	Prickly currant	*Ribes lacustre*	40	8	1	15
RUPA	Thimbleberry	*Rubus parviflorus*	80	19	5	30
SYAL	Common snowberry	*Symphoricarpos albus*	100	20	5	55
Forbs:						
CIAL	Enchanter's nightshade	*Circaea alpina*	100	6	1	15
GALIU	Bedstraw	*Galium*	60	2	1	3
GEMA4	Largeleaf avens	*Geum macrophyllum*	40	2	1	3
HELA4	Common cowparsnip	*Heracleum lanatum*	80	4	3	5
MIST3	Smallflower miterwort	*Mitella stauropetala*	40	1	1	1
MOCO4	Heartleaf minerslettuce	*Montia cordifolia*	80	7	2	10
OSCH	Mountain sweetcicely	*Osmorhiza chilensis*	60	1	1	1
OSOC	Western sweetcicely	*Osmorhiza occidentalis*	60	2	1	3
RUOC2	Western coneflower	*Rudbeckia occidentalis*	40	1	1	1
SMRA	Feathery false Solomon's seal	*Smilacina racemosa*	40	1	1	1
SMST	Starry false Solomon's seal	*Smilacina stellata*	80	4	1	5
URDI	Stinging nettle	*Urtica dioica*	60	2	1	5
VIGL	Pioneer violet	*Viola glabella*	60	3	1	5
Grasses:						
DAGL	Orchardgrass	*Dactylis glomerata*	40	2	1	3
ELGL	Blue wildrye	*Elymus glaucus*	80	8	3	20
FESU	Bearded fescue	*Festuca subulata*	40	6	1	10
POPR	Kentucky bluegrass	*Poa pratensis*	60	2	1	3
Sedges and other grasslikes:						
CADE9	Dewey sedge	*Carex deweyana*	100	10	2	20
CAGE2	Elk sedge	*Carex geyeri*	40	2	1	2
Ferns and horsetails:						
ATFI	Ladyfern	*Athyrium filix-femina*	60	4	1	5
EQHY	Scouringrush horsetail	*Equisetum hyemale*	60	2	1	3

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Management considerations—

The red alder/common snowberry/Dewey sedge plant community type is characterized by annual flood events and a relatively young age distribution (average: 25 to 30 yrs, average 21.6 cm d.b.h.). Red alder, a nitrogen-fixing species, is one of the first species to colonize gravel and cobble bars following catastrophic flood events and represents an important early-seral riparian plant species in the Umatilla National Forest. Strong roots and stems guard against the erosive power of floods and facilitate initial soil accumulation and development. Black bears commonly use red alder as scratch trees and may even climb the smooth bark to take refuge in the branches above. Various amphibians and reptiles, including tree frogs and western garter snakes, are common inhabitants. This community type provides shade for the stream and structure for fish habitat. Possible successional trajectories: PSME/ACGL-PHMA5-SYAL, ABGR/ACGL, and PIPO/SYAL.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: forested wetland
Subclass: broad-leaved deciduous
Water regime: (nontidal) seasonally flooded to saturated.

Adjacent riparian/wetland classifications—

Crowe and Clausnitzer (1997) described a red alder/common snowberry plant community type and noted that Dewey sedge is one of a few important herbaceous species present. Diaz and Mellon (1996) described a number of red alder types for northwestern Oregon but none that match the shrub and herbaceous component described above.

Floristically similar types include black cottonwood/common snowberry (p. 66); red alder/red-osier dogwood (Crowe and Clausnitzer 1997).

White Alder/Mesic Shrub Plant Community Type

Alnus rhombifolia/mesic shrub

SW2102 ALRH2/MESIC SHRUB N = 26

Aaron Wells

Landform environment (n = 26)		Mean	Range
Elevation (m)		599	396–790
Plot slope (percent)		7	1–50
Aspect	All		

Valley environment (n = 26)		Mode	Range
Valley gradient (percent)		4–5	1–>8
Valley width (m)		30–100	30–300
Valley aspect	Mostly northerly		

Soil surface cover (n = 26)	Mean	Range
Submerged (percent)	2	0–15
Bare ground	3	0–20
Gravel	6	0–45
Rock	20	0–60
Bedrock	0	
Litter	55	7–88
Moss	10	0–5

Soil profile characteristics (n = 26)		Mean	Range
Parent material	Basalt, granite, alluvium		
Great group(s)	Endoaquents, Endoaquepts, Fluvaquents, Udifluvents, Udorthents		
		Mean	Range
Water table depth (cm)			30–>86
Rock fragments (percent)		64	0–100
Available water capacity of pit (cm/m)		5	1–20
pH (n = 13)		6.46	5.51–7.16
Depth to redoximorphic features (cm)			9–90
Occurrence of redoximorphic features (percentage of soils)		15	
Surface organic layer (cm)			0–19
Surface layers			
Thickness (cm)			6–90
Texture(s)[a]	SIL, L, SL, LS, cobble, boulders		
Redoximorphic features	Iron oxide concentrations		
Subsurface layers			
Thickness (cm)			7–>48
Texture(s)[a]	CL, SICL, SIL, L, SL, LS, S, cobble, boulders		
Redoximorphic features	Depletions, iron oxide concentrations		

[a] See “Soil Texture Codes” section.

Physical environment—

The white alder/mesic shrub plant community type occurred on low-elevation (396 to 790 m) moderate-gradient (3 percent) floodplains, cobble bars, terraces, and steep-gradient (20 percent) streambanks almost exclusively in Hells Canyon. Valley shapes were mostly trough- and V-shaped. Valley gradient was typically moderate (4 to 5 percent) to very high (>8 percent). Soil development was generally low with most soils falling within the Entisol order of soil taxonomy. Soils were typically excessively drained, shallow (<50 cm), very to extremely cobbly/bouldery, loamy sands to loams. Depth to water table was generally shallow (<50 cm), but occasionally deeper. Redoximorphic features were sometimes present in moderately well-drained soils related to later seral stages of this community type.

Vegetation composition—

White alder always occurs in the overstory and is sometimes joined by black cottonwood, Douglas-fir, or ponderosa pine. The diverse shrub layer might include Lewis' mock orange, Rocky Mountain maple, black hawthorn, and poison ivy. Red-osier dogwood is often present in early seral stages of this community type decreasing in abundance and sometimes dissappearing altogether through time. Barton's raspberry, an endemic raspberry found in only a few drainages in Hells Canyon, was found in the shrub layer in one such drainage.

The mesic herbaceous layer is characteristically sparse but may include mountain sweetcicely, Canadian white violet, common cowparsnip, enchanter's nightshade, Fendler's waterleaf, blue wildrye, Dewey sedge, and horsetails (*Equisetum* spp.).

Adjacent riparian/wetland vegetation types:
Floodplains and terraces: PIPO/SYAL–FLOODPLAIN, ABGR/ACGL–FLOODPLAIN, CERE2, PSME/ACGL-PHMA5–FLOODPLAIN.

Adjacent upland vegetation types:
Sideslopes: PSME/ACGL-PHMA5, PIPO/FEID, RHGL talus slopes, and various AGSP types.

Principal species			CON	COV	MIN	MAX
			Percent			
Primary overstory trees:						
ALRH2	White alder	*Alnus rhombifolia*	92	64	10	100
Subordinate overstory trees:						
ALRH2	White alder	*Alnus rhombifolia*	61	26	1	75
Shrubs:						
COST4	Red-osier dogwood	*Cornus stolonifera*	53	20	3	90
CRDO2	Black hawthorn	*Crataegus douglasii*	50	9	1	25
PHLE4	Lewis' mock orange	*Philadelphus lewisii*	96	29	4	70
RHPU	Alder-leaved buckthorn	*Rhamnus purshiana*	50	7	1	25
Forbs:						
ANSC8	Chervil	*Anthriscus scandicina*	57	17	1	70
GAAP2	Cleavers	*Galium aparine*	76	16	1	80
MOPE3	Perfoliated minerslettuce	*Montia perfoliata*	76	9	1	40
SODU	Climbing nightshade	*Solanum dulcamara*	46	2	1	5
STME2	Common chickweed	*Stellaria media*	50	3	1	10
URDI	Stinging nettle	*Urtica dioica*	69	5	1	20
Grasses:						
ELGL	Blue wildrye	*Elymus glaucus*	57	5	1	15
Sedges and other grasslikes:						
CADE9	Dewey sedge	*Carex deweyana*	61	6	1	45
Ferns and horsetails:						
EQHY	Scouringrush horsetail	*Equisetum hyemale*	46	8	1	60

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Stand characteristics—

Species	Basal area		Diameter at breast height (d.b.h.)		
	Average	Range	Average	Minimum	Maximum
	- - - m^2/ha - - -		- - - - - - - Centimeters - - - - - - -		
ALRH2	23	7–55	30.0	12.7	126.2
PIPO	3	2–5	57.7	24.9	86.4
POTR15	6	2–14	49.5	10.2	99.1
PSME	9	—	54.6	47.8	60.2

Species	Site tree averages		
	d.b.h.	Age	Height
	Centimeters	*Years*	*Meters*
ALRU2	32.5	33	15
PIPO	61.0	112	33
POTR15	41.9	61	18

Management considerations—

White alder fills the same ecological niche in Hells Canyon as red alder fills in riparian zones of the Umatilla National Forest. White alder is one of the first species to take hold on rocky bars and floodplains stabilizing the substrate and lending to the formation of woody debris dams on these annually flooded landforms.

Black bears use alder trees as scratching posts and often climb the trees taking refuge high above. Songbirds, including flycatchers, canyon wrens, cedar waxwings, and chickadees feed on the variety of fruits found in the shrub layer. Grouse are sometimes found roosting here, and rattlesnakes can be quite common…watch out! This association provides shade for the stream and woody debris to slow the torrential springtime floods typical of these steep drainages.

Wild and domestic ungulate use is generally low to moderate depending on the density of animals and the time of year. Poison ivy, cleavers, perfoliated minerslettuce, chervil, cheatgrass, and Kentucky bluegrass are disturbance-related species and may receive a competitive advantage when grazing pressure is unsuitably high. Possible succession relationships: PSME/ACGL-PHMA5-SYAL, ABGR/ACGL, and PIPO/SYAL.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: forested wetland
Subclass: broad-leaved deciduous
Water regime: (nontidal) seasonally flooded to saturated.

Adjacent riparian/wetland classifications—

Crawford (2003) described three white alder types for the Columbia River basin: white alder/water birch, white alder/Lewis' mock orange, white alder/netleaf hackberry. Jankovsky-Jones et al. (2001) described a white alder/Lewis' mock orange type for southwestern Idaho. Miller (1976) provided an extensive classification of white alder types for the Snake River through Hells Canyon and the adjacent Salmon River of western Idaho including white alder community type, white alder/smooth sumac, white alder/netleaf hackberry, white alder/water birch, white alder/Lewis' mock orange, white alder/Woods' rose, white alder/common elderberry, white alder/Western serviceberry, white alder/chokecherry, and white alder/grand fir.

Floristically similar types include black cottonwood/common snowberry (p. 66).

White Alder/Blackberry Plant Community Type

Alnus rhombifolia/Rubus spp.

SW2101 ALRH2/RUBUS N = 3

Aaron Wells

Landform environment (n = 3)		Mean	Range
Elevation (m)		565	396–787
Plot slope (percent)		2	0–3
Aspect	Mostly southerly		

Valley environment (n = 3)		Mode	Range
Valley gradient (percent)			1–3
Valley width (m)		30–100	10–100
Valley aspect	Mostly northerly		

Soil surface cover (n = 3)	Mean	Range
Submerged (percent)	3	0–10
Bare ground	7	0–15
Gravel	2	0–5
Rock	7	0–15
Bedrock	0	
Litter	73	60–90
Moss	8	5–10

Soil profile characteristics (n = 3)			
Parent material	Basalt, alluvium		
Great group(s)	Fluvaquents, Udipsamments		
		Mean	**Range**
Water table depth (cm)			>41–107
Rock fragments (percent)		30	5–60
Available water capacity of pit (cm/m)		9	8–11
pH (n = 3)		6.06	5.60–6.64
Depth to redoximorphic features (cm)		NA	
Occurrence of redoximorphic features (percentage of soils)		0	
Surface organic layer (cm)			0–9
Surface layers			
Thickness (cm)			3–25
Texture(s)[a]	LS, S, SL		
Redoximorphic features	None		
Subsurface layers			
Thickness (cm)			27–76
Texture(s)[a]	L, LS, S, SL		
Redoximorphic features	None		

[a] See “Soil Texture Codes” section.

Physical environment—

The white alder/blackberry plant community type occurred on low-elevation (396 to 787 m) floodplains and terraces in Hells Canyon. Sample sites were located in low-gradient (1 to 3 percent), V- and trough-shaped valleys. Soils were typically well-drained loamy sands to sandy loams over rocky alluvium. Depth to water table ranged from 41 to 107 cm.

Vegetation composition—

White alder forms a dense overstory tree layer sometimes accompanied by black cottonwood. White alder seedlings may be present in the understory but are typically lacking owing to shading by the thick bramble layer. Blackberry species, including Himalayan and cutleaf blackberry, monopolize the shrub layer. Various other shrub species are found scattered throughout including Lewis’ mock orange, western serviceberry, Rocky Mountain maple, alder-leaved buckthorn, blue elderberry, black hawthorn, prickly currant, chokecherry, and red raspberry.

Herbaceous species include cleavers, chervil, perfoliated minerslettuce, lesser burdock, climbing nightshade, ripgut brome, western coneflower, blue wildrye, mountain sweetcicely, enchanter’s nightshade, and horsetails (*Equisetum* spp.).

Principal species			CON	COV	MIN	MAX
				Percent		
Primary overstory trees:						
ALRH2	White alder	*Alnus rhombifolia*	100	68	50	95
Shrubs:						
AMAL2	Western serviceberry	*Amelanchier alnifolia*	66	6	1	10
PHLE4	Lewis' mock orange	*Philadelphus lewisii*	100	4	3	5
RHPU	Alder-leaved buckthorn	*Rhamnus purshiana*	66	3	1	5
RHRA6	Poison ivy	*Rhus radicans*	66	8	5	10
RUDI2	Himalayan blackberry	*Rubus discolor*	66	72	50	95
RUID	American red raspberry	*Rubus idaeus*	66	1	1	1
RULA	Cutleaf blackberry	*Rubus laciniatus*	33	70	70	70
Forbs:						
ANSC8	Chervil	*Anthriscus scandicina*	66	18	15	20
ARMI2	Lesser burdock	*Arctium minus*	66	18	15	20
GAAP2	Cleavers	*Galium aparine*	66	18	15	20
MOPE3	Perfoliated minerslettuce	*Montia perfoliata*	66	9	3	15
OSCH	Mountain sweetcicely	*Osmorhiza chilensis*	66	5	5	5
SODU	Climbing nightshade	*Solanum dulcamara*	66	10	5	15
Grasses:						
BRRI8	Ripgut brome	*Bromus rigidus*	66	10	5	15
ELGL	Blue wildrye	*Elymus glaucus*	100	6	3	10

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Stand characteristics—

	Basal area		Diameter at breast height (d.b.h.)		
Species	Average	Range	Average	Minimum	Maximum
	- - - m^2/ha - - -		- - - - - - - Centimeters - - - - - - -		
ALRH2	26	5-41	31.8	15.5	62.0
POTR15	9	—	35.6	34.0	37.3

	Site tree averages		
Species	d.b.h.	Age	Height
	Centimeters	*Years*	*Meters*
ALRU2	39.4	NA	7

Management considerations—

These sites were located in drainages of Hells Canyon with history of homesteading and ranching. Two plots were on current cattle allotments. The blackberry species are nonnative and most likely were introduced by homesteaders. The prevalence of weedy species in the herbaceous layer also speaks of human influence. Blackberries are a highly preferred food item for black bears and many bird species. Backpackers and wranglers who chance upon this association in the late summer/early fall might also enjoy foraging (but don't forget your chaps, OUCH!). Dense thicket-forming blackberry stems and strong alder roots help maintain streambanks and provide shade and woody debris to the stream channel. Invasion of a site by nonnative blackberries would typically follow a large flood or forest fire. In the absence of these introductions, these sites would resemble the ALRH2/SHRUB plant community in floristic composition. Once blackberry colonies take root, they are particularly difficult to remove, as they are seral species and will regenerate strongly following disturbance.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: forested wetland
Subclass: broad-leaved deciduous
Water regime: (nontidal) seasonally flooded to saturated.

Adjacent riparian/wetland classifications—

The white alder/blackberry plant community type has not previously been described. Miller (1976), when describing his white alder/smooth sumac and white alder/Lewis' mock orange types, noted that colonies of Himalayan blackberry are sometimes found in the understory of these two types. Similarly, Crawford (2003) noted similar occurrence of Himalayan blackberry in his white alder/Lewis' mock orange type.

Arctic Willow Plant Association

Salix arctica

SW1133 SAAR27 N = 3

Aaron Wells

Landform environment (n = 3)		Mean	Range
Elevation (m)		2384	2357–2439
Plot slope (percent)		1	.5–1
Aspect	Mostly northerly		

Valley environment (n = 3)		Mode	Range
Valley gradient (percent)		<1	<1–3
Valley width (m)		30–100	NA
Valley aspect	Mostly northerly		

Soil surface cover (n = 3)	Mean	Range
Submerged (percent)	0	
Bare ground	4	0–10
Gravel	0	
Rock	0	
Bedrock	0	
Litter	12	0–30
Moss	80	60–99

Soil profile characteristics (n = 3)			
Parent material	Mazama ash, limestone, mudstone, peat		
Great group(s)	Cryaquands, Cryosaprists, Haplocryands		
		Mean	**Range**
Water table depth (cm)			20–35
Rock fragments (percent)		0	
Available water capacity of pit (cm/m)		24	12–46
pH (n = 3)		6.97	6.70–7.23
Depth to redoximorphic features (cm)			17–20
Occurrence of redoximorphic features (percentage of soils)		66	
Surface organic layer (cm)			1–10
Surface layers			
Thickness (cm)			6–28
Texture(s)[a]	LS, SL, sapric		
Redoximorphic features	Depletions		
Subsurface layers			
Thickness (cm)			9–>68
Texture(s)[a]	LS, SL, S		
Redoximorphic features	Depletions, iron oxide concentrations		

[a] See "Soil Texture Codes" section.

Physical environment—

The arctic willow plant association was found on high-elevation (2357 to 2439 m) floodplains and terraces in the Eagle Cap Wilderness. Sample plots were located in low-gradient (<3 percent), U-shaped, glacial cirques. Soils were somewhat poorly drained organic-rich sands to sandy loams over sands to loamy sands. A thin (1 to 10 cm) organic veneer resides over the mineral soil layers. Depth to water table ranged from the surface to 35 cm, and redoximorphic features were common throughout. The average pH of the soils was 6.9, most likely a factor of the calcareous geology, including limestones and mudstones, of the cirque basins associated with this type.

Vegetation composition—

Arctic willow forms a thick carpet of shrubs growing less than 5 cm tall. Booth's willow always occurs in a dwarf form at low abundance. The herbaceous layer features a thick sedge compenent with scattered forbs.

Common herbaceous species include Holm's Rocky Mountain sedge, few-flowered spikerush, nearlyblack sedge, elephanthead lousewort, alpine meadow butterweed, Canby's licorice-root, yellow Wallowa Indian paintbrush, tundra aster, and alpine milkvetch.

Adjacent riparian/wetland vegetation types:
- Floodplains and terrace: CAAQ.
- Meadows: mixed subalpine forb.
- Lake edge: SAFA/CAAQ.

Adjacent upland type:
- Ridges: PIAL-JUOC.

Principal species			CON	COV	MIN	MAX
				Percent		
Shrubs:						
SAAR27	Arctic willow	*Salix arctica*	100	67	30	95
SABO2	Booth's willow	*Salix boothii*	100	14	1	35
SAFA	Farr's willow	*Salix farriae*	33	3	3	3
Forbs:						
ANEMO	Anemone	*Anemone*	33	5	5	5
ASAL2	Tundra aster	*Aster alpigenus*	33	1	1	1
ASAL7	Alpine milkvetch	*Astragalus alpinus*	33	1	1	1
CACH16	Yellow Wallowa Indian paintbrush	*Castilleja chrysantha*	33	3	3	3
DOAL	Alpine shootingstar	*Dodecatheon alpinum*	33	1	1	1
LICA2	Canby's licorice-root	*Ligusticum canbyi*	33	5	5	5
PAFI3	Fringed grass of Parnassus	*Parnassia fimbriata*	33	1	1	1
PEGR2	Elephanthead lousewort	*Pedicularis groenlandica*	100	6	1	10
SECY	Alpine meadow butterweed	*Senecio cymbalarioides*	33	1	1	1
ZIEL2	Mountain deathcamas	*Zigadenus elegans*	33	1	1	1
Grasses:						
DECE	Tufted hairgrass	*Deschampsia cespitosa*	33	1	1	1
Sedges and other grasslikes:						
CAPR4	Early sedge	*Carex praeceptorium*	33	1	1	1
CASC12	Holm's Rocky Mountain sedge	*Carex scopulorum*	66	18	5	30
CASU7	Nearlyblack sedge	*Carex subnigricans*	66	26	1	50
ELPA6	Few-flowered spikerush	*Eleocharis pauciflora*	66	46	3	90
Ferns and horsetails:						
EQVA	Variegated scouringrush	*Equisetum variegatum*	33	50	50	50

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Management considerations—

Total forage biomass ranged from 224 to 1195 (avg. 710) kg/ha. Wild ungulate use is typically moderate to high at these sites; the low-growing willow species represent highly nutritional browse in these isolated cirque basins. **Overuse by wild ungulates, horses, and humans can lead to trampling of the wet, cryic soils and damage to the willow mat. Therefore, these sites are particularly vulnerable to horse pasturing and perennial human trails.**

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: scrub-shrub wetland
Subclass: broad-leaved deciduous
Water regime: (nontidal) seasonally flooded to saturated.

Adjacent riparian/wetland classifications—

Arctic willow types have been classified for Alaska (Viereck et al. 1992) but not for the contiguous United States.

Booth's Willow/Holm's Rocky Mountain Sedge Plant Association

Salix boothii/Carex scopulorum

SW1138 SABO2/CASC12 N = 10


Aaron Wells

Landform environment (n = 10)		Mean	Range
Elevation (m)		2242	2152–2375
Plot slope (percent)		1	0–4
Aspect	Mostly northerly		

Valley environment (n = 9)		Mode	Range
Valley gradient (percent)		<1	<1–3
Valley width (m)		100–300	10–300
Valley aspect	Mostly northerly		

Soil surface cover (n = 8)	Mean	Range
Submerged (percent)	7	0–25
Bare ground	7	0–30
Gravel	0	
Rock	0	
Bedrock	0	
Litter	38	3–70
Moss	50	15–91

Soil profile characteristics (n = 9)		Mean	Range
Parent material	Quartz diorite, sedge peat, alluvium		
Great group(s)	Cryaquepts, Cryofluvents, Cryohemists, Cryosaprists, Epiaquents		
Water table depth (cm)			0–48
Rock fragments (percent)		2	0–17
Available water capacity of pit (cm/m)		20	9–50
pH (n = 6)		5.81	5.20–6.47
Depth to redoximorphic features (cm)			9–12
Occurrence of redoximorphic features (percentage of soils)		30	
Surface organic layer (cm)			0–>14
Surface layers			
Thickness (cm)			10–>43
Texture(s)[a]	L, SC, SIL, SL, fibric, hemic		
Redoximorphic features	Iron oxide concentrations		
Subsurface layers			
Thickness (cm)			4–>80
Texture(s)[a]	L, LS, SI, SCL, SICL, SIL, SL, fibric, sapric		
Redoximorphic features	Depletions, iron oxide concentrations		

[a] See "Soil Texture Codes" section.

Physical environment—

The Booth's willow/Holm's Rocky Mountain sedge plant association occurred on low-gradient floodplains, streambanks, and moist/wet meadows above 2100 m elevation (2152 to 2375 m) throughout the Eagle Cap Wilderness and Seven Devils Mountains. Valleys were very low (<1 percent) to low (1 to 3 percent) gradient and U- or trough-shaped. Soils were very poorly to poorly drained, and moist/wet year round. The water table ranged from the surface to 48 cm, and redoximorphic features were common. Soil profiles ranged from organic horizons in various stages of decomposition to organic loams to silty-clay loams above sand or rocky alluvium.

Vegetation composition—

Booth's willow forms a thick overstory above a dense herbaceous layer of Holm's Rocky Mountain sedge. Scattered forbs and graminoids occur throughout the understory including, among others, high mountain cinquefoil, alpine meadow butterweed, explorer's gentian, subalpine fleabane, licorice-root, tufted hairgrass, and violets. Few-flowered spikerush occurs at sites with highly organic soils on the wetter end of the SABO2/CASC12 environmental tolerance gradient.

Adjacent riparian/wetland vegetation types:
- Meadows: CAUT, SALIX/MESIC FORB, CALE9, CASC12, VERAT, CACA4, PHEM MOUNDS.
- Lake edges: CAVE6.

Adjacent upland vegetation type:
- Sideslopes: ABLA/VASC.

Principal species			CON	COV	MIN	MAX
				Percent		
Shrubs:						
SABO2	Booth's willow	*Salix boothii*	100	70	30	90
Forbs:						
GECA	Explorer's gentian	*Gentiana calycosa*	40	5	1	15
LITE2	Idaho licorice-root	*Ligusticum tenuifolium*	40	2	1	5
POFL3	High mountain cinquefoil	*Potentilla flabellifolia*	60	11	1	20
SECY	Alpine meadow butterweed	*Senecio cymbalarioides*	40	16	1	30
Sedges and other grasslikes:						
CASC12	Holm's Rocky Mountain sedge	*Carex scopulorum*	100	62	35	85
ELPA6	Few-flowered spikerush	*Eleocharis pauciflora*	40	26	5	50

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Management considerations—

Booth's willow is an important colonizer of streambanks and floodplains, providing initial soil stabilization. The strong roots and stems of Booth's willow slow floodwaters, trap sediments, and increase streambank and alluvial bar stability, thus enhancing fish habitat and the overall quality of the stream. Booth's willow can propogate from broken stems, produce roots at leaf nodes of buried stems, and regenerate from seed.

Forage biomass values ranged widely, 179 to 1605 (avg. 1054) kg/ha. Elk and deer browse on Booth's willow at low to moderate intensity. **Owing to the wet nature of the soils, these sites are not ideal for horse pasturing. Wranglers should look to slightly drier, more resilient meadows such as CACA4, CASC12, and SALIX/FORB adjacent to the SABO2/CASC12 association for pasturing opportunities.** Possible successional trajectories: SALIX/CACA4, SALIX/FORB, ABLA/VASC.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: scrub-shrub wetland
Subclass: broad-leaved deciduous
Water regime: (nontidal) seasonally flooded to saturated.

Adjacent riparian/wetland classifications—

The Booth's willow/Holm's Rocky Mountain sedge plant association has not previously been described. Kovalchik and Clausnitzer (2004) described a willow/Holm's Rocky Mountain sedge type that sometimes features Booth's willow co-occurring with Drummond's willow.

Floristically similar types include undergreen willow/Holm's Rocky Mountain sedge (p. 80), willow/mesic forb (p. 82).

Undergreen Willow/Holm's Rocky Mountain Sedge Plant Association

Salix commutata/Carex scopulorum

SW1121 SACO2/CASC12 N = 5

E. Crowe

E. Crowe

Landform environment (n = 5)		Mean	Range
Elevation (m)		2087	1945–2253
Plot slope (percent)		3	1–8
Aspect	All		

Valley environment (n = 4)		Mode	Range
Valley gradient (percent)		1–3	1–5, >8
Valley width (m)		30–100	10–300
Valley aspect	Mostly northerly		

Soil surface cover (n = 5)	Mean	Range
Submerged (percent)	7	2–20
Bare ground	24	1–80
Gravel	0	
Rock	3	0–10
Bedrock	0	
Litter	27	2–51
Moss	38	10–60

Soil profile characteristics (n = 4)			
Parent material	Quartz diorite, sedge peat, alluvium		
Great group(s)	Cryaquepts, Cryofluvents		
		Mean	**Range**
Water table depth (cm)			0–55
Rock fragments (percent)		0	
Available water capacity of pit (cm/m)		9	6–12
pH (n = 1)		5.4	
Depth to redoximorphic features (cm)			8–55
Occurrence of redoximorphic features (percentage of soils)		75	
Surface organic layer (cm)			5–>50
Surface layers			
Thickness (cm)			14–32
Texture(s)[a]	LS, S, SIL, SL, hemic		
Redoximorphic features	Iron oxide concentrations		
Subsurface layers			
Thickness (cm)			25–>66
Texture(s)[a]	S, SL, fibric		
Redoximorphic features	Depletions, iron oxide concentrations		

[a] See "Soil Texture Codes" section.

Physical environment—

The undergreen willow/Holm's Rocky Mountain sedge plant association occurred on floodplains, swales, and wet meadows between 1945 and 2253 m elevation. Crowe and Clausnitzer (1997) described this association within the same range of elevation and higher (1970 to 2348 m) on seepy slopes and wet meadows. Sample sites were found in U-shaped valleys of low (1 to 3 percent) to very high (>8 percent) gradient. Soils were poorly drained. Soils were moist/wet throughout the growing season with water being supplied from the stream water table (surface to 55 cm) and, oftentimes, lateral flow from adjacent wet meadows or seeps. Typically an organic horizon caps organic-rich sands to silt loams with redoximorphic features common throughout the soil profile (8 to 55 cm).

Vegetation composition—

Undergreen willow forms a dense shrub layer often overhanging the streambanks. Chance occurrences of Labrador tea and other willow species such as Sitka willow are possible. Subalpine fir seedlings are sometimes found in the understory.

Holm's Rocky Mountain sedge forms a dense herbaceous layer with scattered forbs and graminoids throughout. High mountain cinquefoil and alpine meadow butterweed are nearly always found in the herbaceous layer at low abundance. The occurrence of this type in wet meadows is often typified by the presence of few-flowered spikerush in the herbaceous layer.

Principal species			CON	COV	MIN	MAX
				Percent		
Understory trees:						
ABLA	Subalpine fir	*Abies lasiocarpa*	40	2	1	3
Shrubs:						
SACO2	Undergreen willow	*Salix commutata*	100	61	20	90
Forbs						
ACCO4	Columbian monkshood	*Aconitum columbianum*	40	2	2	2
ANAR3	Lyall's angelica	*Angelica arguta*	40	4	3	5
ARCH3	Chamisso arnica	*Arnica chamissonis*	40	1	1	1
ARMO4	Hairy arnica	*Arnica mollis*	40	6	1	10
ERPE3	Subalpine fleabane	*Erigeron peregrinus*	40	2	1	2
HASA	Slender bog orchid	*Habenaria saccata*	40	1	1	1
HYAN2	Tinker's penny	*Hypericum anagalloides*	40	8	1	15
HYFON	Norton's St. Johnswort	*Hypericum formosum* var. *nortoniae*	40	1	1	1
LUPO2	Bigleaf lupine	*Lupinus polyphyllus*	40	2	2	3
MILE2	Purple monkeyflower	*Mimulus lewisii*	40	1	1	1
MIMO3	Muskflower	*Mimulus moschatus*	40	1	1	1
MIPE	Fivestamen miterwort	*Mitella pentandra*	40	2	1	2
PAFI3	Fringed grass of Parnassus	*Parnassia fimbriata*	40	1	1	1
PEGR2	Elephanthead lousewort	*Pedicularis groenlandica*	40	1	1	1
POFL3	High mountain cinquefoil	*Potentilla flabellifolia*	100	3	1	5
SECY	Alpine meadow butterweed	*Senecio cymbalarioides*	80	4	1	10
VIOLA	Violet	*Viola*	60	3	1	5
Grasses:						
CACA4	Bluejoint reedgrass	*Calamagrostis canadensis*	40	16	3	30
Sedges and other grasslikes:						
CAMI7	Smallwing sedge	*Carex microptera*	40	1	1	1
CASC12	Holm's Rocky Mountain sedge	*Carex scopulorum*	100	56	30	85
JUDR	Drummond's rush	*Juncus drummondii*	40	1	1	1
JUEN	Swordleaf rush	*Juncus ensifolius*	40	1	1	1
LUCA2	Field woodrush	*Luzula campestris*	20	1	1	1
Ferns and horsetails:						
EQAR	Common horsetail	*Equisetum arvense*	60	2	1	5

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Adjacent riparian/wetland vegetation types:
Meadows: CACA4, CASC12, ELPA6, ALVA-CASC12, CANI2, LEGL/CASC12, ABLA-PIEN/LEGL;
Streambanks: ALSI3.

Adjacent upland vegetation type:
Sideslopes: ABLA/VASC.

Management considerations—

Undergreen willow is an important colonizer of streambanks and floodplains, providing initial soil stabilization. The strong roots and stems of undergreen willow slow floodwaters, trap sediments, and increase streambank and alluvial bar stability, thus enhancing fish habitat and the overall quality of the stream. Undergreen willow can propogate from broken stems, produce roots at leaf nodes of buried stems, and regenerate from seed.

Forage biomass ranged from 672 to 1717 (avg. 1045) kg/ha. Elk and deer browse on undergreen willow at low to moderate intensity. The presence of scattered forbs may be an aftereffect of past sheep grazing at these sites, when native forbs were allowed a brief competitive advantage over rhizomatous sedges owing to distubance of the sod layer. Presently, because of wilderness designations and rest from grazing, these fingerprints of historical land use are nearly smudged out. Given the wet nature of the soils, these sites are not ideal for horse pasturing. Wranglers should look to slightly drier more resilient meadows such as CACA4, CASC12, and SALIX/FORB adjacent to the SACO2/CASC12 association for pasturing opportunities. Possible successional trajectories: SALIX/CACA4, SALIX/FORB, PIEN-ABLA/LEGL, ABLA/VASC.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: scrub-shrub wetland
Subclass: broad-leaved deciduous
Water regime: (nontidal) seasonally flooded to saturated.

Adjacent riparian/wetland classifications—

Undergreen willow/Holm's Rocky Mountain sedge types have been described for midmontane regions of the Blue Mountains in Oregon (Crowe and Clausnitzer 1997). Floristically similar types include Booth's willow/Holm's Rocky Mountain sedge (p. 78), willow/mesic forb (p. 82); undergreen willow/Holm's sedge (*Carex scopulorum* var. *bracteosa*)–showy sedge (Kovalchik and Clausnitzer 2004).

Willow/Mesic Forb Plant Community Type

Salix/mesic forb

SW1125 SALIX/MESIC FORB N = 10

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Landform environment (n = 10)		Mean	Range
Elevation (m)		2215	2073–2518
Plot slope (percent)		4	<1–15
Aspect	All		

Valley environment (n = 10)		Mode	Range
Valley gradient (percent)		1–3	<1–>8
Valley width (m)		100–300	10–300
Valley aspect	Mostly northerly		

Soil surface cover (n = 8)	Mean	Range
Submerged (percent)	5	0–30
Bare ground	17	0–80
Gravel	2	0–8
Rock	4	0–25
Bedrock	0	
Litter	38	10–85
Moss	26	5–60

Soil profile characteristics (n = 10)			
Parent material	Mazama ash, quartz diorite, granite, alluvium		
Great group(s)	Cryaquands, Cryaquepts, Cryofluvents, Cryorthents, Dystrocryepts, Haplocryalfs		
		Mean	**Range**
Water table depth (cm)			0–92
Rock fragments (percent)		27	0–100
Available water capacity of pit (cm/m)		10	1–16
pH (n = 5)		5.86	4.79–6.86
Depth to redoximorphic features (cm)			2–25
Occurrence of redoximorphic features (percentage of soils)		60	
Surface organic layer (cm)			0–10
Surface layers			
Thickness (cm)			7–40
Texture(s)[a]	L, LS, SIL, SL, boulders		
Redoximorphic features	Depletions, iron oxide concentrations		
Subsurface layers			
Thickness (cm)			9–>170
Texture(s)[a]	C, CL, LS, S, SIC, SIL, SL		
Redoximorphic features	Depletions, iron oxide concentrations		

[a] See “Soil Texture Codes” section.

Physical environment—

The willow/mesic forb plant community type occurred on moderately steep (<1 to 15, avg. 4 percent) floodplains, streambanks, and moist/wet meadows from 2073 to 2518 m elevation. Sample sites occurred in very low (<1 percent) to very high gradient (>8 percent) U- and trough-shaped valleys. Soils were somewhat poorly drained to moderately well drained, moderately deep (26 to 58 cm) to very deep (>170 cm), and moist year round. Spring flooding was common, but soil surface horizons dry out late in the season. Soil profiles were characterized by a thin (<10 cm) organic layer over sandy loam to silt loam surface horizons, followed by sandy loam to clay subsurface horizons. Depth to water table ranged from the surface to 92 cm. Redoximorphic features were common throughout.

Vegetation composition—

The willow/mesic forb plant community type is associated with any of the following willow species: Booth’s willow, undergreen willow, or Drummond’s willow. Grouse huckleberry and various conifer seedlings can sometimes be found in the understory.

A rich herbaceous layer, characterized by forbs, includes high mountain cinquefoil, Pacific onion, shootingstar, explorer’s gentian, Norton’s St. Johnswort, licorice-root, elephanthead lousewort, and alpine meadow butterweed at colder/moister sites. Alpine leafybract aster, Columbian monkshood, tall fringed bluebells, arrowleaf groundsel, and heartleaf minerslettuce abound at warmer/drier sites.

Principal species			CON	COV	MIN	MAX
			Percent			
Shrubs:						
SABO2	Booth's willow	*Salix boothii*	50	65	22	95
SACO2	Undergreen willow	*Salix commutata*	40	44	10	100
Forbs:						
ALVA	Pacific onion	*Allium validum*	40	12	1	40
ASOC	Western mountain aster	*Aster occidentalis*	40	9	1	20
DOAL	Alpine shootingstar	*Dodecatheon alpinum*	70	5	1	15
GECA	Explorer's gentian	*Gentiana calycosa*	40	18	5	30
HYFON	Norton's St. Johnswort	*Hypericum formosum* var. *nortoniae*	50	6	1	20
LICA2	Canby's licorice-root	*Ligusticum canbyi*	40	9	1	15
LITE2	Idaho licorice-root	*Ligusticum tenuifolium*	40	3	1	10
PEGR2	Elephanthead lousewort	*Pedicularis groenlandica*	80	2	1	5
POFL3	High mountain cinquefoil	*Potentilla flabellifolia*	90	23	1	60
SAAR13	Brook saxifrage	*Saxifraga arguta*	40	2	1	3
SECY	Alpine meadow butterweed	*Senecio cymbalarioides*	70	16	1	40
SETR	Arrowleaf groundsel	*Senecio triangularis*	40	7	1	20
VIOLA	Violet	*Viola*	40	8	1	15
Grasses:						
DECE	Tufted hairgrass	*Deschampsia cespitosa*	60	13	3	30
PHAL2	Alpine timothy	*Phleum alpinum*	50	1	1	3
TRWO3	Wolf's trisetum	*Trisetum wolfii*	40	4	1	10
Sedges and other grasslikes:						
CASC12	Holm's Rocky Mountain sedge	*Carex scopulorum*	80	11	1	30

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Forage biomass values ranged between 821 and 1867 (avg. 1344) kg/ha. Elk and deer use is typically higher at these sites relative to various willow/sedge associations probably as a result of the slightly drier conditions and greater abundance of higher quality forage. The prevalence of forbs is most likely an historical effect of past sheep grazing similar to that described for the SACO2/CASC12 plant association combined with natural succession from wetter willow/sedge types. Possible successional trajectories include ABLA/VASC, SALIX/CACA4, PIEN-ABLA/VACCI.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: scrub-shrub wetland
Subclass: broad-leaved deciduous
Water regime: (nontidal) seasonally to temporarily flooded.

The mostly scattered grass component includes alpine bentgrass, timber oatgrass, prairie Junegrass, alpine timothy, and Wolf's trisetum. Bluejoint reedgrass and tufted hairgrass may occur at higher than average cover in moist microsites.

Holm's Rocky Mountain sedge is often found growing in moist microsites uncharacteristic of the associated landform. Grasslikes typical of the drier end of the environmental spectrum include field woodrush, Jones' sedge, and Mertens' rush.

Adjacent riparian/wetland vegetation types:
Floodplains and meadows: CASC12, ALVA-CASC12, CACA4, and CAAQ.

Adjacent upland vegetation types:
Sideslopes: ABLA/VASC, VASC/VAME.

Management considerations—

Willows are an important colonizer of streambanks, floodplains, and rocky bars, providing initial soil stabilization. The strong roots and stems of willows slow floodwaters, trap sediments, and increase streambank and alluvial bar stability, thus enhancing fish habitat and the overall quality of the stream. Willows can propogate from broken stems, produce roots at leaf nodes of buried stems, and regenerate from seed.

Adjacent riparian/wetland classifications—

Willow/mesic forb types are common throughout riparian zones in the Western United States, the particular species of willow–Booth's, undergreen, Drummonds', which may constitute the willow/mesic forb plant association described here are less wide ranging. Crowe and Clausnitzer (1997) described a willow/mesic forb plant community type, that may feature Booth's or Geyer willow. Padgett et al. (1989) described a *Salix boothii*/mesic forb type for Utah and southeastern Idaho, and Kovalchik and Clausnitzer (2004) described an undergreen willow/mesic forb type for eastern Washington. Youngblood et al. (1985) in their *Riparian Community Type Classification of Eastern Idaho–Western Wyoming*, described a Booth's willow/starry false Solomon's seal type. Lastly, Manning and Padgett (1995) described two willow/forb types for Nevada and eastern California: low *Salix*/mesic forb, which sometimes features undergreen willow, and [tall] *Salix*/mesic forb, which often features Booth's willow.

Other floristically similar types include: *Salix boothii*/*Equisetum arvense* (common horsetail), *Salix boothii*/mesic graminoid (Padgett et al. 1989); *Salix boothii*/*Equisetum arvense* (Youngblood et al. 1985).

Willow/Bluejoint Reedgrass Plant Association

Salix spp./*Calamagrostis canadensis*

SW1124 SALIX/CACA4 N = 4

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Landform environment (n = 4)		Mean	Range
Elevation (m)		2137	2046–2177
Plot slope (percent)		1	1–2
Aspect	Northerly		

Valley environment (n = 4)		Mode	Range
Valley gradient (percent)		1–3	<1–3
Valley width (m)		100–300	10–300
Valley aspect	Northerly		

Soil surface cover (n = 4)	Mean	Range
Submerged (percent)	0	
Bare ground	3	0–5
Gravel	0	
Rock	0	
Bedrock	0	
Litter	76	45–94
Moss	17	3–5

Soil profile characteristics (n = 4)		Mean	Range
Parent material	Mazama ash, quartz diorite, peat		
Great group(s)	Cryaquepts, Cryofluvents		
Water table depth (cm)			5–>100
Rock fragments (percent)		5	0–12
Available water capacity of pit (cm/m)		10	8–11
pH (n = 2)		5.56	5.31–5.80
Depth to redoximorphic features (cm)			5–15
Occurrence of redoximorphic features (percentage of soils)		100	
Surface organic layer (cm)			0–13
Surface layers			
Thickness (cm)			5–>50
Texture(s)[a]	L, LS, SIL, SL		
Redoximorphic features	Iron oxide concentrations		
Subsurface layers			
Thickness (cm)			25–>90
Texture(s)[a]	LS, S, SL		
Redoximorphic features	Depletions, iron oxide concentrations		

[a] See "Soil Texture Codes" section.

Physical environment—

The willow/bluejoint reedgrass plant association occurred at high-elevation (2046 to 2177 m) floodplain and moist meadow sites in the Eagle Cap Wilderness and Seven Devils Mountains. Sample plots occurred in low-gradient (<1 to 3 percent) U- and trough-shaped valleys. Soils were somewhat poorly drained to moderately well drained, moderately deep to deep, loams to silt loams in the surface layer over sands to sandy loams in the subsurface. A thin (2 to 13 cm) organic veneer was sometimes present over the mineral soil horizons. Depth to water table ranged from the surface to greater than 1 m, and redoximorphic features were found in the subsurface layers of all soils sampled.

Vegetation composition—

Willow species, Booth's or undergreen, represent the primary shrub species with chance occurrences of huckleberry or alpine laurel. Bluejoint reedgrass forms a thick sward with scattered subalpine fleabane, Idaho licorice-root, and high mountain cinquefoil. Holm's Rocky Mountain sedge is always present, often growing in wet microsites.

Less frequent members of the herbaceous layer include subalpine fleabane, explorer's gentian, elephanthead lousewort, Payette beardtongue, violets, alpine bentgrass, Wolf's trisetum, and alpine timothy. Bladder sedge, few-flowered spikerush, and tufted hairgrass are species representative of the wetter end of the environmental conditions experienced by this type.

Principal species			CON	COV	MIN	MAX
				Percent		
Shrubs:						
SABO2	Booth's willow	*Salix boothii*	50	72	50	95
SACO2	Undergreen willow	*Salix commutata*	50	75	65	85
Forbs:						
ARCH3	Chamisso arnica	*Arnica chamissonis*	50	1	1	1
ERPE3	Subalpine fleabane	*Erigeron peregrinus*	75	10	1	20
GECA	Explorer's gentian	*Gentiana calycosa*	50	1	1	1
LITE2	Idaho licorice-root	*Ligusticum tenuifolium*	100	5	1	10
PEGR2	Elephanthead lousewort	*Pedicularis groenlandica .*	50	1	1	1
POFL3	High mountain cinquefoil	*Potentilla flabellifolia*	100	12	2	30
VIOLA	Violet	*Viola*	50	2	2	3
Grasses:						
AGHU	Alpine bentgrass	*Agrostis humilis*	50	2	1	3
CACA4	Bluejoint reedgrass	*Calamagrostis canadensis*	100	66	45	90
DECE	Tufted hairgrass	*Deschampsia cespitosa*	75	5	1	10
PHAL2	Alpine timothy	*Phleum alpinum*	75	1	1	1
TRWO3	Wolf's trisetum	*Trisetum wolfii*	50	1	1	1
Sedges and other grasslikes:						
CASC12	Holm's Rocky Mountain sedge	*Carex scopulorum*	100	12	3	30
CAUT	Bladder sedge	*Carex utriculata*	50	6	3	10

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Adjacent riparian/wetland vegetation types:
Floodplains and meadows:
SABO2/CASC12, CAAQ, CASC12, PHEM MOUNDS, CANI2, KAMI/CANI2, ABLA-PIEN/LEGL, SALIX/MESIC FORB, CAUT, PIEN-ABLA/SETR.
Lakes: SPAN2.

Adjacent upland vegetation type:
Sideslopes: ABLA/VASC.

Management considerations—

Forage biomass values ranged from 1008 to 1344 (avg.1548) kg/ha. Bluejoint reedgrass and willows are preferred food items of wild ungulates, although palatability of bluejoint reedgrass varies from moderate to high depending on the season (Hansen et al. 1995). Livestock grazing is typically not an issue at the high elevations where this association is typically found. These sites are not as resilient to grazing pressure as the CACA4/CASC12 association given that the soil surface layers remain wet for longer periods after melt-off and also given the lack of a thick surface layer of sod. Sustained high levels of grazing can result in damage to willow stems and a shift to forbs (SALIX/FORB) in the understory as the competitive advantage of bluejoint reedgrass is thwarted by destruction of the thick sod layer.

These sites provide habitat for small mammals including voles, deer mice, weasels, and snowshoe hares. Bluejoint reedgrass and willows have low fire tolerance, but fires are rare in this moist association. Dense rhizomes and thick willow roots hold soil tenaciously, often leading to undercut streambanks, a favorite hiding place for trout.

This association may follow from SABO2/CASC12 or SACO2/CASC12 given a decrease in soil moisture, and may shift back to these types given an increase in soil moisture. Other possible successional relationships include PIEN-ABLA/CACA4 (not described in this classification effort).

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: scrub-shrub wetland
Subclass: broad-leaved deciduous
Water regime: (nontidal) seasonally flooded to saturated.

Adjacent riparian/wetland classifications—

Willow/bluejoint reedgrass types are common throughout riparian zones in the Western United States, the particular species of willow, Booth's and undergreen, which may constitute the willow/bluejoint reedgrass plant association described here, are less widespread.

Kovalchik and Clausnitzer (2004) described a willow/bluejoint reedgrass type that may feature Booth's, undergreen, and Drummonds' willow. Padgett et al. (1989) and Youngblood et al. (1985) described *Salix boothii*/*Calamagrostis canadensis* types for Utah-southeastern Idaho and eastern Idaho-western Wyoming, respectively.

Other floristically similar types include [Geyer] willow/bluejoint reedgrass (Crowe and Clausnitzer 1997); *Salix geyeriana* (Geyer willow)/*Calamagrostis canadensis*, *Salix planifolia* (planeleaf willow)/*Calamagrostis canadensis* (Padgett et al. 1989).

Coyote Willow Plant Association

Salix exigua

SW1117 SAEX N = 12

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Landform environment (n = 13)		Mean	Range
Elevation (m)		1413	512–2134
Plot slope (percent)		7	<1–30
Aspect	All		

Valley environment (n = 13)		Mode	Range
Valley gradient (percent)		1–3	<1–>8
Valley width (m)		30–100	10–300
Valley aspect	All		

Soil surface cover (n = 13)	Mean	Range
Submerged (percent)	2	0–20
Bare ground	20	0–63
Gravel	7	0–15
Rock	16	0–60
Bedrock	0	
Litter	46	0–89
Moss	5	0–25

Soil profile characteristics (n = 12)			
Parent material	Granite, basalt, alluvium		
Great group(s)	Udifluvents		
		Mean	**Range**
Water table depth (cm)			>13
Rock fragments (percent)		78	0–100
Available water capacity of pit(cm/m)		2	1–8
pH (n = 1)		6.24	
Depth to redoximorphic features (cm)			NA
Occurrence of redoximorphic features (percentage of soils)		0	
Surface organic layer (cm)		0	
Surface layers			
Thickness (cm)			9–>50
Texture(s)[a]	L, S, SIL, SL, cobble		
Redoximorphic features	None		
Subsurface layers			
Thickness (cm)			>13
Texture(s)[a]	SICL, cobble, boulders		
Redoximorphic features	None		

[a] See “Soil Texture Codes” section.

Physical environment—

The coyote willow plant association occurred on cobble and gravel bars at a wide range of elevations. Elevations ranged from 512 to 976 m in Hells Canyon and the Malheur National Forest to 1524 to 2134 m along drainages in the Eagle Cap Wilderness. Crowe and Clausnitzer (1997) described a very similar association as occurring between 914 and 1328 m. The coyote willow plant community type was never observed above 2134 m elevation.

Valley aspects at the upper range in elevation ranged from southeast to southwest, whereas the elevation at the lowest occurrence was almost directly north (10°) suggesting a possible correlation between aspect and elevation at the extremes in elevation. Midelevations showed no clear elevation-aspect trend. Valley shape ranged from V-shaped and flat in the canyon country to U-shaped in the subalpine. For most sites, valley gradient ranged from very low (<1 percent) to moderate (4 to 5 percent).

Soils were typically undeveloped, usually consisting of alluvial gravels and cobbles sometimes covered with a thin (<30 cm) veneer of sand or loam.

Vegetation composition—

Coyote willow forms an interweaving tall shrub layer and is sometimes accompanied by other willow species including Pacific willow and rigid willow. Other less common shrub species include red-osier dogwood, twinberry honeysuckle, and shrubby cinquefoil. Engelmann spruce and black cottonwood seedlings are commonly found growing up through the thick shrub layer.

The sparse herbaceous layer might include white sagebrush, curly dock, common horsetail, falsegold groundsel, arrowleaf groundsel, tall ragwort, giant mountain aster, and smallwing sedge.

Adjacent riparian/wetland vegetation types:
- Low-elevation floodplains and terraces: ACNE2, CANU5.
- High-elevation floodplains and terraces: PICO-PIEN/POPR.
- High-elevation springs and seeps: CAUT.

Adjacent upland vegetation types:
- Low-elevation sideslopes: ABGR/SYAL, JUOC/AGSP, and various AGSP types;
- High-elevation sideslopes: ABLA/VASC.

Principal species			CON	COV	MIN	MAX
				Percent		
Shrubs:						
SAEX	Coyote willow	*Salix exigua*	100	63	8	90
SARI2	Rigid willow	*Salix rigida*	46	28	15	45
Forbs						
ARLU	White sagebrush	*Artemisia ludoviciana*	46	4	1	10
RUOC2	Western coneflower	*Rudbeckia occidentalis*	46	3	1	10
Grasses						
POPR	Kentucky bluegrass	*Poa pratensis*	46	9	1	30
Ferns and horsetails						
EQAR	Common horsetail	*Equisetum arvense*	61	17	1	5

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Management considerations—

The coyote willow plant association is characterized by annual flood scour and deposition of alluvium. Coyote willow is an important colonizer of gravel and cobble bars providing initial soil stabilization. The strong roots and stems of coyote willow slow floodwaters, trap sediments, and increase streambank and alluvial bar stability, thus enhancing fish habitat and the overall quality of the stream. Coyote willow can propogate from broken stems, produce roots at leaf nodes of buried stems, and regenerate from seed. A variety of birds can be found nesting and feeding here including willow flycatchers, yellow warblers, red-winged blackbirds, kingfishers, and great blue herons.

Coyote willow is fairly palatable (Crowe and Clausnitzer 1997) to wild and domestic ungulates and can provide important winter forage for elk and deer. The typically sparse understory provides little herbaceous forage biomass (11 to 22 kg/ha). Coyote willow is a highly preferred food of beavers. Coyote willow is often replaced over time by black cottonwood and alder tree types at low elevations and black cottonwood and Engelmann spruce types at high elevations.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: scrub-shrub wetland
Subclass: broad-leaved deciduous
Water regime: (nontidal) seasonally flooded to saturated.

Adjacent riparian/wetland classifications—

Coyote willow is a common riparian species cover type throughout the Western United States. A number of variations of the coyote willow plant association have been described in adjacent classifications including coyote willow plant association (Crowe and Clausnitzer 1997, Crawford 2003); coyote willow and Pacific willow community types (Hansen et al. 1995); coyote willow/mesic forb, coyote willow/Woods' rose, coyote willow/bench, Pacific willow/mesic forb (Manning and Padgett 1995); coyote willow riparian type (Padgett 1981); *Salix exigua*/mesic forb, *Salix exigua*/barren (Padgett et al. 1989); coyote willow/barren, coyote willow/Woods' rose (Jankovsky-Jones et al. 2001); coyote willow/Kentucky bluegrass, coyote willow/common horsetail community type (Youngblood et al. 1985).

The Pacific willow/coyote willow (Crawford 2003) and Pacific willow/bench (Manning and Padgett 1995) are two types that feature coyote willow as a subordinate willow species and are similar enough to the coyote willow plant community type to mention here.

Miscellaneous Willow Types

Booth’s Willow/Inflated Sedge Plant Community

Salix boothi/Carex vesicaria

SW1139 SABO2/CAVE6 N = 1

This community was found in a wet meadow at 2348 m in the Eagle Cap Wilderness. Soils were moderately deep to bedrock, very poorly drained organic loams over sandy clay loam and silty clay loam layers. Depth to water table was 70 cm, and the available water capacity was 13 cm/m. Booth’s willow (*Salix boothii*) (90 percent foliar cover) forms a thick monocultural stand over inflated sedge (30 percent) and early sedge (10 percent). Curled starwort was found scattered throughout the herbaceous layer.

Adjacent riparian types:
 Meadows: SABO2/CASC12, CAVE6.
 Lake edges: CAVE6.

Adjacent upland vegetation type:
 Sideslopes: ABLA/VASC.

The Booth’s willow/inflated sedge plant community has not previously been described.

Willow/Aquatic Sedge Plant Association

Salix spp.*/Carex aquatilis*

SW1114 SALIX/CAAQ N = 2

The willow/aquatic sedge plant association occurred near Frances Lake in the Eagle Cap Wilderness, where an alluvial fan meets the lake. Sample plots were located at 2348 m. Soil great groups were Cryofluvents. Soils were moderately deep, very poorly drained, silt loams over sands and gravels. The water table was at or near the surface for most of the year.

Farr’s (60 percent) or Booth’s (92 percent) willow forms the shrub layer, Farr’s willow in clumps and Booth’s willow as continuous coverage. Depth to water table is the distinguishing environmental characteristic between Farr’s (deeper) and Booth’s willow (shallower). Aquatic sedge (avg. 70 percent) forms a thick herbaceous layer along with trace amounts of Holm’s Rocky Mountain sedge, few-flowered spikerush, alpine meadow butterweed, variegated scouringrush, Idaho licorice-root, alpine smartweed, alpine shootingstar, and common yarrow. In this case, both plots occurred directly adjacent to each other. Booth’s willow occurred directly along the lake edge, whereas Farr’s willow occurred slightly higher (~0.5 m). Aquatic sedge occurred throughout. Total forage biomass was 1195 kg/ha.

Adjacent riparian/wetland vegetation types:
 Alluvial fans: SAFA/ALVA.
 Meadows: POFR4-BEGL, SAAR27.

This community type has been described for Booth’s willow by Padgett et al. (1989), Crowe and Clausnitzer (1997), and Kovalchik (1987). Kovalchik and Clausnitzer (2004) described a Farr’s willow/bladder sedge type in which aquatic sedge is an alternate indicator species.

Farr's Willow/Pacific Onion Plant Community

Salix farriae/Allium validum

SW1134 SAFA/ALVA N = 1

The Farr's willow/Pacific onion plant community occurred on an alluvial fan near the edge of Frances Lake in the Eagle Cap Wilderness at 2351 m. The soil great group was Cryofluvents. The soil was moderately deep, somewhat poorly drained, organic silt loams over sandy loams and gravels. Depth to water table ranged from the surface during spring runoff to 70 cm late in the season. Farr's willow (60 percent) occurred in clumps with Booth's willow (18 percent) scattered throughout. Pacific onion (80 percent) fills in around the willow clumps with alpine meadow butterweed (20 percent) and trace amounts of high mountain cinquefoil, white marsh marigold, alpine smartweed, and Chamisso arnica. Holm's Rocky Mountain sedge, rock sedge, and tufted hairgrass round out the herbaceous layer.

Adjacent riparian types:
Lakeshore: SALIX/CAAQ.
Meadows: POFR4-BEGL.

The Farr's willow/Pacific onion plant community type has not previously been described.

Undergreen Willow/Bladder Sedge Plant Community Type

Salix commutata/Carex utriculata

SW1127 SACO2/CAUT N = 1

The undergreen willow/bladder sedge plant community type was found on a moderately steep (13 percent), seepy meadow adjacent to Blue Creek in the Eagle Cap Wilderness at 2024 m. The soils were Cryohemists. Soils were poorly drained, organic loams. Depth to water table was 30 cm in late August. Undergreen willow (50 percent) occurred scattered throughout with a thick understory of bladder sedge (80 percent). Other herbaceous species include Holm's Rocky Mountain sedge, woodrush sedge, Mertens' rush, alpine meadow butterweed, fringed grass of Parnassus, darkthroat shootingstar, and common horsetail. Forage biomass totaled 1120 kg/ha, and deer and elk use was high with most of the grazing concentrated on undergreen willow.

Adjacent riparian wetland vegetation type:
Moist meadows: CACA4.

Adjacent upland vegetation type:
Sideslopes: ABLA/VASC.

Crowe and Clausnitzer (1997) described an undergreen willow/bladder sedge plant community that is similar to the undergreen willow/bladder sedge community described above.

Drummond's Willow/Arrowleaf Groundsel Plant Community

Salix drummondiana/Senecio triangularis

SW1137 SADR/SETR N = 1

The Drummond's willow/arrowleaf groundsel plant community was found growing in and along a low-gradient section (1 to 3 percent) of Granite Creek, near the headwaters, in the Seven Devils Mountains at 2049 m. Soil great groups were Cryaquents. Soils were very poorly drained sands with a thin organic veneer. The water table remains running above the surface throughout the year. A thick tangle of Drummond's willow (80 percent) stems overtops a mesic herbaceous layer including arrowleaf groundsel (20 percent), slender bog orchid, fringed willowherb, violets, muskflower, tall mannagrass, drooping woodreed, and Holm's Rocky Mountain sedge. Drummond's willow has low tolerance for anaerobic conditions and requires a renewable source of well-oxygenated water to survive in saturated soils (USDA NRCS 2002b). Drummond's willow provides streambank stability and shade to the stream channel, is a filter for nutrient and sediments, and is habitat to many bird species.

The Drummond's willow/arrowleaf groundsel plant community has not previously been described. Similar types include Drummond's willow community type, willow/tall forb (Manning and Padgett 1995); Drummond's willow/bluejoint reedgrass, Drummond's willow/beaked sedge (Hansen et al. 1995); willow/Douglas spiraea, willow/tall mannagrass (Kovalchik and Clausnitzer 2004).

Lemmon's Willow/Mesic Forb Plant Community Type

Salix lemmonii/mesic forb

SW1135 SALE/MESIC FORB N = 1

The Lemmon's willow/mesic forb plant community type was found on a high-elevation (1951 m) floodplain of Cliff Creek, a moderate-gradient (4 percent) stream with a cobble bed, in the Eagle Cap Wilderness. The soils were Cryofluvents. The soils were moderately well drained, moderately deep (52 cm) to cobbles, and sandy loam in texture.

Lemmon's willow (70 percent) was joined by undergreen (20 percent) and coyote (10 percent) willow forming a thick tall shrub layer. Other shrubs include Sitka alder, twinberry honeysuckle, stinking currant, and prickly currant. Lyall's angelica (10 percent), alpine leafybract aster (15 percent), fireweed (10 percent), tall fringed bluebells (5 percent), arrowleaf groundsel (10 percent), vieny meadow-rue (20 percent), American saw-wort (5 percent) and violets (15 percent) include the important forbs species. Graminoids include bluejoint reedgrass (30 percent), fringed brome (10 percent), blue wildrye (5 percent), Mertens' rush (1 percent), and woodrush (1 percent).

Adjacent riparian/wetland vegetation type:
POFR4-BEGL.

Manning and Padgett (1995) described Lemmon's willow/mesic forb and Lemmon's willow/mesic graminoid types for Nevada and eastern California that are similar to the willow/mesic forb plant community described above.

Sitka Willow/Common Horsetail Plant Community

Salix sitchensis/Equisetum arvense

SW1136 SASI2/EQAR N = 1

The Sitka willow/common horsetail plant community was found on a midstream cobble bar in the Wenaha-Tucannon Wilderness at 732 m. Soils were excessively drained cobbles, with a sandy matrix.

Sitka willow (70 percent) and mountain alder (35 percent) form a dense shrub layer along with red-osier dogwood and streambank wild hollyhock. Young black cottonwoods (10 percent) were found throughout the shrub layer, suggesting the most likely successional trajectory for this community. Common horsetail (30 percent) was found throughout the herbaceous layer, along with Canada goldenrod, stinging nettle, peppermint, and fowl bluegrass. Spring flood scour and deposition is characteristic of this site, as evidenced by fresh sand deposits across the bar surface. Sitka willow and common horsetail are important early seral species on cobble bars providing initial soil stabilization for the establishment of later successional species such as black cottonwood. Sitka willow is a highly nutritional browse species of wild ungulates and provides nesting and feeding habitat for willow flycatchers.

Adjacent riparian/wetland vegetation types:

Floodplains and terraces:

ABGR/ACGL–FLOODPLAIN,
ALIN2/GLEL, ABGR/SYAL.

Diaz and Mellon (1996) described two Sitka willow types for northwestern Oregon including Sitka willow plant community type, Sitka willow/arctic sweet coltsfoot. Kovalchik and Clausnitzer (2004), in their willow series, described three types for southeastern Oregon that are floristically similar to the Sitka willow/common horsetail community including willow/common horsetail, willow/alluvial bar, and willow/mesic forb.

Alpine Laurel/Black Alpine Sedge Plant Association

Kalmia microphylla/Carex nigricans

SW901 KAMI/CANI2 N = 4

E. Crowe

Landform environment (n = 4)	Mean	Range
Elevation (m)	2283	2177–2515
Plot slope (percent)	1	.5–1

Valley environment (n = 4)	Mode	Range
Valley gradient (percent)	1–3	<1–3
Valley width (m)	30–100	10–300

Soil surface cover (n = 4)	Mean	Range
Submerged (percent)	0	
Bare ground	2	0–3
Gravel	0	
Rock	10	0–40
Bedrock	0	
Litter	45	1–77
Moss	34	5–65

Soil profile characteristics (n = 4)			
Parent material	Mazama ash, quartz diorite, peat		
Great group(s)	Cryaquents, Cryaquepts, Cryofluvents, Dystrocryepts		
		Mean	**Range**
Water table depth (cm)			6–36
Rock fragments (percent)		0	
Available water capacity of pit(cm/m)		10	6–12
pH (n = 3)		5.54	5.11–6.12
Depth to redoximorphic features (cm)			6–36
Occurrence of redoximorphic features (percentage of soils)		100	
Surface organic layer (cm)			0–11
Surface layers			
Thickness (cm)			9–36
Texture(s)[a]	CL, SI, SIC, SIL		
Redoximorphic features	Iron oxide concentrations		
Subsurface layers			
Thickness (cm)			17–56
Texture(s)[a]	LS, S, SC, SIC		
Redoximorphic features	Depletions, iron oxide concentrations		

[a] See “Soil Texture Codes” section.

Physical environment—

The alpine laurel/black alpine sedge plant association was found at high-elevation (2177 to 2515 m) floodplain and moist/wet meadow sites in the Eagle Cap Wilderness. Sample sites were located in low-gradient (<3 percent) U- and trough-shaped valleys. Soils were somewhat poorly drained silt loam to silty clay overlying fine sand to sandy loam subsurface layers. Depth to water table ranged from the surface to 36 cm, and redoximorphic features were found in the subsurface layers of all soils sampled.

Vegetation composition—

Alpine laurel is found growing throughout forming a sporadic low shrub layer, its pink flowers often mixing with those of pink mountainheath, the red flowers of dwarf bilberry, and the white of western moss heather, alpine spicywintergreen, grouse huckleberry, and Labrador tea, providing a delicate balance of colors against an evergreen background. A variety of willow species including arctic, Booth’s, and undergreen willow may also be found in the shrub layer. Various conifer seedlings are often found growing in the understory.

Black alpine and Holm’s Rocky Mountain sedge are always found in the herbaceous layer and may be joined by other graminoids including Drummond’s and Mertens’ rush, few-flowered spikerush, woodrush sedge, tufted hairgrass, timber oatgrass, and field woodrush.

The sparse forb layer always includes subalpine fleabane, explorer’s gentian, Idaho licorice-root, high mountain cinquefoil, and alpine meadow butterweed. Other species may include yellow Wallowa Indian paintbrush, Pacific onion, elephanthead lousewort, and hooded ladies’-tresses.

Adjacent riparian/wetland vegetation types:

Floodplains and meadows: CALE9, CANI2, SALIX/CACA4, ABLA-PIEN/LEGL–FLOODPLAIN, CASC12, SAAR27.

Adjacent upland vegetation types:

Footslope and sideslopes: ABLA/VASC, FEVI.

Principal species			CON	COV	MIN	MAX
				Percent		
Understory trees:						
PICO	Lodgepole pine	*Pinus contorta*	50	4	1	7
Shrubs:						
GAHU	Alpine spicywintergreen	*Gaultheria humifusa*	50	20	20	20
KAMI	Alpine laurel	*Kalmia microphylla*	100	29	10	50
PHEM	Pink mountainheath	*Phyllodoce empetriformis*	75	2	1	3
SABO2	Booth's willow	*Salix boothii*	50	4	1	8
VACA13	Dwarf bilberry	*Vaccinium caespitosum*	50	12	10	15
VASC	Grouse huckleberry	*Vaccinium scoparium*	50	1	1	1
Forbs:						
ALVA	Pacific onion	*Allium validum*	50	9	3	15
CACH16	Yellow Wallowa Indian paintbrush	*Castilleja chrysantha*	50	1	1	1
ERPE3	Subalpine fleabane	*Erigeron peregrinus*	100	1	1	2
GECA	Explorer's gentian	*Gentiana calycosa*	100	6	1	15
LITE2	Idaho licorice-root	*Ligusticum tenuifolium*	100	2	1	5
PEGR2	Elephanthead lousewort	*Pedicularis groenlandica*	50	1	1	1
POFL3	High mountain cinquefoil	*Potentilla flabellifolia*	100	4	1	10
SECY	Alpine meadow butterweed	*Senecio cymbalarioides*	100	4	1	10
SPRO	Hooded ladies'-tresses	*Spiranthes romanzoffiana*	50	1	1	1
Grasses:						
AGHU	Alpine bentgrass	*Agrostis humilis*	50	2	2	2
DAIN	Timber oatgrass	*Danthonia intermedia*	75	1	1	1
DECE	Tufted hairgrass	*Deschampsia cespitosa*	75	3	2	3
Sedges and other grasslikes:						
CAIL	Sheep sedge	*Carex illota*	50	3	1	5
CALU7	Woodrush sedge	*Carex luzulina*	50	6	1	10
CANI2	Black alpine sedge	*Carex nigricans*	100	34	15	50
CASC12	Holm's Rocky Mountain sedge	*Carex scopulorum*	100	18	3	45
ELPA6	Few-flowered spikerush	*Eleocharis pauciflora*	50	2	2	2
JUDR	Drummond's rush	*Juncus drummondii*	75	1	1	1
LUCA2	Field woodrush	*Luzula campestris*	50	1	1	1

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Management considerations—

Total forage biomass ranged from 435 to 1792 (avg. 892) kg/ha. Deer and elk use is low to moderate with most browsing/grazing on willow species and Holm's sedge. **The wet, cryic soils of this association are sensitive to trampling; therefore sites are vulnerable to horse pasturing and perennial human trails.** These sites are most likely successional to PHEM MOUNDS as soil gradually builds up around the scattered shrub species shifting the potential to PHEM as the mounds form and the soils dry out.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: scrub-shrub wetland
Subclass: broad-leaved evergreen
Water regime: (nontidal) saturated.

Adjacent riparian/wetland classifications—

Hansen et al. (1995) described a small-leaved laurel (*Kalmia microphylla*)/ Holm's Rocky Mountain sedge type that is similar to the alpine laurel/black alpine sedge plant association described above.

Other floristically similar types include pink mountain-heath mounds (p. 94); Merten moss-heather (*Cassiope mertensiana*)–red mountain-heath (*Phyllodoce empetriformis*) (Kovalchik and Clausnitzer 2004).

Pink Mountainheath Mounds Plant Association

Phyllodoce empetriformis

SS1912 PHEM MOUNDS N = 5

Aaron Wells

Landform environment (n = 5)		Mean	Range
Elevation (m)		2274	2195–2439
Plot slope (percent)		2	1–3
Aspect	All		

Valley environment (n = 4)		Mode	Range
Valley gradient (percent)		<1	<1–3
Valley width (m)		100–300	30–>300
Valley aspect	Mostly northerly		

Soil surface cover (n = 4)	Mean	Range
Submerged (percent)	0	
Bare ground	24	5–40
Gravel	0	
Rock	5	1–10
Bedrock	0	
Litter	51	20–85
Moss	13	5–20

Soil profile characteristics (n = 5)		Mean	Range
Parent material	Mazama ash, Eolian deposits, glacial till		
Great group(s)	Cryaquands, Cryofluvents, Dystrocryepts (mounds), Cryaquepts (intermounds)		
Water table depth (cm)			35–>77
Rock fragments (percent)		9	0–18
Available water capacity of pit (cm/m)		13	10–16
pH (n = 5)		5.54	5.20–5.82
Depth to redoximorphic features (cm)		49	
Occurrence of redoximorphic features (percentage of soils)		20	
Surface organic layer (cm)			0–3
Surface layers			
Thickness (cm)			3–27
Texture(s)[a]	L, SIL		
Redoximorphic features	None		
Subsurface layers			
Thickness (cm)			5–>21
Texture(s)[a]	L, SL		
Redoximorphic features	Depletions		

[a] See “Soil Texture Codes” section.

Physical environment—

The pink mountainheath mounds plant association occurred in moist meadows at the upper terminus of glacial valleys above 2134 m elevation in the Eagle Cap Wilderness and Elkhorn Mountains. Valleys were all U-shaped, broad (100 to 300 m) to very broad (>300 m), with very low (<1 percent) to moderate (1 to 3 percent) gradient. Soils were mounded (10 to 26 cm), often with a buried surface horizon at the bottom of the mounds and buried subsurface horizons throughout the subsurface layer. Surface horizons were typically loams, and subsurface horizons ranged from gravelly sandy loams to gravelly loams. Soils were well drained in the mounds to moderately well drained in the intermounds. Depth to water table ranged from 35 to greater than 77 cm. Soil pH was low ranging from 5.2 to 5.8 representing a typical range for ericaceous shrub communities. Redoximorphic features were rare.

Vegetation composition—

The vegetation composition of the pink mountainheath mounds plant association tends to be distinct between mound and intermound microsites. Mound species tend to be those that require slightly drier conditions, whereas intermound species are those that prefer slightly moister conditions. Some species are generalists and grow on or between mounds without preference.

Pink mountainheath, alpine laurel, grouse huckleberry, western moss heather, and alpine spicywintergreen are low shrub species commonly found growing on the mounds, only rarely growing between the mounds. Explorer’s gentian and creeping sibbaldia are herbaceous species always found growing on the mounds. Less common mound species include subalpine fleabane, alpine pussytoes, and woodrush. Species that may be growing on or between mounds include high mountain cinquefoil, black alpine sedge, Drummond’s rush, licorice-root, and Indian paintbrush.

Intermound herbaceous species include Holm’s Rocky Mountain sedge, Pacific onion, shootingstar, marsh violet, and elephanthead lousewort.

Principal species			CON	COV	MIN	MAX
			Percent			
Shrubs:						
CAME7	Western moss heather	*Cassiope mertensiana*	60	10	1	15
KAMI	Alpine laurel	*Kalmia microphylla*	100	8	1	20
PHEM	Pink mountainheath	*Phyllodoce empetriformis*	100	46	35	65
VASC	Grouse huckleberry	*Vaccinium scoparium*	80	10	1	15
Forbs:						
ALVA	Pacific onion	*Allium validum*	40	22	5	40
ANAL4	Alpine pussytoes	*Antennaria alpina*	60	22	10	45
DOAL	Alpine shootingstar	*Dodecatheon alpinum*	60	8	5	10
EPILO	Willowherb	*Epilobium*	40	3	3	3
ERPE3	Subalpine fleabane	*Erigeron peregrinus*	60	15	5	35
GECA	Explorer's gentian	*Gentiana calycosa*	100	10	1	20
LEPY2	Alpine lewisia	*Lewisia pygmaea*	60	6	3	10
LICA2	Canby's licorice-root	*Ligusticum canbyi*	40	6	1	10
POFL3	High mountain cinquefoil	*Potentilla flabellifolia*	100	11	3	25
RAPO	Popular buttercup	*Ranunculus populago*	40	2	1	3
SIPR	Creeping sibbaldia	*Sibbaldia procumbens*	100	17	3	50
VIPA4	Marsh violet	*Viola palustris*	80	8	1	15
Grasses:						
AGHU	Alpine bentgrass	*Agrostis humilis*	40	15	10	20
DAIN	Timber oatgrass	*Danthonia intermedia*	40	12	5	20
FEVI	Greenleaf fescue	*Festuca viridula*	40	6	1	10
Sedges and other grasslikes:						
CANI2	Black alpine sedge	*Carex nigricans*	80	18	5	40
JUDR	Drummond's rush	*Juncus drummondii*	80	8	1	10

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Adjacent riparian/wetland vegetation types:
Meadows: ABLA-PIEN/LEGL–FLOODPLAIN, ALVA-CASC12, ELPA6, CANI2, and CASC12.

Adjacent upland vegetation type:
Sideslopes: ABLA/VASC.

Management considerations—

Mound development could be the result of a number of factors. Mounds may have been formed from frost heaving or eolian (wind) deposition.

Mound formation may be the result of eolian deposition of fines around the decumbent shrubs. Winds carrying airborne sediments would be slowed by the dense stems of pink mountainheath, alpine laurel, and grouse huckleberry resulting in the deposition of those sediments. Given enough time, mounds would form and the slight shift in microclimate would lend toward the success of the slightly more xeric shrubs on the mounds.

Eolian deposition is considered the most probable cause of mound formation given the buried surface horizons found in some of the soil profiles. Frost heaving is often associated with mixing of the soil horizons leading to a lower probability of finding an intact buried surface horizon.

It is plausible that soils lacking the buried horizon may have been formed by frost heaving, as this process of mound formation is well known in the subarctic (Johnson 2004b). The exact casual agents of mound formation are difficult to surmise, perhaps a combination of the above factors have led to mound formation, perhaps none.

The moist, cryic soil mounds of this association are sensitive to trampling; therefore sites are vulnerable to horse pasturing and perennial human trails.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: scrub-shrub wetland
Subclass: broad-leaved evergreen
Water regime: (nontidal) saturated to temporarily flooded.

Adjacent riparian/wetland classifications—

A number of variations on the pink mountainheath theme have been described throughout the Pacific Northwest including red mountainheath (*Phyllodoce empetriformis*) association (Kovalchik 1987); red mountain-heath (*P. empetriformis*)–Cascade huckleberry, Merten moss-heather (*Cassiope mertensiana*)–red mountain-heath (Kovalchik and Clausnitzer 2004).

Other floristically similar types include alpine laurel/black alpine sedge (p. 92); Aleutian mountainheath (P*hyllodoce aleutica*)-moss heather (*Cassiope* spp.)-huckleberry (*Vaccinium* spp.); Aleutian mountainheath–western moss heather (Viereck et al. 1992).

Miscellaneous Low Shrub Types

Labrador Tea/Holm's Rocky Mountain Sedge Plant Community
Ledum glandulosum/Carex scopulorum
SW0101 LEGL/CASC12 N = 1

This community was found on a floodplain of the Minam River in the Eagle Cap Wilderness at 2079 m. The soils were Cryofibrists, moderately deep to bedrock, somewhat poorly drained, organic sedge peat (54 cm) over a thin layer of loamy fine sand (3 cm). Depth to water table was 65 cm in mid-August and available water capacity was 14 cm/m.

The vegetation composition is remarkably similar to the PIEN-ABLA/LEGL with the exception of the tree species. Laborador tea (48 percent) forms a low shrub layer along with pink mountainheath (22 percent), grouse huckleberry, alpine spicywintergreen, and dwarf bilberry. Holm's Rocky Mountain sedge (25 percent) and Pacific onion (30 percent) form a thick herbaceous layer with lesser amounts of high mountain cinquefoil, explorer's gentian, umber pussytoes, few-flowered spikerush, bluejoint reedgrass, and tufted hairgrass. Total forage biomass was 821 kg/ha, and wild ungulate use appeared to be low.

This community is self-perpetuating; the thick, acidic organic layer at the surface precluding the establishment of conifers at the site. Potential exists for the ABLA-PIEN/LEGL plant association given an influx of fresh sediment that would allow for the establishment of conifer species. This community has not previously been described.

Shrubby Cinquefoil–Bog Birch Plant Community Type
Potentilla fruiticosa-Betula glandulosa
SS6001 POFR4-BEGL N = 2

The shrubby cinquefoil–bog birch plant community type occurred on high-elevation (1985 and 2351 m) dry/moist meadows in the Eagle Cap Wilderness. Soil great groups were Cryopsamments and Cryorthents. Soils were moderately well drained, very fine sandy loam to loam overlying sands and gravels.

Shrubby cinquefoil (avg. 63 percent) and bog birch (avg. 55 percent) are found growing in clumps scattered throughout the community with a variety of conifer seedlings slowly "invading" the understory. A rich understory of forbs and graminoids may include tufted hairgrass, timber oatgrass, subalpine fleabane, alpine meadow butterweed, falsegold groundsel, western meadow-rue, slender muhly, simple bog sedge, nearlyblack sedge, and northern singlespike sedge, among others.

Elk and pastured horses may occasionally browse on shrubby cinquefoil and bog birch when the availability of high-quality forage is low.

A number of shrubby cinquefoil types (Crowe and Clausnitzer 1997; Hansen et al. 1995; Kovalchik and Clausnitzer 2004; Manning and Padgett 1995; Padgett et al. 1989, Youngblood et al. 1985) and one bog birch type (Hansen et al. 1995) have been described in adjacent areas. Two types have been described for Alaska that feature the two species together: shrubby cinquefoil-sweetgale-bog birch/black crowberry, shrubby cinquefoil-sweetgale-bog birch-marsh Labrador tea (Viereck et al. 1992).

Sitka Alder/Mesic Forb Plant Community Type

Alnus sinuata/mesic forb

SW2113 ALSI3/MESIC FORB N = 8

Aaron Wells

Landform environment (n = 8)		Mean	Range
Elevation (m)		1927	1707–1890
Plot slope (percent)		19	2–50
Aspect	Mostly northerly		

Valley environment (n = 7)		Mode	Range
Valley gradient (percent)		>8	4–>8
Valley width (m)		10–30	<10–100
Valley aspect	Mostly northerly		

Soil surface cover (n = 7)	Mean	Range
Submerged (percent)	2	0–10
Bare ground	11	0–20
Gravel	3	0–10
Rock	16	5–40
Bedrock	0	
Litter	58	35–75
Moss	8	1–25

Soil profile characteristics (n = 8)			
Parent material	Quartz diorite, granite, alluvium		
Great group(s)	Cryofluvents, Cryorthents, Udifluvents, Udorthents)		
		Mean	**Range**
Water table depth (cm)			28–>89
Rock fragments (percent)		58	0–100
Available water capacity of pit (cm/m)		4	1–11
pH (n = 5)		5.63	5.20–6.40
Depth to redoximorphic features (cm)		0	
Occurrence of redoximorphic features (percentage of soils)		0	
Surface organic layer (cm)			0–9
Surface layers			
Thickness (cm)			0–23
Texture(s)[a]	L, SIL, SL, cobble		
Redoximorphic features	None		
Subsurface layers			
Thickness (cm)			13–55
Texture(s)[a]	LS, SIL, SL, S, cobble		
Redoximorphic features	None		

[a] See “Soil Texture Codes” section.

Physical environment—

Sitka alder/mesic forb plant community type was found along typically steep (2 to 50, avg. 19 percent) streambanks and floodplains at moderately high elevations (1707 to 1890 m) throughout the Eagle Cap Wilderness and Seven Devils Mountains. This type was never found in the Strawberry Mountain Wilderness where mountain alder is the ecological equivalent to Sitka alder. Valleys were typically steep (>8 percent); narrow (10 to 30 m); V-, U-, and trough-shaped, and flat. Soils ranged from cobbles to excessively drained sandy loams to loams over cobbly/bouldery sands to loamy sands. Soils were shallow (18 cm) to deep (89 cm) over coarse alluvium or bedrock.

Vegetation composition—

Sitka alder forms a tall thick shrub overstory and is often joined by prickly currant. A rich understory of herbaceous species includes common cowparsnip, mountain sweetcicely, fragrant bedstraw, heartleaf minerslettuce, tall fringed bluebells, arrowleaf groundsel, claspleaf twistedstalk, violets, Lyall’s angelica, veiny meadow-rue, and blue wildrye. Brook saxifrage, enchanter’s nightshade, ladyfern, and drooping woodreed occur rarely at or near the stream edge.

Adjacent riparian/wetland vegetation types:
Terraces and floodplains: COST4, ACGL/OSCH.
Meadows: CASC12.

Adjacent upland vegetation types:
Sideslopes: ABGR/ACGL, ABLA/VAME, ABLA/VASC, ABGR/ALSI3, and ABGR/VAME.

Management considerations—

Johnson and Clausnitzer (1992) described a Sitka alder community type for upland sites as occurring on disturbance-related sites such as avalanche paths, stand-replacing burns, and stand-replacing tree harvest operations. The Sitka alder/mesic forb plant community

Principal species			CON	COV	MIN	MAX
				Percent		
Understory trees:						
ABLA	Subalpine fir	*Abies lasiocarpa*	50	4	3	5
Shrubs:						
ALSI3	Sitka alder	*Alnus sinuata*	100	86	70	100
RILA	Prickly currant	*Ribes lacustre*	63	8	1	20
VAME	Big huckleberry	*Vaccinium membranaceum*	50	12	3	35
Forbs:						
ANAR3	Lyall's angelica	*Angelica arguta*	63	3	3	3
ARMA18	Largeleaf sandwort	*Arenaria macrophylla*	38	2	1	5
CIAL	Enchanter's nightshade	*Circaea alpina*	38	27	7	65
GATR3	Fragrant bedstraw	*Galium triflorum*	100	3	1	5
GEMA4	Largeleaf avens	*Geum macrophyllum*	38	2	1	5
HELA4	Common cowparsnip	*Heracleum lanatum*	75	21	3	60
MECI3	Tall fringed bluebells	*Mertensia ciliata*	63	12	1	40
MOCO4	Heartleaf minerslettuce	*Montia cordifolia*	38	9	2	20
OSCH	Mountain sweetcicely	*Osmorhiza chilensis*	100	2	1	3
SETR	Arrowleaf groundsel	*Senecio triangularis*	38	3	1	5
STAM2	Claspleaf twistedstalk	*Streptopus amplexifolius*	50	6	2	10
THVE	Veiny meadow-rue	*Thalictrum venulosum*	38	8	5	10
URDI	Stinging nettle	*Urtica dioica*	38	3	2	4
VIOLA	Violet	*Viola* L.	63	15	1	60
Grasses:						
BRVU	Columbia brome	Bromus vulgaris	50	4	3	7
ELGL	Blue wildrye	*Elymus glaucus*	63	2	1	3

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

type differs in that it is found on disturbance-related sites along streambanks and floodplains. Sitka alder, an early-successional, nitrogen-fixing species, is one of the first to colonize rocky streambanks and floodplains providing initial soil stabilization and enrichment. The Sitka alder/mesic forb plant community type buffers streambanks against the effects of the powerful floods characteristic of steep stream reaches. The association provides shade and nutrient-rich litter to the stream channel. Sitka alder has a low tolerance for fire, but fire is infrequent in this moist association (Crowe and Clausnitzer 1997). Possible successional relationships: ABLA/VAME–FLOODPLAIN, ABGR/ALSI3, ABGR/VAME, and ABLA/VAME.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: scrub-shrub wetland
Subclass: broad-leaved deciduous
Water regime: (nontidal) intermittently to temporarily flooded.

Adjacent riparian/wetland classifications—

Crowe and Clausnitzer (1997) and Kovalchick and Clausnitzer (2004) described Sitka alder/mesic forb types for the midmontane wetlands of the Blue Mountains in Oregon and eastern Washington, respectively.

There were no floristically similar types.

Miscellaneous Sitka Alder Types

Sitka Alder/Ladyfern Plant Association

Alnus sinuata/Athyrium filix-femina

SW2111 ALSI3/ATFI N = 2

The Sitka alder/ladyfern plant association occurred on a steep (12 percent) streambank and a low-gradient (1 percent) floodplain at approximately 1860 m elevation. Valleys were narrow (10 to 30 m) and moderately steep (4 to 5 percent) to very steep (>8 percent). The soil surface was typically rocky (avg. 20 percent) and partly submerged for much of the growing season (avg. 13 percent). Soils ranged from moss-covered boulders to moderately deep loamy sands and sands over gravel and cobble. Soil great groups were Cryofluvents. The water table ranged from the surface in early summer to 41 cm later in the season, and the soils remain moist throughout the growing season. Annual flooding is typical at these sites. Sitka alder (avg. 68 percent) forms a dense shrub layer along with prickly (avg. 14 percent) and stinking currant (avg. 7 percent). Ladyfern (avg. 8 percent) is always present along with a variety of mesic forbs including arrowleaf groundsel (avg. 8 percent), brook saxifrage (avg. 16 percent), and claspleaf twistedstalk (avg. 5 percent). The Sitka alder/ladyfern plant association provides shade and nutrient-rich litter to the stream channel and buffers the soil during peak flow periods. Ladyfern contains filicic acid and may be poisonous to some classes of livestock (Walkup 1991). Crowe and Clausnitzer (1997) described a Sitka alder/ladyfern plant association for midmontane northeastern Oregon. Other floristically similar types include: Sitka alder/drooping woodreed, mountain alder/ladyfern, and red-osier dogwood/brook saxifrage (Crowe and Clausnitzer 1997); Sitka alder (Hansen et al. 1995).

Sitka Alder/Drooping Woodreed Plant Association

Alnus sinuata/Cinna latifolia

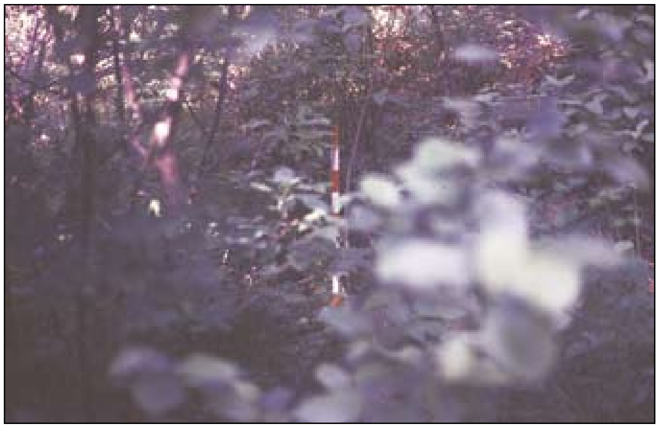
SW2112 ALSI3/CILA2 N = 2

The Sitka alder/drooping woodreed plant association occurred in U-shaped valleys of low (1 to 3 percent) to moderate gradient (4 to 5 percent) between 1677 and 1829 m elevation. The plant association occurred on a low-gradient (2 percent) wet floodplain and a moderate-gradient (4 percent) seep. Soils were poorly drained loams and sandy loams over gravels. Redoximorphic features always occurred within 60 cm of the soil surface suggesting that the soil profile is saturated for at least part of the growing season. The floodplain soil water table ranged from the soil surface early in the summer to >64 cm near the end of the growing season. The water table at the seep remained at or near the surface (18 cm) throughout the growing season. Soil great groups were Udifluvents and Endoaquents, respectively. Sitka alder (avg. 85 percent) forms a thick shrub layer enveloping a diverse array of mesic forbs and grasses including drooping woodreed (avg. 15 percent). A close look at the herbaceous layer might unveil Lyall's angelica, fragrant bedstraw, slender bog orchid, purple monkeyflower, fivestamen miterwort, arrowleaf groundsel, and tall mannagrass. Sitka alder converts airborne nitrogen into biologically useful forms resulting in the nutrient-rich soils related to this and other alder types. Drooping woodreed is of limited value as forage for livestock (Crowe and Clausnitzer 1997). The Sitka alder/drooping woodreed plant association provides important habitat for songbirds and amphibians. The Sitka alder/drooping woodreed plant association has been described for midmontane northeastern Oregon riparian zones and wetlands by Crowe and Clausnitzer (1997). Other floristically similar types include Sitka alder/mesic forb, mountain alder/tall mannagrass, and currants/drooping woodreed (Crowe and Clausnitzer 1997).

Mountain Alder/Ladyfern Plant Association

Alnus incana/Athyrium filix-femina

SW2116 ALIN2/ATFI N = 3



Aaron Wells

Landform environment (n = 3)		Mean	Range
Elevation (m)		894	744–976
Plot slope (percent)		1	NA
Aspect	Mostly southerly		

Valley environment (n = 3)		Mode	Range
Valley gradient (percent)		1–3	1–5
Valley width (m)		30–100	30–300
Valley aspect	Mostly southerly		

Soil surface cover (n = 3)	Mean	Range
Submerged (percent)	10	0–20
Bare ground	5	0–10
Gravel	0	0–1
Rock	0	
Bedrock	0	
Litter	61	35–83
Moss	23	5–40

Soil profile characteristics (n = 3)		Mean	Range
Parent material	Alluvium		
Great group(s)	Endoaquents		
Water table depth (cm)			35–83
Rock fragments (percent)		64	27–100
Available water capacity of pit (cm/m)		4	1–7
pH (n = 2)		7.73	6.97–8.48
Depth to redoximorphic features (cm)		9	
Occurrence of redoximorphic features (percentage of soils)		33	
Surface organic layer (cm)			0–8
Surface layers			
Thickness (cm)			0–9
Texture(s)[a]	SIL, cobble		
Redoximorphic features	None		
Subsurface layers			
Thickness (cm)			20–>65
Texture(s)[a]	L, SL, LS		
Redoximorphic features	Iron oxide concentrations		

[a] See “Soil Texture Codes” section.

Physical environment—

The mountain alder/ladyfern plant association occurred on a variety of landforms including a seasonal channel, a spring, and a gravel bar exclusively in the Wenaha-Tucannon and North Fork Umatilla Wilderness. Elevations ranged from 700 to 1000 m. Crowe and Clausnitzer (1997) described this type occurring at moderate elevations (avg. 1273 m). Valleys ranged from low (1 to 3 percent) to moderate (4 to 5 percent) gradient, flat and V- and trough-shaped. Sample site slopes were always low (1 percent). Soils were poorly drained, with low available water capacity (1 to 7 cm/m) and high percentage of rock fragments. Soil textures ranged from water-worked gravels to silt loams over loams and loamy sands. Redoximorphic features were rare. Water flows over the surface during spring and early summer, and the soil profile remains moist/wet year round.

Vegetation composition—

Mountain alder forms a dense tall shrub layer along with red-osier dogwood, stinking currant and prickly currant. Coniferous species from adjacent plant communities sometimes shade this association.

Ladyfern, always present, is joined by a diverse chorus of herbaceous species that may include largeleaf avens, common cowparsnip, seep monkeyflower, arrowleaf groundsel, starry false Solomon’s seal, tall mannagrass, Dewey sedge, and common horsetail.

Adjacent riparian/wetland vegetation types:
Floodplains and terraces:
PSME/SYAL–FLOODPLAIN,
ABGR/ACGL–FLOODPLAIN.

Adjacent upland vegetation type:
Sideslopes: PSME/mixed shrub.

Management considerations—

Mountain alder is a nitrogen-fixing, early colonizing species, able to withstand long-term anaerobic conditions (USDA NRCS 2002b). Mountain alder provides shade, soil stability, and nitrogen-rich litter to streams and rivers but is of limited value to wild and domestic ungulates as a browse species. Ladyfern contains filicic acid and may be poisonous to some classes of livestock (Walkup 1991).

Principal species			CON	COV	MIN	MAX
				Percent		
Shrubs:						
ALIN2	Mountain alder	*Alnus incana*	100	82	60	100
COST4	Red-osier dogwood	*Cornus stolonifera*	100	10	5	20
RIHU	Northern black currant	*Ribes hudsonianum*	67	23	5	40
RILA	Prickly currant	*Ribes lacustre*	67	4	2	5
Forbs:						
CIAL	Enchanter's nightshade	*Circaea alpina*	67	10	10	10
GATR2	Threepetal bedstraw	*Galium trifidum*	67	3	1	5
GEMA4	Largeleaf avens	*Geum macrophyllum*	100	6	3	10
HELA4	Common cowparsnip	*Heracleum lanatum*	100	9	5	15
MIGU	Seep monkeyflower	*Mimulus guttatus*	67	1	1	1
MOCO4	Heartleaf minerslettuce	*Montia cordifolia*	100	19	3	30
RAUN	Woodland buttercup	*Ranunculus uncinatus*	67	5	5	5
RUOC2	Western coneflower	*Rudbeckia occidentalis*	67	3	2	3
SETR	Arrowleaf groundsel	*Senecio triangularis*	67	1	1	1
SMST	Starry false Solomon's seal	*Smilacina stellata*	67	10	5	15
STAM2	Claspleaf twistedstalk	*Streptopus amplexifolius*	67	4	3	5
TITR	Threeleaf foamflower	*Tiarella trifoliata*	67	6	2	10
URDI	Stinging nettle	*Urtica dioica*	67	3	3	3
Grasses:						
FESU	Bearded fescue	*Festuca subulata*	67	20	5	35
GLEL	Tall mannagrass	*Glyceria elata*	67	16	2	30
Sedges and other grasslikes:						
CADE9	Dewey sedge	*Carex deweyana*	100	30	10	50
Ferns and horsetails:						
ATFI	Ladyfern	*Athyrium filix-femina*	100	17	5	25
EQAR	Common horsetail	*Equisetum arvense*	100	5	1	10

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

The mountain alder/ladyfern plant association is of limited forage value to livestock.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: scrub-shrub wetland
Subclass: broad-leaved deciduous
Water regime: (nontidal) seasonally flooded to saturated.

Adjacent riparian/wetland classifications—

Crowe and Clausnitzer (1997) described a mountain alder/ladyfern plant association for midmontane northeastern Oregon riparian areas and wetlands.

Floristically similar types include: red-osier dogwood/ladyfern (p. 121), mountain alder/Dewey sedge (p. 105); Sitka alder/ladyfern, mountain alder/Dewey sedge (Crowe and Clausnitzer 1997).

Mountain Alder–Red-Osier Dogwood/Mesic Forb Plant Association

Alnus incana-Cornus stolonifera/mesic forb

SW2216 ALIN2-COST4/MESIC FORB N = 3

Physical environment—

The mountain alder–red-osier dogwood/mesic forb plant association occurred on low-elevation (726 to 1189 m) floodplains throughout the Wenaha-Tucannon and North Fork Umatilla Wilderness. Valleys ranged from low (1 to 3 percent) to moderate (4 to 5 percent), V-, and trough-shaped. Sample site slopes were slightly steeper than those of ALIN2/ATFI ranging between 1 and 3 percent (avg. 2 percent). Soils ranged from cobbles to very-extremely gravelly/cobbly loams and loamy sands over silt loams and cobbles. Annual flood/scour events are typical at these sites during peak runoff.

Vegetation composition—

Mountain alder and red-osier dogwood compose a dog-hair tall shrub layer. Other shrubs include common snow-berry and Lewis' mock orange. Moister versions of this type may also include prickly currant in the tall shrub layer. Grand fir seedlings may inhabit the understory layers.

Common horsetail is always present in the typically sparse understory. Common cowparsnip, largeleaf avens, Lyall's angelica, blue wildrye, and Dewey sedge are some of the more common herbaceous species present. Ladyfern, small-fruit bulrush, and inflated sedge occur rarely (constancy <40 percent) and at low abundance (<5 percent) in the wettest portions of the landform. The mountain alder–red-osier dogwood plant association is generally drier than the mountain alder/ladyfern and mountain alder/tall mannagrass plant associations.

Landform environment (n = 3)		**Mean**	**Range**
Elevation (m)		986	726–1189
Plot slope (percent)		2	1–3
Aspect	Mostly southerly		

Valley environment (n = 3)		**Mode**	**Range**
Valley gradient (percent)		1–3	1–5
Valley width (m)		100–300	10–300
Valley aspect	Mostly southerly		

Soil surface cover (n = 3)	**Mean**	**Range**
Submerged (percent)	2	0–5
Bare ground	10	1–15
Gravel	6	2–10
Rock	18	5–25
Bedrock	0	
Litter	35	5–50
Moss	28	0–80

Soil profile characteristics (n = 3)			
Parent material	Alluvium		
Great group(s)	Udifluvents		
		Mean	**Range**
Water table depth (cm)			47–77
Rock fragments (percent)		63	41–100
Available water capacity of pit (cm/m)		4	1–5
pH (n = 2)		6.11	5.84–6.37
Depth to redoximorphic features (cm)		NA	
Occurrence of redoximorphic features (percentage of soils)		0	
Surface organic layer (cm)			0
Surface layers			
Thickness (cm)			0–12
Texture(s)[a]	L, LS, cobble		
Redoximorphic features	None		
Subsurface layers			
Thickness (cm)			40–>65
Texture(s)[a]	SL, LS, cobble		
Redoximorphic features	None		

[a] See "Soil Texture Codes" section.

Principal species			CON	COV	MIN	MAX
				Percent		
Understory trees:						
ABGR	Grand fir	*Abies grandis*	67	6	1	10
Shrubs:						
ALIN2	Mountain alder	*Alnus incana*	100	75	25	100
COST4	Red-osier dogwood	*Cornus stolonifera*	100	45	35	60
PHLE4	Lewis' mock orange	*Philadelphus lewisii*	67	23	15	30
RUPA	Thimbleberry	*Rubus parviflorus*	67	35	30	40
SYAL	Common snowberry	*Symphoricarpos albus*	67	18	5	30
Forbs:						
ACRU2	Red baneberry	*Actaea rubra*	67	1	1	1
ANAR3	Lyall's angelica	*Angelica arguta*	67	3	1	5
CIAL	Enchanter's nightshade	*Circaea alpina*	67	6	1	10
GEMA4	Largeleaf avens	*Geum macrophyllum*	67	2	1	2
HELA4	Common cowparsnip	*Heracleum lanatum*	67	2	1	3
MECI3	Tall fringed bluebells	*Mertencia ciliata*	67	8	1	15
MOCO4	Heartleaf minerslettuce	*Montia cordifolia*	67	8	1	15
OSCH	Mountain sweetcicely	*Osmorhiza chilensis*	67	2	1	3
Grasses:						
ELGL	Blue wildrye	*Elymus glaucus*	67	3	1	4
Sedges and other grasslikes						
CADE9	Dewey sedge	*Carex deweyana*	67	12	3	20
Ferns and horsetails:						
EQAR	Common horsetail	*Equisetum arvense*	100	6	2	10

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Management considerations—

Mountain alder is a nitrogen-fixing, early colonizing species, able to withstand long-term anaerobic conditions (USDA NRCS 2002b). Mountain alder and red-osier dogwood provide shade, soil stability, and nutrient-rich litter to streams and rivers, but mountain alder is of limited value to wild and domestic ungulates as a browse species.

Red-osier dogwood, on the other hand, is relatively unpalatable to livestock but will be browsed when more desirable forage species are lacking (Crowe and Clausnitzer, 1997). Mule deer are heavy browsers of leaves and sprouts of red-osier dogwood in summer and light browsers in fall and winter. Elk browse red-osier dogwood in winter. See Crowe and Clausnitzer (1997: 135) for more details regarding management consideration for the mountain alder–red-osier dogwood/mesic forb plant association.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: scrub-shrub wetland
Subclass: broad-leaved deciduous
Water regime: (nontidal) temporarily to intermittently flooded.

Adjacent riparian/wetland classifications—

Crowe and Clausnitzer (1997) described a mountain alder–red-osier dogwood/mesic forb plant association for midmontane riparian areas of northeastern Oregon.

Floristically similar types include mountain alder/Dewey sedge (p. 105); mountain alder/Dewey sedge, mountain alder/common snowberry (Crowe and Clausnitzer 1997).

Miscellaneous Mountain Alder Types

Mountain Alder/Tall Mannagrass Plant Association

Alnus incana/Glyceria elata

SW2215 ALIN2/GLEL N = 2

The mountain alder/tall mannagrass plant association occurred in the Strawberry Mountain Wilderness on a moderate-gradient (3 percent) floodplain and steep headwater spring (12 percent) between 1921 and 2287 m. Soils were typically moderately deep (50 to 100 cm) to deep (>100 cm) to the water table, and redoximorphic features were common. Annual flooding is common during peak runoff, and the soils remain moist/wet throughout the growing season. Soil great groups were Cryofluvents and Endoaqualfs.

Mountain alder (avg. 90 percent) forms a thick tall shrub layer sometimes accompanied by stinking currant (avg. 35 percent). Tall mannagrass (avg. 19 percent) is always present along with common cowparsnip, arrowleaf groundsel, and common horsetail. Muskflower, drooping woodreed, and big-leaved sedge may occur in the wettest portions of the landform. Tall mannagrass is a rhizomatous grass, with high tolerance for anaerobic conditions, low drought and fire tolerance, and high palatability to wild and domestic ungulates. Given the low average cover of tall mannagrass in this association, the forage potential is limited. Crowe and Clausnitzer (1997) described a mountain alder/tall mannagrass plant association for midmontane northeastern Oregon. Other floristically similar types include willow/mesic forb, currants/tall mannagrass, Sitka alder/drooping woodreed (Crowe and Clausnitzer 1997).

Mountain Alder/Common Horsetail Plant Association

Alnus incana/Equisetum arvense

SW2117 ALIN2/EQAR N = 1

The mountain alder/common horsetail plant association occurred along a narrow (about 3 m wide), moderately steep (5 percent) streambank, along Big Wall Creek in the Umatilla National Forest at 854 m elevation. Soils were cobbly loams over extremely cobbly sands and cobbles. Soils were Endoaquents. At the time of sampling (late June), the water table was lower than 50 cm, but signs of spring flooding were evident.

Mountain alder (90 percent) forms a thick tall shrub layer strongly overhanging the stream channel. Common horsetail (25 percent) is always present in the diverse herbaceous layer. Wet species such as tall mannagrass, Creeping spikerush, arrowleaf groundsel, and American speedwell occur along the stream edge, whereas drier species including pioneer violet, woodland buttercup, and western mountain aster occur higher on the streambank.

Common horsetail slows floodwaters, reduces erosion, and improves water quality for salmonid species by acting as a nutrient and sediment filter. Crowe and Clausnitzer (1997) described a mountain alder/common horsetail plant association for midmontane riparian zones and wetlands of the Blue Mountains.

Mountain Alder–Common Snowberry Plant Association

Alnus incana-Symphoricarpos albus

SW2211 ALIN2-SYAL N = 1

The mountain alder-common snowberry plant association occurred on a low-gradient (1 percent) floodplain of the North Fork Asotin Creek in the Umatilla National Forest at 854 m elevation. Soils were silt loam and sandy loam over gravel and had a shallow water table (33 cm). Soils were Udifluvents.

Mountain alder (30 percent) and common snowberry (55 percent) head the lineup of a diverse shrub layer including water birch, oceanspray, red-osier dogwood, Lewis' mock orange, and prickly currant. The herbaceous layer consists of a number of mesic forbs and grasses including pioneer violet, heartleaf minerslettuce, threepetal bedstraw, enchanter's nightshade, heartleaf arnica, and drooping woodreed.

Common snowberry will resprout from rootstock following fire, but fire is rare in this moist association. Common snowberry is a highly palatable and much preferred browse species for wild and domestic ungulates. Crowe and Clausnitzer (1997) described a mountain alder-common snowberry plant association for midmontane riparian zones and wetlands of the Blue Mountains.

Mountain Alder/Dewey Sedge Plant Community Type

Alnus incana/Carex deweyana

SW2118 ALIN2/CADE9 N = 2

The mountain alder/Dewey sedge plant community type occurred on a low-gradient (1 percent) cobble bar and streamside spring in the Wenaha-Tucannon wilderness between 823 and 884 m elevation. The soil surface is flooded in the spring but typically dries up following spring runoff. Soils ranged from cobbles to organic loams and silt-loams.

Mountain alder (88 percent) forms a dense tall shrub layer accompanied by red-osier dogwood, and thimbleberry. The herbaceous layer consists of a number of mesic forbs and grasses, including Dewey sedge (8 percent), heartleaf minerslettuce, common cowparsnip, stinging nettle, and ladyfern in the wettest portions of the landform.

The duration and extent of soil water retention represent the key environmental factors that distinguish ALIN2/GLEL from ALIN/CADE9. Unlike tall mannagrass, Dewey sedge has low tolerance for anaerobic soil conditions, but is moderately drought tolerant (USDA NRCS 2002b). Dewey sedge, a tuft-forming species, is fire tolerant, and will regenerate strongly after light/moderate ground fires. Dewey sedge is of low forage value to domestic and wild ungulates. Crowe and Clausnitzer (1997) described a mountain alder/Dewey sedge plant community type for mid-montane riparian zones and wetlands of the Blue Mountains. Other floristically similar types include mountain alder–red-osier dogwood/mesic forb (p. 102), mountain alder/ladyfern (p. 100), red-osier dogwood/ladyfern (p. 121); mountain alder–red-osier dogwood/mesic forb (Crowe and Clausnitzer 1997).

Water Birch/Mesic Forb Plant Community Type

*Betula occidentalis/*mesic forb

SW3112 BEOC2/MESIC FORB N = 13

Aaron Wells

Landform environment (n = 13)		Mean	Range
Elevation (m)		676	402–1723
Plot slope (percent)		10	<1–40
Aspect	Mostly northerly		

Valley environment (n = 13)		Mode	Range
Valley gradient (percent)		1–3	1–>8
Valley width (m)		30–100	<10–>300
Valley aspect	Mostly northerly		

Soil surface cover (n = 13)	Mean	Range
Submerged (percent)	2	0–15
Bare ground	8	0–45
Gravel	9	0–70
Rock	13	0–60
Bedrock	0	
Litter	58	25–95
Moss	7	0–40

Soil profile characteristics (n = 11)		Mean	Range
Parent material	Serpentine, basalt, alluvium, colluvium		
Great group(s)	Ustifluvents, Udifluvents, Ustorthents		
Water table depth (cm)			42–91
Rock fragments (percent)		49	5–100
Available water capacity of pit (cm/m)		6	1–14
pH (n = 8)		6.99	6.13–8.48
Depth to redoximorphic features (cm)		42	
Occurrence of redoximorphic features (percentage of soils)		8	
Surface organic layer (cm)			0–10
Surface layers			
Thickness (cm)			2–>50
Texture(s)[a]	L, LS, SI, SIL, SL, cobble, boulders		
Redoximorphic features	None		
Subsurface layers			
Thickness (cm)			31–58
Texture(s)[a]	L, LS, S, SCL, SL, cobble, boulders		
Redoximorphic features	Iron oxide concentrations		

[a] See “Soil Texture Codes” section.

Physical environment—

The water birch/mesic forb plant community type was found on floodplains, terraces, steep streambanks, and swales between 402 and 1006 m in stream valleys throughout Hells Canyon. Plot WW4801, was found on a floodplain at 1723 m in the Eagle Cap Wilderness. Canyons were typically V- or trough-shaped and low (1 to 3 percent) to high (6 to 8 percent) gradient. Soils were typically well-drained very to extremely gravelly/cobbly sands to silt loams, but also included rocky alluvium with very little soil development. Annual flooding in spring was common, and the water table remains within the rooting zone of water birch for much of the year.

Vegetation composition—

Clumps of water birch, the branches reaching skyward, form a dense canopy over a diversity of shrub species including Lewis’ mock orange, chokecherry, Rocky Mountain maple, black hawthorn, common snowberry, netleaf hackberry, red-osier dogwood, alder-leaved buckthorn, and blue elderberry. Poison ivy can often be found in the lower shrub layer.

A rich herbaceous layer may include enchanter’s nightshade, mountain sweetcicely, starry false Solomon’s seal, stinging nettle, blue wildrye, Dewey sedge, and scouringrush horsetail. Weedy species, including chervil, cleavers, perfoliated minerslettuce, cheatgrass, ripgut brome, Kentucky bluegrass, and common chickweed, are often found in the herbaceous layer at the expense of the above-mentioned species.

Adjacent riparian/wetland vegetation types:
Terraces and floodplains: CRDO2/MESIC FORB, SYAL.

Adjacent upland vegetation types:
Sideslopes: CERE2/AGSP, AGSP/ASCU5, RHGL/AGSP, CELE3, GLNE/AGSP, FEID/KOCR, ARTRV/AGSP, and various other AGSP types.

Principal species			CON	COV	MIN	MAX
				Percent		
Shrubs:						
ACGL	Rocky Mountain maple	*Acer glabrum*	46	14	5	30
BEOC2	Water birch	*Betula occidentalis*	100	72	30	95
CERE2	Netleaf hackberry	*Celtis reticulata*	46	11	1	25
CRDO2	Black hawthorn	*Crataegus douglasii*	46	13	1	30
PHLE4	Lewis' mock orange	*Philadelphus lewisii*	92	16	1	40
PRVI	Chokecherry	*Prunus virginiana*	53	9	1	40
RHRA6	Poison ivy	*Rhus radicans*	76	13	1	40
SYAL	Common snowberry	*Symphoricarpos albus*	46	9	2	25
Forbs:						
ANSC8	Chervil	*Anthriscus scandicina*	69	18	1	55
GAAP2	Cleavers	*Galium aparine*	69	16	3	50
MOPE3	Perfoliated minerslettuce	*Montia perfoliata*	46	15	1	60
TAOF	Dandelion	*Taraxacum officinale*	46	1	1	3
Grasses:						
ELGL	Blue wildrye	*Elymus glaucus*	46	8	1	25
Ferns and horsetails:						
EQHY	Scouringrush horsetail	*Equisetum hyemale*	46	8	1	40

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Management considerations—

The relatively open understory of the water birch/mesic forb plant community type makes this type highly preferred by cattle for forage, resting, and shade. Overuse is common, and in a similar trend, overgrazing of the water birch/mixed mesic forb plant association results in weedy species prevailing within the herbaceous and low shrub layers. Lacking the thick shrub layer common to other shrub types in the canyon country, streambanks are highly susceptible to erosion and damage from trampling. Forage values are typically low (<168 kg/ha) for this association in its present state, but the potential exists for increasing forage value given proper grazing management. Managers and landowners may want to consider a few years rest from grazing followed by short-term grazing in spring and early summer.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: scrub-shrub wetland
Subclass: broad-leaved deciduous
Water regime: (nontidal) seasonally flooded to saturated.

Adjacent riparian/wetland classifications—

Water birch/mesic forb types have been described for riparian/wetland sites of midmontane northeastern Oregon (Crowe and Clausnitzer 1997), southwestern Idaho (Jankovsky-Jones et al. 2001), Nevada and eastern California (Manning and Padgett 1995), and Utah and southeastern Idaho (Padgett et al. 1989).

Floristically similar types include black cottonwood/mountain alder–red-osier dogwood (p. 102); white alder/water birch (Crawford, 2003).

Red-Osier Dogwood Plant Association

Cornus stolonifera

SW5112 COST4 N = 9

Aaron Wells

Landform environment (n = 9)		Mean	Range
Elevation (m)		793	424–1128
Plot slope (percent)		10	1–35
Aspect	All		

Valley environment (n = 9)		Mode	Range
Valley gradient (percent)		>8	1–5, >8
Valley width (m)		30–100	<10–100
Valley aspect	All		

Soil surface cover (n = 9)	Mean	Range
Submerged (percent)	5	0–30
Bare ground	10	0–60
Gravel	3	0–10
Rock	8	0–20
Bedrock	0	
Litter	27	2–76
Moss	43	<1–90

Soil profile characteristics (n = 9)			
Parent material	Basalt, alluvium		
Great group(s)	Endoaquents, Endoaquepts, Udifluvents		
		Mean	**Range**
Water table depth (cm)			0–78
Rock fragments (percent)		54	0–100
Available water capacity of pit (cm/m)		7	1–17
pH (n = 6)		6.99	5.6–7.6
Depth to redoximorphic features (cm)		41	
Occurrence of redoximorphic features (percentage of soils)		11	
Surface organic layer (cm)			0–19
Surface layers			
Thickness (cm)			8–18
Texture(s)[a]	L, SIL, SL, cobble, gravel		
Redoximorphic features	None		
Subsurface layers			
Thickness (cm)			2–>28
Texture(s)[a]	LS, SICL, SIL, SL, cobble, gravel		
Redoximorphic features	Iron oxide concentrations		

[a] See “Soil Texture Codes” section.

Physical environment—

The red-osier dogwood plant association was found on steep, rocky floodplains and streambanks throughout the lower elevations of the study area. Sample sites occurred in mostly moderate (4 to 5 percent) to very steep (>8 percent) gradient, V-shaped valleys. Often soils were undeveloped, usually consisting of alluvial gravels and cobbles and sometimes covered with a thin (<30 cm) veneer of sand or loam. More developed soils were typically well-drained, shallow (<50 cm), very gravelly/cobbly sandy loams to silt loams overlying cobble/boulder beds. The water table is within the rooting zone of red-osier dogwood throughout most of the year.

Vegetation composition—

A rich shrub layer featuring red-osier dogwood is often accompanied by Rocky Mountain maple, Lewis’ mock orange, thimbleberry, water birch, and prickly currant. Various coniferous seedlings may be found scattered in the understory.

The sparse herbaceous layer might include Fendler’s waterleaf, common cowparsnip, enchanter’s nightshade, Canadian white violet, western meadow-rue, blue wildrye, tall mannagrass, and horsetails.

Adjacent riparian/wetland vegetation types:
Floodplains and terraces:
CERE2, ALRH2/MESIC SHRUB, PSME/ACGL-PHMA5–FLOODPLAIN, and PIPO/SYAL–FLOODPLAIN.

Adjacent upland types:
Sideslopes: PSME/HODI, ABGR/ACGL–PHMA5, ABGR/CARU, and various AGSP types.

Principal species			CON	COV	MIN	MAX
				Percent		
Shrubs:						
ACGL	Rocky Mountain maple	*Acer glabrum* Torr.	66	10	1	15
COST4	Red-osier dogwood	*Cornus stolonifera*	100	52	21	100
PHLE4	Lewis' mock orange	*Philadelphus lewisii*	66	10	5	12
RUPA	Thimbleberry	*Rubus parviflorus*	44	30	1	50
SYAL	Common snowberry	*Symphoricarpos albus*	44	21	2	40
Forbs:						
GAAP2	Cleavers	*Galium aparine*	55	7	1	15
Grasses:						
ELGL	Blue wildrye	*Elymus glaucus*	33	1	1	1
Sedges and other grasslikes:						
CADE9	Dewey sedge	*Carex deweyana*	33	2	1	3
Ferns and horsetails:						
EQHY	Scouringrush horsetail	*Equisetum hyemale*	66	3	1	7

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Management considerations—

Total dry herbaceous biomass ranged from 112 to 2576 (avg. 1187) kg/ha. The range of herbaceous biomass is obviously highly variable and depends on the density of the red-osier dogwood canopy, the gradient of the site, and the soil texture (Crowe and Clausnitzer 1997). Red-osier dogwood is relatively unpalatable to livestock but will be browsed when more desirable forage species are lacking. Mule deer are heavy browsers of leaves and sprouts of red-osier dogwood in summer and light browsers in fall and winter. Elk browse red-osier dogwood in winter.

Red-osier dogwood is an important early colonizer species on rocky bars and streambanks throughout its range. The red-osier dogwood association buffers the effects of flooding on streambanks thus reducing erosion, and provides shade and high-quality litter to the stream channel. See Crowe and Clausnitzer (1997: 152) for more details regarding management consideration for the red-osier dogwood plant association.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: scrub-shrub wetland
Subclass: broad-leaved deciduous
Water regime: (nontidal) seasonally flooded to saturated.

Adjacent riparian/wetland classifications—

Although a variety of red-osier dogwood types have been described for adjacent riparian areas (see below) the red-osier dogwood association described above is more similar (based on ordering a Bray/Curtis similarity matrix) to other shrub types (red-osier dogwood/ladyfern, Rocky Mountain maple/mountain sweetcicely, mountain alder/Dewey sedge, thimbleberry, mallow ninebark) described in this classification than it is to red-osier dogwood types from surrounding classifications, including the red-osier dogwood types described for midmontane riparian zones and wetlands of the Blue Mountains found in Crowe and Clausnitzer (1997). This suggests that although red-osier dogwood is a widespread species, the particular assemblage of plants that make up the red-osier dogwood association are unique, most likely a result of the large number of sample plots that were located in the environmentally distinct Hells Canyon.

Red-osier dogwood types from adjacent riparian and wetland classifications include Pacific willow/red-osier dogwood (Crawford 2003); red-osier dogwood plant association, red-osier dogwood/brook saxifrage (Crowe and Clausnitzer 1997); red-osier dogwood plant association (Diaz and Mellon 1996); red-osier dogwood community type (Hansen et al. 1995); red-osier dogwood plant association, red-osier dogwood (Jankovsky-Jones et al. 2001); red-osier dogwood/common snowberry, red-osier dogwood/mesic forb, red-osier dogwood/ladyfern, red-osier dogwood/horsetail (Kovalchik and Clausnitzer 2004); *Cornus sericea* (red-osier dogwood) community type, *Cornus sericea-Salix* community type (Manning and Padgett 1995); *Cornus stolonifera* (red-osier dogwood)/*Heracleum lanatum* (common cow parsnip) (Padgett et al., 1995); *Cornus stolonifera*/*Heracleum lanatum*; *Cornus stolonifera*/*Galium triflorum* (fragrant bedstraw) (Youngblood et al. 1985).

Floristically similar types include red-osier dogwood/brook saxifrage, western serviceberry (Crowe and Clausnitzer 1997); red-osier dogwood/ladyfern, Rocky Mountain maple, common snowberry (Kovalchik and Clausnitzer 2004).

Black Hawthorn/Mesic Forb Plant Community Type

Crataegus douglasii/mesic forb

SW3111 CRDO2/MESIC FORB N = 17

Aaron Wells

Physical environment—

The black hawthorn/mesic forb plant community type was found on low to midelevation (579 to 1232 m) floodplains, terraces, steep streambanks, and a moist meadow. Valley types included low (1 to 3 percent) to high (6 to 8 percent) gradient V- and trough-shaped and flat canyons. Landform slope ranged from 1 to 6 percent on floodplains, terraces, and meadows to 4 to 85 percent on streambanks. Soils were poorly drained to moderately well drained, gravelly/cobbly loams and silt loams in the surface layers to loams and clays in the subsurface layers. Water flows over the surface most or part of the year, and the soil profile remains moist/wet for the entire growing season. Black hawthorn, a drought-intolerant species, requires slightly higher soil moisture content or less intense solar radiation exposure than common snowberry, a more drought-tolerant species.

Vegetation composition—

Black hawthorn forms a tangled tall shrub layer with common snowberry frequently present. Other shrub species sometimes present at low abundance include Lewis' mock orange, western serviceberry, Rocky Mountain maple, mallow ninebark, currants, and poison ivy.

A diverse understory of mesic forbs and grasses includes enchanter's nightshade, blue wildrye, mountain sweetcicely, Canadian white violet, Dewey sedge, and scouringrush horsetail. Heavy grazing may lead to the prevalence of weedy species such as cleavers, chervil, perfoliated minerslettuce, dandelion, and lesser burdock.

Landform environment (n = 17)		**Mean**	**Range**
Elevation (m)		830	579–1232
Plot slope (percent)		8	<1–85
Aspect	All		

Valley environment (n = 17)		**Mode**	**Range**
Valley gradient (percent)		4–5	1–>8
Valley width (m)		30–100	<10–>300
Valley aspect	All		

Soil surface cover (n = 17)	**Mean**	**Range**
Submerged (percent)	2	0–15
Bare ground	5	0–60
Gravel	0	
Rock	2	0–5
Bedrock	0	
Litter	75	39–95
Moss	16	0–47

Soil profile characteristics (n = 17)			
Parent material	Mazama ash, basalt, alluvium		
Great group(s)	Endoaquands, Haplustolls, Hapludalfs, Haplustands, Ustifluvents, Ustorthents		
		Mean	**Range**
Water table depth (cm)			23–>100
Rock fragments (percent)		15	0–36
Available water capacity of pit (cm/m)		12	6–19
pH (n = 15)		6.48	5.11–7.01
Depth to redoximorphic features (cm)			25–45
Occurrence of redoximorphic features (percentage of soils)		18	
Surface organic layer (cm)			0–7
Surface layers			
Thickness (cm)			9–81
Texture(s)[a]	C, L, LS, S, SICL, SIL, SL		
Redoximorphic features	Iron oxide concentrations		
Subsurface layers			
Thickness (cm)			26–>79
Texture(s)[a]	C, CL, L, LS, S, SIL, SL		
Redoximorphic features	Iron oxide concentrations		

[a] See "Soil Texture Codes" section.

Adjacent riparian/wetland vegetation types:
Floodplains and terraces: PSME/ACGL-PHMA–FLOODPLAIN and ALRH2/MESIC SHRUB.

Adjacent upland vegetation types:
Sideslopes: PIPO/SYAL, ABGR/ACGL, and various bluebunch wheatgrass types.

Principal species			CON	COV	MIN	MAX
				Percent		
Shrubs:						
CRDO2	Black hawthorn	*Crataegus douglasii*	100	86	40	100
PHLE4	Lewis' mock orange	*Philadelphus lewisii*	70	11	1	25
SYAL	Common snowberry	*Symphoricarpos albus*	94	20	1	50
Forbs:						
ANSC8	Chervil	*Anthriscus scandicina*	64	44	1	90
CIAL	Enchanter's nightshade	*Circaea alpina*	64	9	1	50
GAAP2	Cleavers	*Galium aparine*	82	21	1	70
MOPE3	Perfoliated minerslettuce	*Montia perfoliata*	82	16	1	60
OSCH	Mountain sweetcicely	*Osmorhiza chilensis*	52	11	3	30
VICA4	Canadian white violet	*Viola canadensis*	41	11	1	50
Grasses:						
ELGL	Blue wildrye	*Elymus glaucus*	58	18	1	85
Sedges and other grasslikes:						
CADE9	Dewey sedge	*Carex deweyana*	41	10	1	40

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Management considerations—

Black hawthorn foliage is readily eaten by livestock although stout thorns discourage heavy browsing (Habeck 1991). Common snowberry is browsed by deer, elk, and cattle. It is a nutritious species for cattle late in the season but probably sustains the least damage if grazed in spring. Common snowberry reproduces by rhizomes and can increase or decrease following heavy grazing depending on the season and yearly moisture condition (Snyder 1991). Mallow ninebark is little browsed by livestock and wild ungulates (Habeck 1992).

Although the aboveground parts of black hawthorn are killed by even low-intensity fires, some plants may survive and resprout from the root crown. Fire can be used to reduce or contain a black hawthorn population (Habeck 1991). Fires of low to moderate intensity will generally cause snowberry to sprout vigorously from its rhizomes. Severe fires may kill snowberry plants (Snyder 1991). Mallow ninebark is fire resistant and will resprout vigorously from horizontal rhizomes following fire (Habeck 1992).

Black hawthorn is a valuable source of food and cover for wildlife. Fruits are eaten by blue and sharp-tailed grouse, mule deer, and small mammals. The dense branching in a hawthorn thicket provides good nesting for black-billed magpies and thrushes, long-eared owls, and other birds. Mice, voles, deer, and birds use hawthorn for hiding and thermal cover (Habeck 1991). Snowberry provides good nesting cover for small mammals and many birds, including ruffed grouse, wild turkey, and various songbirds. The fruits are eaten by quail, pheasant, grouse, and other animals (Snyder 1991). (The above three paragraphs were taken from Crowe and Clausnitzer 1997.)

Total dry herbaceous biomass ranged from 112 to 2577 (avg. 1077) kg/ha. The black hawthorn/mixed mesic forb plant community type often occupy long narrow, stretches along streams on the benchlands of Hells Canyon providing important travel corridors, bedding, feeding, and watering sites for wildlife in an otherwise harsh and forbidding environment.

The black hawthorn/mesic forb plant association has the potential to shift to the common snowberry plant association given a reduction in soil moisture combined with fire. Intense shading and dense thickets can result in black hawthorn inhabiting these sites for long periods, often until a disturbance event, such as a fire, shifts the competitive advantage to other species.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: scrub-shrub wetland
Subclass: broad-leaved deciduous
Water regime: (nontidal) saturated to temporarily flooded.

Adjacent riparian/wetland classifications—

Crawford (2003) described two black hawthorn types for the Columbia River basin: black hawthorn/common snowberry and black hawthorn/Woods' rose. Crowe and Clausnitzer (1997) described a black hawthorn type for the midmontane wetlands of the Blue Mountains in Oregon. Lastly, Kovalchik and Clausnitzer (2004) described a black hawthorn/Douglas spirea type for eastern Washington.

Floristically similar types include Rocky Mountain maple (p. 114).

Common Snowberry Plant Community Type

Symphoricarpos albus

SM3110 SYAL N = 6

Aaron Wells

Landform environment (n = 6)		Mean	Range
Elevation (m)		817	442–1223
Plot slope (percent)		3	1–7
Aspect	Mostly northerly		

Valley environment (n = 6)		Mode	Range
Valley gradient (percent)		4–5	1–8
Valley width (m)		30–100	30–>300
Valley aspect	Mostly northerly		

Soil surface cover (n = 6)	Mean	Range
Submerged (percent)	0	
Bare ground	13	0–75
Gravel	0	
Rock	7	0–15
Bedrock	0	
Litter	64	15–95
Moss	16	0–60

Soil profile characteristics (n = 6)			
Parent material	Alluvium		
Great group(s)	Hapludalfs, Udifluvents, Ustifluvents, Udorthents		
		Mean	**Range**
Water table depth (cm)			91–>100
Rock fragments (percent)		26	0–100
Available water capacity of pit (cm/m)		11	1–15
pH (n = 5)		6.45	5.63–7.25
Depth to redoximorphic features (cm)		NA	
Occurrence of redoximorphic features (percentage of soils)		0	
Surface organic layer (cm)			0–6
Surface layers			
Thickness (cm)			5–9
Texture(s)[a]	L, S, SCL, SL, cobbly loam		
Redoximorphic features	None		
Subsurface layers			
Thickness (cm)			5–>26
Texture(s)[a]	CL, L, LS, SICL, SL, cobble, boulders		
Redoximorphic features	None		

[a] See “Soil Texture Codes” section.

Physical environment—

The common snowberry plant community type occurred on floodplains and terraces throughout the deep canyons of the study area (400 to 1200 m). Valley types included low (1 to 3 percent) to high (6 to 8 percent) gradient V- and trough-shaped and flat canyons. Soils are moderately well-drained gravelly/cobbly sands and loams in the surface layers to loams and silty-clay loams in the subsurface layers. The soil surface is flooded in the spring but typically dries up following spring runoff. Subsurface soils do not retain significant amounts of moisture throughout the year. Sample sites occurred in areas fully exposed to intense solar radiation.

Vegetation composition—

Common snowberry monopolizes the tall shrub layer and may occasionally be overtopped by tall shrub species at low abundance including black hawthorn, Lewis’ mock orange, Wood’s rose, oceanspray, Rocky Mountain maple, netleaf hackberry, and mallow ninebark. The shrub layer is often so thick that regeneration of conifers is rare.

Cleavers is always found in the typically sparse understory, and is often accompanied by enchanter’s nightshade, starry false Solomon’s seal, mountain sweetcicely, brittle bladderfern, common cowparsnip, Canada thistle, chervil, Kentucky bluegrass, and Dewey sedge.

Adjacent riparian/wetland vegetation types:
- Floodplains and terraces: CERE2, POTR15/ALIN2-COST4, CRDO2/MESIC FORB, EQAR, and ALRH2/MESIC SHRUB.

Adjacent upland vegetation types:
- Sideslopes: PSME/ACGL-PHMA5, PIPO/AGSP, various AGSP types.

Principal species			CON	COV	MIN	MAX
				Percent		
Shrubs:						
CRDO2	Black hawthorn	*Crataegus douglasii*	50	9	6	10
HODI	Oceanspray	*Holodiscus discolor*	50	22	5	40
PHLE4	Lewis' mock orange	*Philadelphus lewisii*	50	28	25	30
ROWO	Woods' rose	*Rosa woodsii*	50	27	2	40
SYAL	Common snowberry	*Symphoricarpos albus*	100	64	40	90
Forbs:						
CIAL	Enchanter's nightshade	*Circaea alpina*	66	12	1	20
CIAR4	Canada thistle	*Cirsium arvense*	50	2	1	3
GAAP2	Cleavers	*Galium aparine*	100	9	1	25
MOPE3	Perfoliated minerslettuce	*Montia perfoliata*	50	9	3	15
OSCH	Mountain sweetcicely	*Osmorhiza chilensis*	50	8	3	10
SMST	Starry false Solomon's seal	*Smilacina stellata*	66	11	5	20
Grasses:						
POPR	Kentucky bluegrass	*Poa pratensis*	50	6	3	10
Ferns and horsetails:						
CYFR2	Brittle bladderfern	*Cystopteris fragilis*	50	5	1	10

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Management considerations—

Common snowberry is a highly palatable and much preferred browse species for wild and domestic ungulates, especially later in the season (USDA NRCS 2002b). However, overuse of the common snowberry floodplain plant association can result in weedy species such as cleavers, chervil, Kentucky bluegrass, Canada thistle, and perfoliated minerslettuce overtaking the herbaceous layer. Common snowberry reproduces mainly by rhizomes and may increase or decrease following heavy grazing, depending on the season and moisture conditions of the soil (Crowe and Clausnitzer 1997).

High-intensity fires may kill common snowberry, whereas low to moderate fires tend to cause vigorous resprouting from rhizomes. The thick shrub layer and abundant berries provide nesting and feeding habitat for songbirds and small mammals. Intense shading by snowberry and dense thickets can result in common snowberry occupying these sites for long periods, often until a disturbance event, such as a fire or flood, shifts the competitive advantage to other species.

The common snowberry plant community type has the potential to shift to black hawthorn/mixed mesic forb given an increase in soil moisture content combined with disturbance. Conversely, the black hawthorn/mixed mesic forb plant association has the potential to shift to the common snowberry plant association given a reduction in soil moisture combined with moderate-intensity fire. Possible successional trajectories include PSME/SYAL, PIPO/SYAL, POTR15/SHRUB, CRDO2/MESIC FORB, ALIN2-SYAL.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: scrub-shrub wetland
Subclass: broad-leaved deciduous
Water regime: (nontidal) saturated to temporarily flooded.

Adjacent riparian/wetland classifications—

Kovalchik and Clausnitzer (2004) described a common snowberry community type for eastern Washington.

There are no floristically similar types.

Rocky Mountain Maple Plant Community Type

Acer glabrum

HD01 ACGL N = 7

Aaron Wells

Landform environment (n = 8)		Mean	Range
Elevation (m)		745	524–1079
Plot slope (percent)		6	2–15
Aspect	All		

Valley environment (n = 8)		Mode	Range
Valley gradient (percent)		4–5	4–8
Valley width (m)		10–30	<10–300
Valley aspect	Mostly northerly		

Soil surface cover (n = 8)	Mean	Range
Submerged (percent)	0	
Bare ground	2	0–10
Gravel	1	0–5
Rock	20	0–65
Bedrock	0	
Litter	31	13–70
Moss	45	15–82

Soil profile characteristics (n = 8)			
Parent material	Basalt, alluvium, colluvium		
Great group(s)	Haplustands, Udorthents, Ustifluvents, Ustorthents		
		Mean	**Range**
Water table depth (cm)			>40
Rock fragments (percent)		60	0–100
Available water capacity of pit (cm/m)		6	1–16
pH (n = 5)		6.30	5.93–7.08
Depth to redoximorphic features (cm)		NA	
Occurrence of redoximorphic features (percentage of soils)		0	
Surface organic layer (cm)			0–6
Surface layers			
Thickness (cm)			1–5
Texture(s)[a]	L, LS, S, SICL, SIL, SL, boulders		
Redoximorphic features	None		
Subsurface layers			
Thickness (cm)			11–>18
Texture(s)[a]	L, LS, S, SL, boulders		
Redoximorphic features	None		

[a] See “Soil Texture Codes” section.

Physical environment—

The Rocky Mountain maple plant community type occurred on moderate to steep (2 to 15 percent) terraces, streambanks, and abandoned channels throughout the lower reaches of the Blue Mountains (524 to 1079 m). Valleys were typically moderate (4 to 5 percent) to high (6 to 8 percent) gradient and V-shaped or flat. Rocky Mountain maple is often found growing up between moss-covered boulders with very little soil development. When soil development was evident, soils were typically well-drained, very to extremely gravelly/cobbly sands to loams over boulders.

Vegetation composition—

Rocky Mountain maple forms the tall shrub layer and is often accompanied by Lewis’ mock orange at low abundance. Western serviceberry, black hawthorn, oceanspray, common snowberry, and blue elderberry may also be found in the tall shrub layer. White spirea, thimbleberry, and poison ivy are characteristic of the low shrub layer.

Mountain sweetcicely is usually found in the typically sparse herbaceous layer along with enchanter’s nightshade, blue wildrye, Alaska oniongrass, Dewey sedge, and scouringrush horsetail. Less common are heartleaf arnica, feathery false Solomon’s seal, manyflower tonella, and California brome. Disturbance-related species include chervil, cleavers, perfoliated minerslettuce, and ripgut brome.

Adjacent riparian/wetland vegetation types:

Terraces and floodplains:

PSME/ACGL-PHMA5–FLOODPLAIN, ABGR/ACGL–FLOODPLAIN, ALRH2/MESIC SHRUB.

Adjacent upland vegetation types:

Sideslopes: PIPO/AGSP, ABGR/ACGL, GLNE/AGSP, and various bluebunch wheatgrass types.

Principal species			CON	COV	MIN	MAX
				Percent		
Shrubs:						
ACGL	Rocky Mountain maple	*Acer glabrum*	100	74	20	100
PHLE4	Lewis' mock orange	*Philadelphus lewisii*	87	23	10	35
SYAL	Common snowberry	*Symphoricarpos albus*	50	10	2	20
Forbs:						
ANSC8	Chervil	*Anthriscus scandicina*	50	30	3	70
CIAL	Enchanter's nightshade	*Circaea alpina*	50	2	1	3
GAAP2	Cleavers	*Galium aparine*	75	16	2	40
MOPE3	Perfoliated minerslettuce	*Montia perfoliata*	87	10	1	25
OSCH	Mountain sweetcicely	*Osmorhiza chilensis*	75	8	3	15
Grasses:						
ELGL	Blue wildrye	*Elymus glaucus*	62	3	2	5
MESU	Alaska oniongrass	*Melica subulata*	50	5	1	10
Ferns and horsetails:						
EQHY	Scouringrush horsetail	*Equisetum hyemale*	50	2	1	3

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Management considerations—

Deer and elk will browse at these sites, but the steep nature and undulating boulder-strewn surface preclude high use by cattle. A variety of birds including rufous-sided towhee, Lazuli buntings, winter wrens, and grouse feed on the abundant fruits found in the shrub layer. Squirrels and chipmunks feed on the winged seeds of Rocky Mountain maple. Rocky Mountain maple is fire tolerant and will resprout vigorously from rootstocks following fires (USDA NRCS 2002b). Flooding is rare, and fire may represent the most important natural disturbance influencing these sites. Light ground fires, not livestock grazing, may be the principal disturbance factor leading to the establishment of weedy species in the herbaceous layer of steeper sites. Possible successional trajectories include PSME/ACGL-PHMA5-SYAL and ABGR/ACGL.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: scrub-shrub wetland
Subclass: broad-leaved deciduous
Water regime: (nontidal) temporarily to intermittently flooded.

Adjacent riparian/wetland classifications—

Kovalchik and Clausnitzer (2004) described a Rocky Mountain maple series for eastern Washington that features a variety of Rocky Mountain maple known as Douglas Rocky Mountain maple (*Acer glabrum* Torr. var. *douglasii* (Hook.) Dippel). The Douglas Rocky Mountain maple series is similar environmentally to the Rocky Mountain maple plant community type.

Floristically similar types include black hawthorn/mesic forb (p. 110), thimbleberry (p. 123).

Netleaf Hackberry/Brome Plant Community Type

Celtis reticulata/Bromus spp.

SD5612 CERE2/BROMU N = 14

Aaron Wells

Landform environment (n = 14)		Mean	Range
Elevation (m)		502	393–643
Plot slope (percent)		14	2–54
Aspect	Mostly northerly		

Valley environment (n = 14)		Mode	Range
Valley gradient (percent)		4–5	1–>8
Valley width (m)		30–100	10–100
Valley aspect	All		

Soil surface cover (n = 14)	Mean	Range
Submerged (percent)	0	
Bare ground	0	
Gravel	2	0–30
Rock	5	0–30
Bedrock	1	0–6
Litter	83	47–95
Moss	5	0–30

Soil profile characteristics (n = 14)		Mean	Range
Parent material	Basalt, alluvium, colluvium		
Great group(s)	Haplustands, Haplustolls, Ustifluvents, Ustorthents		
Water table depth (cm)			70–114
Rock fragments (percent)		42	0–100
Available water capacity of pit (cm/m)		7	1–16
pH (n = 13)		6.76	4.72–7.83
Depth to redoximorphic features (cm)		NA	
Occurrence of redoximorphic features (percentage of soils)		0	
Surface organic layer (cm)			0–30
Surface layers			
Thickness (cm)			9–56
Texture(s)[a]	CL, L, LS, S, SIL, SL, extremely cobbly sandy loam, cobbles		
Redoximorphic features	None		
Subsurface layers			
Thickness (cm)			8–102
Texture(s)[a]	L, LS, S, SIL, SL, extremely cobbly/ bouldery sand, cobbles		
Redoximorphic features	None		

[a] See “Soil Texture Codes” section.

Physical environment—

The netleaf hackberry/brome plant community type is very common on low-elevation (393 to 643 m) terraces of Hells Canyon. Sample sites were typically located near the mouths of tributary streams as they flowed into the Snake River. Valleys were typically low (1 to 3 percent) to very high (6 to 8 percent) gradient and V-, trough-, or box-shaped. Soils were well drained, rocky, and moderately coarse textured. A typical soil might consist of an organic horizon (0 to 30 cm) over a thin (<10 cm) loamy surface horizon, below which is a deep (20 to 100 cm), very gravelly/cobbly loam subsurface layer often ending in bedrock or boulders. The water table, although deep, remains available to hackberry throughout the year.

Vegetation composition—

Netleaf hackberry creates a thick overstory layer with Lewis’ mock orange thoughout. Chokecherry, blue elderberry, oceanspray, common snowberry, and black hawthorn may also occur in the tall shrub layer. Poison ivy and snow currant may be found in the low shrub layer.

The herbaceous layer is often completely composed of exotic brome grasses, chervil, cleavers, and perfoliated minerslettuce. Various native, mesic species often occur scattered throughout including mountain sweetcicely, waterleaf, manyflower tonella, brodiaea, tapertip onion, and blue wildrye.

Adjacent riparian/wetland vegetation types:
Floodplains and terraces: ALRH2/SHRUB, SYAL.

Adjacent upland vegetation types:
Sideslopes: CERE2/AGSP, RHGL/AGSP, GLNE/ASGP, AGSP/POSA12, and FEID/AGSP.

Principal species			CON	COV	MIN	MAX
				Percent		
Shrubs:						
CERE2	Netleaf hackberry	*Celtis reticulata*	100	72	45	95
PHLE4	Lewis' mock orange	*Philadelphus lewisii*	78	23	1	60
RHRA6	Poison ivy	*Rhus radicans*	64	13	5	40
SACE3	Blue elderberry	*Sambucus cerulea*	42	10	1	25
Forbs:						
ANSC8	Chervil	*Anthriscus scandicina*	92	47	3	85
GAAP2	Cleavers	*Galium aparine*	85	25	1	70
MOPE3	Perfoliated minerslettuce	*Montia perfoliata*	50	14	5	30
Grasses:						
BRRI8	Ripgut brome	*Bromus rigidus*	42	38	5	85
BRTE	Cheatgrass	*Bromus tectorum*	35	46	3	85

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Management considerations—

Johnson and Simon (1987) described a similar plant association in uplands sites associated with seepage and on stream tearraces of Hells Canyon. The netleaf hackberry/brome plant community type differs from the netleaf hackberry/bluebunch wheatgrass association in that mesic shrubs and herbs are present in the former.

These sites tend be heavily impacted by livestock and humans because of their location in the riparian zone where water availability and a cooler microenvironment temper the high summer temperatures. Also, travel is much easier along low-gradient canyon bottoms relative to the steep sideslopes charateristic of Hells Canyon. Livestock and humans take advantage of the shade provided at these sites by the thick shrub layer, often the only escape from the sun available in the hot, dry lower reaches of Hells Canyon. Continual disturbance of the soil surface has perpetuated exotic and weedy species such as cheatgrass, chervil, and poison ivy.

Fires encourage cheatgrass, which is not only fire tolerant but can alter the natural fire cycle, negatively impacting native species such as bluebunch wheatgrass (USDA NRCS 2002b). In the absence of disturbance, these sites would most likely resemble the netleaf hackberry/bluebunch wheatgrass association of Johnson and Simon (1987) with high coverage of mesic rather than xeric forbs and an absence of cheatgrass. The netleaf hackberry/brome plant community type represents a disclimax association in valley bottoms of Hells Canyon.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: scrub-shrub wetland
Subclass: broad-leaved deciduous
Water regime: (nontidal) temporarily to intermittently flooded.

Adjacent riparian/wetland classifications—

Miller (1976) first described a netleaf hackberry community type for Hells Canyon similar to the association described above with cheatgrass and a “multitude” of disturbance species occupying the understory. Jankovsky-Jones et al. (2001) noted that although no netleaf hackberry types were sampled in southwestern Idaho they expected such types to occur. Crawford (2003) described a netleaf hackberry/Lewis' mock orange type with cheatgrass always found in the understory.

Floristically similar types include Lewis' mock orange/mesic forb (p. 118).

Lewis' Mock Orange/Mesic Forb Plant Community Type

Philadelphus lewisii/mesic forb

SM3001 PHLE4/MESIC FORB N = 9

Aaron Wells

Physical environment—

The Lewis' mock orange/mesic forb plant community type occurred on floodplains, terraces, streambanks, and abandoned channels mostly below 762 m (Plot WW5621, 854 m). Sample sites occurred exclusively in Hells Canyon near the mouths of tributaries to the Snake River. Sample sites were moderate (4 to 5 percent) to very high (6 to 8 percent) gradient and mostly V-shaped valleys with trough-shaped and flat valleys occurring as well. Soils were excessively drained and ranged from moss-covered boulders to a thin veneer of silt loam over cobbles/boulders.

Vegetation composition—

The multiple stems of Lewis' mock orange create an arborlike canopy with scattered netleaf hackberry, Rocky Mountain maple, blue elderberry, western serviceberry, and red-osier dogwood throughout the tall shrub layer. Poison ivy is often found in the low shrub layer.

Mesic species such as common cowparsnip, mountain sweetcicely, blue wildrye, Dewey sedge, and scouringrush horsetail tend to occur at low constancy and abundance in the herbaceous layer. Weedy species prevail at these sites including cleavers, chervil, perfoliated minerslettuce, cheatgrass, ripgut brome, and Kentucky bluegrass. Common St. Johnswort, an invasive species in Oregon, was found in the herbaceous layer of this association.

Landform environment (n = 7)		Mean	Range
Elevation (m)		540	354–854
Plot slope (percent)		8	2–20
Aspect	All		

Valley environment (n = 7)		Mode	Range
Valley gradient (percent)		4–5	4–>8
Valley width (m)		<10	>10–300
Valley aspect	All		

Soil surface cover (n = 7)	Mean	Range
Submerged (percent)	2	0–10
Bare ground	4	0–20
Gravel	2	0–5
Rock	16	0–40
Bedrock	2	0–10
Litter	53	2–100
Moss	19	0–85

Soil profile characteristics (n = 7)			
Parent material	Alluvium, colluvium, basalt		
Great group(s)	Ustifluvents, Ustorthents		
		Mean	**Range**
Water table depth (cm)			66–>100
Rock fragments (percent)		64	0–100
Available water capacity of pit (cm/m)		5	1–16
pH (n = 3)		7.13	6.80–7.60
Depth to redoximorphic features (cm)		NA	
Occurrence of redoximorphic features (percentage of soils)		0	
Surface organic layer (cm)			0–5
Surface layers			
Thickness (cm)			1–8
Texture(s)[a]	L, SIL, SL, cobble, boulders		
Redoximorphic features	None		
Subsurface layers			
Thickness (cm)			9–>84
Texture(s)[a]	L, LS, SL, cobble, boulders		
Redoximorphic features	None		

[a] See "Soil Texture Codes" section.

Adjacent riparian/wetland vegetation types:
Floodplains and terraces: CERE2/BROMU, ALRH2/MESIC SHRUB.

Adjacent upland vegetation types:
Sideslopes: PSME/HODI, PIPO/HODI, RHGL/AGSP, FEID-AGSP/PHCO10, AGSP-POSA12/PHCO10, and other AGSP types.

Principal species			CON	COV	MIN	MAX
				Percent		
Shrubs:						
CERE2	Netleaf hackbery	*Celtis reticulata*	66	16	1	35
PHLE4	Lewis' mock orange	*Philadelphus lewisii*	100	55	6	90
RHRA6	Poison ivy	*Rhus radicans*	44	7	1	20
Forbs:						
ANSC8	Chervil	*Anthriscus scandicina*	77	27	1	65
GAAP2	Cleavers	*Galium aparine*	77	6	1	10
MOPE3	Perfoliated minerslettuce	*Montia perfoliata*	44	12	2	30
URDI	Stinging nettle	*Urtica dioica*	44	4	3	5
Grasses:						
AGSP	Bluebunch wheatgrass	*Agropyron spicatum*	44	6	1	15
BRRI8	Ripgut brome	*Bromus rigidus*	33	27	10	50
BRTE	Cheatgrass	*Bromus tectorum*	44	35	25	60
POPR	Kentucky bluegrass	*Poa pratensis*	55	7	1	15

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Management considerations—

The Lewis' mock orange/mixed mesic forb plant community type occurred in stream valleys of Hells Canyon with historical or present-day ranching activity including Eureka Creek, Downey Gulch, Jones Creek, Pittsburg Creek, Hominy Creek, and Two Corral Creek. Lewis' mock orange is a highly palatable browse species for domestic and wild ungulates and will resprout from rootstock following low to moderate disturbance. Constant trampling has smothered out other shrub seedlings at these sites, and perpetuated Lewis' mock orange and poison ivy in a positive feedback cycle. The prevalence of weedy herbaceous species is the result of past or current overgrazing; mesic forbs were trampled, allowing a competitive advantage to agressive species like chervil and cheatgrass. In the absence of grazing, these sites would likely have succeeded to netleaf hackberry or Rocky Mountain maple plant associations. Lewis' mock orange has low tolerance to fire, but often will resprout from rootstock following low- to moderate-intensity fires.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: scrub-shrub wetland
Subclass: broad-leaved deciduous
Water regime: (nontidal) temporarily to intermittently flooded.

Adjacent riparian/wetland classifications—

Crawford (2003) described a Lewis' mockorange/common snowberry type for the Columbia River basin in Washington. Jankovsky-Jones (2001) described a Lewis' mock orange association for southwestern Idaho with a combination of mesic forbs similar to the Lewis' mock orange/mesic forb plant community type described here.

Floristically similar types include: netleaf hackberry/brome (p. 116).

Miscellaneous Tall Shrub Types

Twinberry Honeysuckle/Common Ladyfern Plant Community

Lonicera involucrata/Athyrium filix-femina

SW0102 LOIN5/ATFI N = 1

This community was found along steep streambanks (15 percent) of a narrow (2 m), steep (>8 percent), forested headwater stream in the Strawberry Mountain Wilderness at 1875 m. The soils fell into the Cryofluvents great group. Soils were deep, well-drained, very cobbly sandy loams to loams over extremely cobble coarse sands.

Twinberry honeysuckle occurred at low abundance (15 percent) along with Greene's mountain ash, prickly currant, rock spirea, and trace amounts of thimbleberry and grouse huckleberry. Douglas-fir and lodgepole pine were overhanging the community from adjacent uplands. Ladyfern (25 percent) and Canadian burnet (25 percent) inhabit the herbaceous layer along with a variety of other herbaceous species at lower abundance including willowherb, fringed grass of Parnassus, Columbian monkshood, western columbine, twistedstalk, arrowleaf groundsel, and brook saxifrage, among others.

Twinberry honeysuckle is highly palatable to wild and domestic ungulates making this community highly important for food and water in the Strawberry Mountain Wilderness where high-quality food and water are difficult to find later in the season. This community is also important for streambank stability along these steep streams that are characterized by powerful spring flood events.

Adjacent upland vegetation type:
Sideslopes: PSME/VASC.

This type has not previously been described.

Water Birch/Wet Sedge Plant Community Type

Betula occidentalis/Carex

SW3113 BEOC2/WET SEDGE N = 2

The water birch/wet sedge plant community type was found growing in sunny seeps and springs on stream terraces in low-gradient (1 to 3 percent), flat valleys of the Umatilla National Forest. Soil great groups were Endoaquepts. Soils were poorly drained loams to silt loams over sandy loam.

Scattered water birch (avg. 38 percent) and mountain alder (avg. 9 percent) occur throughout the spring with a thick understory of big-leaved sedge (avg. 75 percent). Largeleaf avens, Dewey sedge, ladyfern, seep monkeyflower, and leafy white orchis are characteristic understory species. Kentucky bluegrass always occurred at low coverage (1 percent).

These rich spring sites offer cover and water for small mammals and grouse, habitat for amphibians, and a diversity of flowers for butterflies.

The water birch/wet sedge plant community type has not previously been described in adjacent riparian areas. Crowe and Clausnitzer (1997) described a water birch/wet sedge plant community for midmontane northeastern Oregon. Jankovsky-Jones et al. (2001) described a single occurrence of water birch/Lewis' mock orange that featured a trace of big-leaved sedge in the herbaceous layer. Floristically similar types include red-osier dogwood/ladyfern (p. 121) and mountain alder/big-leaved sedge (Crowe and Clausnitzer 1997).

Water Birch/Reed Canarygrass Plant Community

Betula occidentalis/Phalaris arundinacea

SM41 BEOC2/PHAR3 N = 1

This community was found in a swale at 695 m elevation along Crooked Creek in the Wenaha-Tucannon Wilderness. The soils were Endoaquents. Soils were shallow, well-drained sandy loam over cobbles. The swale was flooded in spring but slowed to a trickle in summer with standing water in the channel. Water birch (80 percent) was rooted on the streambanks overhanging and shading the seasonal channel. Other shrubs include Lewis' mock orange, stinking currant, streambank wild hollyhock, and red-osier dogwood. Reed canarygrass (40 percent) was rooted along the streambanks and in standing water. Other herbaceous species include enchanter's nightshade, male fern, threepetal bedstraw, leafy white orchis, common cowparsnip, waterleaf, woodland buttercup, Canadian white violet, Dewey sedge, western coneflower, and oxeye daisy.

Reed canarygrass is an aggressive, rhizomatous species native to North America. It is considered a noxious weed or invasive species throughout the Western United States (Whitson et al. 1996). Reed canarygrass is a facultative wetland species throughout the Pacific Northwest (USDA NRCS 2002b). Owing to its aggressive nature, reed canarygrass often takes over large areas, crowding out other species and reducing species diversity. The strong rhizomes of reed canarygrass help maintain streambank integrity, and the dense stems slow overland flow and act as a filter for nutrients and sediment. Reed canarygrass is moderately fire tolerant and is most suitable for grazing early in the season before the seed heads form. Moderate disturbance levels may actually increase species diversity in areas where reed canarygrass has formed thick monocultural stands. The community provides food and shelter for many species of birds and small mammals.

Adjacent riparian/wetland vegetation type:
Floodplains: ALRU2/SYAL/CADE9.

The water birch/reed canarygrass plant community has not previously been described. Hansen et al. (1995) and Crawford (2003) described a reed canarygrass habitat type and association, respectively. Jankovsky-Jones et al. (2001) noted the occurrence of reed canarygrass in similar communities, but no samples were taken of this type.

Red-Osier Dogwood/Ladyfern Plant Association

Cornus stolonifera/Athyrium filix-femina

SW4133 COST4/ATFI N = 2

The red-osier dogwood/ladyfern plant association occurred in a shady spring on a stream terrace in a flat valley and on the sides of a steep, seepy box canyon in the Umatilla National Forest. Soil great groups were Hapludalfs and Udorthents. Soils ranged from poorly drained organics over clay to poorly drained silt loams over extremely cobbly sands to sandy loams. Both sites were constantly supplied with cold, well-aerated water that saturated the soil throughout the summer.

Red-osier dogwood (avg. 60 percent) occurs with a variety of shrubs including mountain alder, thimbleberry, water birch, black hawthorn, prickly currant, and devilsclub. Ladyfern (avg. 40 percent) is always found in the rich herbaceous layer, its elegant fronds unfurling from perennial rhizomes in early summer. Other characteristic herbaceous species include enchanter's nightshade, starry false Solomon's seal, largeleaf avens, waterleaf, seep monkeyflower, heartleaf minerslettuce, brook saxifrage, twistedstalk, stinging nettle, false bugbane, bearded fescue, tall mannagrass, maidenhair, and brittle bladderfern.

Adjacent riparian/wetland vegetation types:
Floodplains and terraces:
ABGR/ACGL–FLOODPLAIN,
ABGR/TABR2/LIBO3–FLOODPLAIN.

Adjacent upland vegetation type:
Sideslopes: ABGR/mixed shrub.

Kovalchik and Clausnitzer (2004) described a red-osier dogwood/ladyfern type for eastern Washington. Other floristically similar types include mountain alder/ladyfern (p. 100), water birch/wet sedge (p. 120); Sitka alder/ladyfern, mountain alder/ladyfern, and red-osier dogwood/brook saxifrage (Crowe and Clausnitzer 1997).

Pacific Ninebark Plant Community

Physocarpus capitatus

SM1901 PHCA11 N = 1

The Pacific ninebark community was found on an artificial levee, along a restored section of Thomas Creek in the North Umatilla Wilderness at 890 meters. The soils were Udorthents. Soils were deep, well-drained gravelly sandy loam over very gravelly loamy coarse sand with a 10-cm-thick organic cap.

The levee was crowded with Pacific ninebark (95 percent) and a generous coverage of common snowberry (40 percent) in the lower shrub layer. A variety of other shrubs were also present, including alder-leaved buckthorn, Rocky Mountain maple, western serviceberry, Lewis' mock orange, red-osier dogwood, Oregon boxleaf, and thimbleberry. Grand fir seedlings were present in the understory. The herbaceous layer, consisting exclusively of forbs, featured Fendler's waterleaf (40 percent) along with fairybells, British Columbia wildginger, dutchman's breeches, and starry false Solomon's seal.

Adjacent riparian/wetland vegetation type:
Abandoned channels: POTR15/SYAL.

Adjacent upland vegetation type:
Sideslopes: PSME/ACGL.

This community has not previously been described.

Mallow Ninebark–Common Snowberry Plant Community Type

Physocarpus malvaceus–Symphoricarpos albus

SM1111 PHMA5-SYAL N = 2

The mallow ninebark-common snowberry plant community type was found on steep (7 and 75 percent) streambanks in the bench lands of Hells Canyon (915 and 1204 m). Soil great groups were Paleustalfs. Soils were shallow, well-drained loam over clay loam to silty clay loam.

Mallow ninebark (avg. 43 percent) and common snowberry (avg. 15 percent) are joined by western serviceberry, white spirea, thimbleberry, oceanspray, black hawthorn, and red raspberry, forming a thick shrub layer. Characteristic herbaceous species include heartleaf arnica, yellow avalanche-lily, cleavers, perfoliated minerslettuce, feathery false Solomon's seal, manyflower tonella, American vetch, Ross' sedge, and brittle bladderfern.

The mallow ninebark plant community type may be the result of stand-replacing fires in PSME/ACGL-PHMA5-SYAL floodplain stands (Johnson and Clausnitzer 1992). Mallow ninebark is highly fire tolerant and will resprout vigorously following fire. The strong roots and thick stems slow overland flow and hold streambanks together, thus reducing soil erosion following fire. Possible successional relationships include PSME/ACGL-PHMA5–FLOODPLAIN. The highly competitive nature of mallow ninebark may result in this community type persisting for many years on these steep streambanks.

Adjacent upland vegetation types:
Sideslopes: PIPO/SYAL, PSME/SYAL.

Johnson and Simon (1987) described a mallow ninebark-common snowberry for upland slopes in the Wallowa-Snake Province, but it has not previously been described for riparian/wetland areas. Floristically similar types include thimbleberry (p. 123), black hawthorn/common snowberry (Crawford 2003), and western serviceberry (Crowe and Clausnitzer 1997).

Thimbleberry Plant Community Type

Rubus parviflorus

SM5912 RUPA N = 3

The thimbleberry plant community was found on low-elevation (579 to 1128 m) terraces in Hells Canyon. Sample sites were located in low (1 to 3 percent)- to high (6 to 8 percent)-gradient V-shaped valleys. Soils ranged from Entisols, including excessively drained bouldery colluvium, to Paleustalfs, consisting of well-drained, moderately deep sandy loams to clay loams. Water table ranged from shallow (42 cm) to moderately deep (92 cm).

Thimbleberry (avg. 95 percent) forms a thick overstory and is often joined on the edges of the community by Rocky Mountain maple and Lewis' mock orange. The thick overstory results in a scattered, but rich, understory of forbs, including cleavers, chervil, perfoliated miners-lettuce, enchanter's nightshade, waterleaf, and mountain sweetcicely. Graminoids include Dewey sedge, Columbia brome, and pinegrass. Ferns and horsetails may include male fern, western brakenfern, and scouringrush horsetail.

Thimbleberry is a highly fire-tolerant shrub species that resprouts quickly from aggressive rhizomes. The dense rhizomes and thick stems slow overland water flow and hold streambanks together, thus reducing soil erosion following fire. The thick, berry-producing stands provide food and cover for small mammals and birds as well as black bears. These sites are early seral and may develop over time into the ACGL or CRDO2/FORB plant association.

Adjacent riparian/wetland vegetation type:
Floodplains and terraces: BEOC2/MESIC FORB.

Adjacent upland vegetation types:
Sideslopes: PSME/ACGL-PHMA, PIPO/SYAL.

The Thimbleberry plant community type has not been previously described. Floristically similar types include Rocky Mountain maple (p. 114) and mallow ninebark–common snowberry (p. 122).

Barton's Raspberry Plant Community

Rubus bartonianus

SM5001 RUBA N = 1

This community was found on a steep (30 percent) floodplain of a high-gradient stream (>8 percent) in Hells Canyon. Barton's raspberry (85 percent) was growing between boulders, forming a dense shrub canopy approximately 2 m tall. Trace amounts of Pennsylvania pellitory, cleavers, manyflower tonella, Oregon cliff fern, and cheatgrass occurred throughout the understory. Barton's raspberry is endemic to Hells Canyon, growing only on the slopes, and in the drainages between Hells Canyon Dam and Steep Creek (Carrey et al. 1979). Barton's raspberry was first discovered in 1933 at Battle Creek by one of the first settlers in the canyon, Lenora Barton.

Adjacent upland vegetation types:
Sideslopes and cliffs: GLNE, GLNE/AGSP.

The Barton's raspberry plant community has not previously been described.

Himalayan Blackberry Plant Community

Rubus discolor

SM5002 RUDI2 N = 1

This community was found on a floodplain of Big Canyon Creek in Hells Canyon at 360 m elevation. Soils were Ustifluvents. Soils were excessively well-drained loams over extremely gravelly/cobbly loamy sands. Depth to water table was 64 cm, and the available water capacity of the soil was 5 cm/m. Himalayan blackberry (90 percent) forms an almost impenetrable shrub layer guarded by thick, sharp thorns. Red-osier dogwood, poison ivy, Lewis' mock orange, netleaf hackberry, and rock clematis occur scattered throughout the blackberry patch. Climbing nightshade, ripgut brome, and bluebunch wheatgrass make up the sparse understory.

Himalayan blackberry is an introduced species in the United States. Its aggressive rhizomes can take over areas quickly following disturbance by fire or flooding. Dense thicket-forming blackberry stems help maintain streambanks, provide shade and woody debris to the stream channel, and supply habitat for small mammals. Blackberries are a highly preferred food item for black bears and many bird species.

Adjacent upland vegetation types:

Sideslopes and cliffs: GLNE, GLNE/AGSP.

Jankovsky-Jones et al. (2001) noted the occurrence of Himalayan blackberry at riparian sites in southwestern Idaho, but no samples of this type were taken.

Aquatic Sedge Plant Association

Carex aquatilis

MM2914 CAAQ N = 7

Aaron Wells

Landform environment (n = 7)		Mean	Range
Elevation (m)		1995	823–2409
Plot slope (percent)		1	0–2
Aspect	All		

Valley environment (n = 7)		Mode	Range
Valley gradient (percent)		<1	1–5
Valley width (m)		100–300	30–300
Valley aspect	Northerly		

Soil surface cover (n = 7)	Mean	Range
Submerged (percent)	35	0–65
Bare ground	9	0–60
Gravel	0	
Rock	4	0–30
Bedrock	0	
Litter	45	10–70
Moss	7	0–25

Soil profile characteristics (n = 7)		Mean	Range
Parent material	Peat, alluvium		
Great group(s)	Cryofibrists, Cryohemists, Cryosaprists, Endoaquents		
Water table depth (cm)			0–40
Rock fragments (percent)		14	0–100
Available water capacity of pit (cm/m)		37	1–49
pH (n = 2)		6.07	5.83–6.30
Depth to redoximorphic features (cm)		30	
Occurrence of redoximorphic features (percentage of soils)		15	
Surface organic layer (cm)			7–28
Surface layers			
Thickness (cm)			7–28
Texture(s)[a]	S, fibric, hemic, sapric		
Redoximorphic features	None		
Subsurface layers			
Thickness (cm)			3–>22
Texture(s)[a]	Sapric		
Redoximorphic features	None		

[a] See “Soil Texture Codes” section.

Physical environment—

The aquatic sedge plant association occurred along high-elevation (2067 to 2409 m) floodplains, lake edges, and wet meadows. One site occurred at 823 m along a rocky stream edge, in a 4- to 5-percent-gradient flat valley, in the Umatilla National Forest. High-elevation sites occurred in broad (>100 m), U-shaped valleys of low (<3 percent) gradient. High-elevation soils were very poorly drained peat. Depth to water table ranged from the surface to 40 cm late in the season. The low-elevation soil was composed of inundated alluvial gravels and cobbles.

Vegetation composition—

Aquatic sedge forms a veritable monoculture of stout stems anchored to the soil with dense rhizomatous roots. Other species occur infrequently and at low abundance including bladder sedge, Holm’s Rocky Mountain sedge, tufted hairgrass, common horsetail, high mountain cinquefoil, western mountain aster, and alpine shootingstar. Watercress was found growing at the low-elevation site.

Adjacent riparian/wetland vegetation types:

Low-elevation terraces: PIPO/SYAL–FLOODPLAIN, PSME/ACGL-PHMA5–FLOODPLAIN.

High-elevation floodplains and meadows: ELPA6, CASC12, CANI2, DECE.

Lake edges: CAUT.

Adjacent upland vegetation types:

Footslope and sideslopes: ABLA/VASC.

Principal species			CON	COV	MIN	MAX
				Percent		
Grasses:						
DECE	Tufted hairgrass	*Deschampsia cespitosa*	42	7	1	15
Sedges and other grasslikes:						
CAAQ	Aquatic sedge	*Carex aquatilis*	100	74	55	85
Ferns and horsetails:						
EQAR	Common horsetail	*Equisetum arvense*	42	2	1	3

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Management considerations—

Total forage biomass ranged from 560 to 3080 (avg. 1681) kg/ha. Elk and deer use is moderate to high. Livestock grazing is typically not an issue at high-elevation sites, whereas at more moderate elevations livestock grazing can become an issue. Livestock grazing and horse pasturing is prohibited within 30 m of subalpine lakes in wilderness areas; therefore, when this association occurs along lakeshores it should see no livestock use. Aquatic sedge may be grazed late in the season (August-September) when soils have dried out (Crowe and Clausnitzer 1997). Grazing when soils are wet will eventually lead to soil erosion and a shift in species composition to forbs and Kentucky bluegrass.

The thick sod-producing rhizomes of aquatic sedge provide soil stability to streambanks and floodplains, and the dense stems slow floodwaters and filter sediments acting as an important nutrient filter in headwater streams. The dense stems also provide habitat and forage for small mammals, amphibians, waterfowl, and other birds including sandhill cranes, green-winged teals, common snipes, common yellowthroat, red-winged blackbirds, and lesser yellow legs (Crowe and Clausnitzer 1997). Overhanging vegetation provides hiding places for trout.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: emergent wetland
Subclass: persistent
Water regime: (nontidal) permanently flooded to saturated.

Adjacent riparian/wetland classifications—

Aquatic sedge types have been described throughout the Western United States including midmontane northeastern Oregon (Crowe and Clausnitzer 1997), Montana (Hansen et al. 1995), central Oregon (Kovalchik 1987), eastern Washington (Kovalchik and Clausnitzer 2004), Nevada and eastern California (Manning and Padgett 1995), Utah and southeastern Idaho (Padgett et al. 1989), Alaska (Viereck et al. 1992), and eastern Idaho-western Wyoming (Youngblood et al. 1985). Hansen et al. (1995) described a two-phase aquatic sedge habitat type, a wetter aquatic sedge phase and a slightly drier tufted hairgrass phase. The aquatic sedge plant association described here is most similar to the aquatic sedge phase.

Floristically similar types include woodrush sedge (p. 142).

Bladder Sedge Plant Association

Carex utriculata

MM2917 CAUT N = 7


Aaron Wells

Landform environment (n = 7)		Mean	Range
Elevation (m)		2096	1966–2354
Plot slope (percent)		4	0–1
Aspect	All		

Valley environment (n = 7)		Mode	Range
Valley gradient (percent)		1–3	<1–3
Valley width (m)		30–100	30–>300
Valley aspect	All		

Soil surface cover (n = 7)	Mean	Range
Submerged (percent)	24	0–45
Bare ground	5	0–20
Gravel	0	
Rock	0	
Bedrock	0	
Litter	59	20–95
Moss	9	0–30

Soil profile characteristics (n = 7)			
Parent material	Peat, alluvium		
Great group(s)	Cryaquepts, Cryosaprists, Endoaqualfs		
		Mean	**Range**
Water table depth (cm)			0–89
Rock fragments (percent)		1	0–4
Available water capacity of pit (cm/m)		29	13–49
pH (n = 2)		5.82	5.07–6.57
Depth to redoximorphic features (cm)		18	
Occurrence of redoximorphic features (percentage of soils)		14	
Surface organic layer (cm)			0–>4
Surface layers			
Thickness (cm)			27–49
Texture(s)[a]	CL, L, SCL, SICL, sapric		
Redoximorphic features	Iron oxide concentrations		
Subsurface layers			
Thickness (cm)			25–>46
Texture(s)[a]	CL, SICL, SIL, SL, sapric		
Redoximorphic features	Iron oxide concentrations		

[a] See “Soil Texture Codes” section.

Physical environment—

The bladder sedge plant association occurred on seepy slopes, swales, and lake edges throughout the upper reaches (1966 to 2354 m) of the Eagle Cap Wilderness, Seven Devils and Elkhorn Mountains. Crowe and Clausnitzer (1997) described this type on similar landforms from 1177 to 2277 m throughout the Blue Mountains. Sample sites were located in low-gradient (<3 percent), U- and trough-shaped valleys.

Available water capacity of soils varied depending on landform. Available water capacity of lake edge soils averaged 49 cm/m, and the water table was at or near the surface for most of the growing season. Available water capacity of soils in seeps and swales averaged 16 cm/m. Seep and swale soils were poorly drained, organic loams to silty clay loams, and depth to water table was mostly from the surface to 66 cm. The depth to water table for one site in a swale was 89 cm, with redoximorphic features occurring in every soil horizon. That particular soil had a slowly permeable silty clay loam surface horizon that retained water at the surface during the early growing season.

Vegetation composition—

Bladder sedge forms a near monoculture with occasional occurrences of common horsetail, seep monkeyflower, glaucus willowherb, and mountain bentgrass.

Adjacent riparian/wetland vegetation types:
- Floodplains and meadows: JUBA, CAMI7, CACA4, CASC12, SABO2/CASC12, DECE.
- Seeps: PIEN/EQAR.
- Lake edges: CAAQ.

Adjacent upland vegetation type:
- Sideslopes: ABLA/VASC.

Principal species			CON	COV	MIN	MAX
				Percent		
Forbs:						
EPGL	Glaucus willowherb	*Epilobium glaberrimum*	28	10	10	10
MIGU	Seep monkeyflower	*Mimulus guttatus*	28	8	5	10
Grasses:						
AGVA	Mountain bentgrass	*Agrostis variabilis*	28	3	3	3
Sedges and other grasslikes:						
CAUT	Bladder sedge	*Carex utriculata*	100	86	65	100
Ferns and horsetails:						
EQAR	Common horsetail	*Equisetum arvense*	28	20	15	25

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Management considerations—

Total forage biomass ranged from 168 to 3136 (avg. 1829) kg/ha. Elk and deer use is low to moderate. Livestock grazing is typically not an issue at high-elevation sites, whereas at more moderate elevations livestock grazing can become an issue. Livestock grazing and horse pasturing is prohibited within 30 m of subalpine lakes in wilderness areas; therefore, when this association occurs along lakeshores it should see no livestock use. Bladder sedge may be grazed late in the season (August-September) when soils have dried out and upland vegetation becomes less palatable (Kovalchik 1987). Grazing when soils are wet can lead to soil erosion, and an eventual shift to forbs and Nebraska sedge or Baltic rush, at lower elevations (<1900 m), and mesic forbs and smallwing sedge at higher elevations.

The thick sod-producing rhizomes of bladder sedge provide soil stability to streambanks and floodplains, while the dense stems slow floodwater/overland flow and filter sediments acting as an important nutrient filter in headwater streams. The dense stems also provide habitat and forage for small mammals, amphibians, and waterfowl.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: emergent wetland
Subclass: persistent
Water regime: (nontidal) permanently flooded to saturated.

Adjacent riparian/wetland classifications—

Bladder sedge types have been described for many of the Western States including the Columbia River basin (Crawford 2003), midmontane northeastern Oregon (Crowe and Clausnitzer 1997), Montana (Hansen et al. 1995), central Oregon (Kovalchik 1987), eastern Washington (Kovalchik and Clausnitzer 2004), Nevada and eastern California (Manning and Padgett 1995), Utah and southeastern Idaho (Padgett et al. 1989), Alaska (Viereck et al. 1992), and eastern Idaho–western Wyoming (Youngblood et al. 1985).

Hansen et al. (1995) described a three-phase bladder sedge habitat type, the wettest being the bladder sedge phase where other species are often sparse or absent. The intermediate aquatic sedge phase finds aquatic sedge and bladder sedge co-occurring. Lastly, the tufted hairgrass phase, the driest of the three, finds significant amounts of tufted hairgrass and Baltic rush throughout. The bladder sedge association described here is most similar to the bladder sedge phase.

Floristically similar types include buckbean (Crowe and Clausnitzer 1997).

Inflated Sedge Plant Association

Carex vesicaria

MW1923 CAVE6 N = 5

Aaron Wells

Aaron Wells

Landform environment (n = 5)		Mean	Range
Elevation (m)		2228	1933–2348
Plot slope (percent)		3	0–9
Aspect	All		

Valley environment (n = 5)		Mode	Range
Valley gradient (percent)		<1	<1, 4–5
Valley width (m)		100–300	30–300
Valley aspect	All		

Soil surface cover (n = 5)	Mean	Range
Submerged (percent)	30	0–75
Bare ground	3	0–10
Gravel	0	
Rock	0	
Bedrock	0	
Litter	0	
Moss	59	25–100

Soil profile characteristics (n = 4)		Mean	Range
Parent material	Peat		
Great group(s)	Cryorthents, Cryosaprists, Epiaqualfs		
Water table depth (cm)			0–33
Rock fragments (percent)		0	
Available water capacity of pit (cm/m)		22	14–46
pH (n = 2)		6.08	5.94–6.22
Depth to redoximorphic features (cm)			15–23
Occurrence of redoximorphic features (percentage of soils)		50	
Surface organic layer (cm)			0–10
Surface layers			
Thickness (cm)			3–>15
Texture(s)[a]	SCL, hemic, sapric		
Redoximorphic features	None		
Subsurface layers			
Thickness (cm)			10–>28
Texture(s)[a]	C, S, SC, hemic, sapric		
Redoximorphic features	Iron oxide concentrations		

[a] See “Soil Texture Codes” section.

Physical environment—

The inflated sedge plant association occurred along high-elevation (1933 to 2348 m) lakeshores in the Eagle Cap and Strawberry Mountain Wilderness and the Seven Devils Mountain Range. Sample sites occurred mostly in low-gradient (<3 percent), U-shaped basins. Crowe and Clausnitzer (1997) described this type as occurring between 933 and 1933 m elevation in wet basins, floodplains, and along pond edges. Soils were very poorly drained organic sedge peat to sandy clays with a thin organic veneer (≤10 cm). Water table ranged from the surface to 33 cm, and redoximorphic features were common.

Vegetation composition—

Inflated sedge forms a thick monocultural stand with scattered forbs and graminoids throughout. Forbs include northern and threepetal bedstraw, plantainleaf buttercup, and narrowleaf bur-reed. Grasses include alpine bentgrass, shortawn foxtail, bluejoint reedgrass, tufted hairgrass, and tall mannagrass. Sedges may include widefruit sedge, Holm’s Rocky Mountain Sedge, and meadow sedge.

Adjacent riparian/wetland vegetation types:

- Floodplains and meadows: SABO2/CASC12, EQAR, ALIN2/GLEL, SALIX/CAVE6.
- Lake edges: ELBE, CAAQ.
- Lakes: SPAN2.

Adjacent upland vegetation type:

- Sideslopes: ABLA/VASC.

Principal species			CON	COV	MIN	MAX
				Percent		
Forbs:						
GABO2	Northern bedstraw	*Galium boreale*	20	25	25	25
GATR2	Threepetal bedstraw	*Galium trifidum*	20	5	5	5
RAAL	Plantainleaf buttercup	*Ranunculus alismifolius*	20	1	1	1
ROCU	Curvepod yellowcress	*Rorippa curvisiliqua*	20	1	1	1
SPAN2	Narrowleaf bur-reed	*Sparganium angustifolium*	20	10	10	10
Grasses:						
AGHU	Alpine bentgrass	*Agrostis humilis*	20	5	5	5
ALAE	Shortawn foxtail	*Alopecurus aequalis*	20	1	1	1
CACA4	Bluejoint reedgrass	*Calamagrostis canadensis*	20	1	1	1
DECE	Tufted hairgrass	*Deschampsia cespitosa*	20	1	1	1
GLEL	Tall mannagrass	*Glyceria elata*	20	1	1	1
Sedges and other grasslikes:						
CAEU2	Widefruit sedge	*Carex eurycarpa*	40	4	3	5
CAPR7	Meadow sedge	*Carex praticola*	20	1	1	1
CASC12	Holm's Rocky Mountain sedge	*Carex scopulorum*	20	3	3	3
CAVE6	Inflated sedge	*Carex vesicaria*	100	81	65	100

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Management considerations—

Total forage biomass ranged from 1344 to 1792 (avg. 1568) kg/ha. Elk and deer use is generally low. Livestock grazing and horse pasturing is prohibited within 30 m of subalpine lakes in wilderness areas; therefore, when this association occurs along lakeshores it should see no livestock use. The dense stems also provide habitat and forage for small mammals, amphibians, waterfowl, and shorebirds including common snipes and lesser yellowlegs.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: emergent wetland
Subclass: persistent
Water regime: (nontidal) seasonally flooded to saturated.

Adjacent riparian/wetland classifications—

Inflated sedge types have been described for most of Oregon and eastern Washington (Crowe and Clausnitzer 1997, Kovalchik 1987, Kovalchik and Clausnitzer 2004).

There are no floristically similar types.

Few-Flowered Spikerush Plant Association

Eleocharis pauciflora

MW4911 ELPA6 N = 14

Aaron Wells

Landform environment (n = 14)		Mean	Range
Elevation (m)		2237	2067–2348
Plot slope (percent)		2	<1–4
Aspect	All		

Valley environment (n = 14)		Mode	Range
Valley gradient (percent)		<1	<1–3, 6–8
Valley width (m)		30–100	30–>300
Valley aspect	Mostly northerly		

Soil surface cover (n = 13)	Mean	Range
Submerged (percent)	27	0–90
Bare ground	11	0–40
Gravel	0	
Rock	0	
Bedrock	0	
Litter	21	0–63
Moss	35	0–92

Soil profile characteristics (n = 14)			
Parent material	Mazama ash, granite, quartz diorite, peat		
Great group(s)	Cryaquands, Cryofibrists, Cryohemists, Haplocryands, Cryaqualfs		
		Mean	Range
Water table depth (cm)			0–70
Rock fragments (percent)		0	
Available water capacity of pit (cm/m)		32	13–46
pH (n = 9)		5.63	5.20–6.05
Depth to redoximorphic features (cm)			10–25
Occurrence of redoximorphic features (percentage of soils)		21	
Surface organic layer (cm)			5–>100
Surface layers			
Thickness (cm)			5–>100
Texture(s)[a]	SIL, SL, fibric, hemic, sapric		
Redoximorphic features	Iron oxide concentrations		
Subsurface layers			
Thickness (cm)			3–>45
Texture(s)[a]	SIL, SICL, hemic, sapric		
Redoximorphic features	Depletions, iron oxide concentrations		

[a] See “Soil Texture Codes” section.

Physical environment—

The few-flowered spikerush plant association occurred in high-elevation (2067 to 2348 m) headwater basins on wet meadows and steep springs throughout the Eagle Cap Wilderness and Elkhorn Mountains, with one occurrence in the Strawberry Mountain Wilderness. Valleys were typically U-shaped glacial valleys with low (<3 percent) gradient. Two plots occurred in trough-shaped valleys of low (1 to 3 percent) to high (6 to 8 percent) gradient. Soils were very poorly drained, typically deep (50 to >100 cm) organic sedge peat over bedrock. Soils were often submerged throughout the growing season and had high available water capacity (avg. 32 cm/m).

Vegetation composition—

Few-flowered spikerush occurs in water paths (Kovalchik 1987), while Holm’s Rocky Mountain sedge and sphagnum moss often occur on slightly drier hummocks (10 to 20 cm).

Other hummock species include alpine shootingstar, high mountain cinquefoil, tinker’s penny, willowherb, alpine meadow butterweed, elephanthead lousewort, Idaho licorice-root, tufted hairgrass, and slender muhly. Aquatic sedge sometimes co-occurs with few-flowered spikerush in the wettest portions of the plot.

Adjacent riparian/wetland vegetation types:

Floodplains and meadows: CASC12, CANI2, ALVA-CASC12, SABO2/CASC12, PIEN/CASC12, DECE, PHEM MOUNDS, CALU7, CAJO, CAIL.

Adjacent upland vegetation types:

Sideslopes and footslope: ABLA/VASC, and various ABLA and PIAL types.

Principal species			CON	COV	MIN	MAX
				Percent		
Forbs:						
DOAL	Alpine shootingstar	*Dodecatheon alpinum*	71	8	1	60
Sedges and other grasslikes:						
ELPA6	Few-flowered spikerush	*Eleocharis pauciflora*	100	70	40	95

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Management considerations—

Total forage biomass ranged between 251 and 1991 (avg. 869) kg/ha, although Kovalchik (1987) pointed out that the palatability of few-flowered spikerush is low. Elk and deer use is moderate to high in these meadows, but is generally concentrated in adjacent drier associations such as Holm's Rocky Mountain sedge and black alpine sedge. Horse pasturing opportunities are low owing to the wet nature of this association. Wranglers should look to adjacent drier associations for good pasture. The wet nature of this association also makes it prime amphibian habitat. Few-flowered spikerush is self-perpetuating by creating a thick, acidic, organic soil (Kovalchik 1987). Given a continuous source of water, the ELPA6 plant association may represent climax ecological status in headwater basins of northeastern Oregon. The potential exists for this type to eventually dry out enough for other species to move in and initiate the formation of more complex soils. Possible successional trajectories include CANI2, DECE, and CASC12.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: emergent wetland
Subclass: persistent
Water regime: (nontidal) intermittently exposed to seasonally flooded.

Adjacent riparian/wetland classifications—

Few-flowered spikerush types have been described throughout the Western United States including midmontane northeastern Oregon (Crowe and Clausnitzer 1997), Montana (Hansen et al. 1995), central Oregon (Kovalchik 1987), eastern Washington (Kovalchik and Clausnitzer 2004), Nevada and eastern California (Manning and Padgett 1995), and Utah and southeastern Idaho (Padgett et al. 1989).

Floristically similar types include woodrush sedge (p. 142) and star sedge (p. 149 and Crowe and Clausnitzer 1997).

Small-Fruit Bulrush Plant Association

Scirpus microcarpus

MM2924 SCMI2 N = 4


Aaron Wells

Physical environment—

The small-fruit bulrush plant association occurred on floodplains, swales, and seasonal channels located between 756 and 915 m elevation in the canyon country of the Umatilla National Forest, to as high as 1921 m in a south-facing meadow of the Strawberry Mountain Wilderness. These sites were typified by annual floods and perennial soil moisture. Valleys were low (1 to 3 percent) to moderate (4 to 5 percent) gradient, trough-shaped and flat. Some soils had an organic layer overlying mineral soil, were shallow (to alluvium) to deep, poorly to somewhat poorly drained, loams to silt loams over clay loam to silty clay loam. Available water capacity averaged 29 cm/m, and depth to water table ranged from the surface to >97 cm.

Vegetation composition—

Small-fruit bulrush coverage ranged between 40 and 95 percent. Scattered forbs and graminoids occurred throughout including willowherb, largeleaf avens, muskflower, leafy white orchis, water speedwell, water whorlgrass, bluejoint reedgrass (>1900 m), weak alkaligrass, saw-beak sedge, bladder sedge, swordleaf rush, and common horsetail. Aquatic sedge occurred at the swale and seasonal channel sites, which were characterized by standing water throughout the growing season.

Landform environment (n = 4)		**Mean**	**Range**
Elevation (m)		1096	756–1921
Plot slope (percent)		10	2–18
Aspect	All		

Valley environment (n = 4)		**Mode**	**Range**
Valley gradient (percent)		1–3	1–5
Valley width (m)		10–30	10–300
Valley aspect	All		

Soil surface cover (n = 4)	**Mean**	**Range**
Submerged (percent)	19	15–25
Bare ground	4	0–10
Gravel	5	3–5
Rock	10	5–15
Bedrock	0	
Litter	40	15–55
Moss	23	10–40

Soil profile characteristics (n = 4)			
Parent material	Basalt, alluvium, colluvium		
Great group(s)	Endoaqualfs, Fluvaquents		
		Mean	**Range**
Water table depth (cm)			0–>97
Rock fragments (percent)		2	0–7
Available water capacity of pit (cm/m)		29	12–46
pH (n = 3)		6.19	6.10–6.30
Depth to redoximorphic features (cm)			6–37
Occurrence of redoximorphic features (percentage of soils)		75	
Surface organic layer (cm)			0–14
Surface layers			
Thickness (cm)			13–15
Texture(s)[a]	CL, L, S, SIL, SL		
Redoximorphic features	None		
Subsurface layers			
Thickness (cm)			16–>51
Texture(s)[a]	L, LS, SL		
Redoximorphic features	Depletions, iron oxide concentrations		

[a] See “Soil Texture Codes” section.

Principal species			CON	COV	MIN	MAX
				Percent		
Forbs:						
EPGL4	Fringed willowherb	*Epilobium glandulosum*	75	2	1	5
MIMO3	Muskflower	*Mimulus moschatus*	50	3	1	5
Grasses:						
PUPA3	Weak alkaligrass	*Puccinellia pauciflora*	50	15	5	25
Sedges and other grasslikes:						
CAAM10	Big-leaved sedge	*Carex amplifolia*	25	1	1	1
CAAQ	Aquatic sedge	*Carex aquatilis*	50	14	3	25
CALA13	Smooth-stemmed sedge	*Carex laeviculmis*	25	1	1	1
CAST5	Saw-beak sedge	*Carex stipata*	50	1	1	1
CAUT	Bladder sedge	*Carex utriculata*	25	15	15	15
ELEOC	Spikerush	*Eleocharis*	25	1	1	1
ELPA3	Creeping spikerush	*Eleocharis palustris*	25	5	5	5
JUBA	Baltic rush	*Juncus balticus*	25	5	5	5
JUEN	Swordleaf rush	*Juncus ensifolius*	50	2	1	3
SCMI2	Small-fruit bulrush	*Scirpus microcarpus*	100	66	40	95
Ferns and horsetails:						
EQAR	Common horsetail	*Equisetum arvense*	75	20	5	40

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Adjacent riparian/wetland vegetation types:

Low-elevation floodplains and terraces:

ABGR/ACGL–FLOODPLAIN, ALIN2/CADE9, PSME/ACGL-PHMA5–FLOODPLAIN, ALIN2/SCCY.

High-elevation floodplains and meadows:

CACA4, ALIN2/GLEL.

Adjacent upland vegetation types:

Sideslopes: PSME/mixed shrub, PIPO-LAOC/mixed shrub.

Management considerations—

Small-fruit bulrush is not a preferred food item of ungulates, and very little evidence of ungulate activity was observed in this association. However, the meadows adjacent to this association may be very important to ungulates. The swales and seasonal channels often associated with this type provide important breeding grounds for amphibians and habitat for salmonid fry.

The dense, aggressive rhizomes and rapidly spreading seeds of small-fruit bulrush lend to its ability to quickly establish on freshly deposited sediments and begin the initial stages of soil stabilization. Furthermore, the thick stands of mature small-fruit bulrush slow floodwaters and filter sediments providing an important ecological service by keeping gravel beds silt free for salmonid runs. Small-fruit bulrush is moderately fire tolerant and will resprout vigorously following low- to moderate-intensity fires but may be killed by high-intensity fires. Possible successional trajectories: ALIN2/SCCY (observed, but not described in this classification effort).

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: emergent wetland
Subclass: persistent
Water regime: (nontidal) permanently flooded to saturated

Adjacent riparian/wetland classifications—

Small-fruit bulrush types have been described for mid-montane northeastern (Crowe and Clausnitzer 1997) and central Oregon (Kovalchik 1987), eastern Washington (Kovalchik and Clausnitzer 2004), Utah and southeastern Idaho (Padgett et al. 1989), and Alaska (Viereck et al. 1992).

Floristically similar types include bluejoint reedgrass and woolly sedge (Crowe and Clausnitzer 1997).

Miscellaneous Wet Graminoid Types

Widefruit Sedge Plant Association

Carex eurycarpa

MM2913 CAEU2 N = 1

The widefruit sedge plant association occurred on a lake edge in the Seven Devils Mountains at 2317 meters elevation. Soils were Cryopsamments. Soils were very poorly drained, and a thin organic layer was overlying loamy fine sand and fine sand. Depth to water table was 37 cm, and available water capacity was 15 cm/m. The site was inundated by lake water in spring and the soil profile remained saturated throughout the summer. Widefruit sedge occurred on hummocks at 45 percent coverage throughout the site. Other species present were sheep sedge, few-flowered spikerush, weak alkaligrass, high mountain cinquefoil, threepetal bedstraw, and violets. Total forage biomass was 1008 kg/ha. Deer and elk use of this community appeared to be low. The palatability of widefruit sedge to wild and domestic ungulates is unknown.

Adjacent riparian/wetland vegetation types:
Lake edges and lakes: CAVE6, SPAN2, ABLA/VAME.

Adjacent upland vegetation types:
Sideslopes: ABLA/SPIRA, EPAN2.

Kovalchik (1987) described a widefruit sedge type for central Oregon.

Mud Sedge Plant Association

Carex limosa

MM2928 CALI7 N = 1

The mud sedge plant association was found on the edge of Lily Pad Lake at 2265 m in the Seven Devils Mountains. Soil great groups were Cryohemists. The soil was very poorly drained, organic sedge peat over fine sandy loam. The soil surface was inundated in spring and remained saturated throughout the year. Mud sedge (60 percent) forms a monocultural stand among patches of bare soil and standing water. Total forage biomass was 645 kg/ha. Elk and deer use appeared to be low with most browsing on adjacent willows. The wet nature of this site makes it ideal amphibian habitat.

Adjacent riparian/wetland vegetation types:
Lakes: NUPO2.
Lake edges: CAUT.
Forested basins: PIEN/CASC12.

Mud sedge types have been described by Padgett et al. (1989), Hansen et al. (1995), and Kovalchik and Clausnitzer (2004).

Sierra Hare Sedge Plant Association

Carex leporinella

MM2927 CALE9 N = 4

The Sierra hare sedge plant association occurred in high-elevation (2204 to 2546 m) wet meadows, a swale, and along a lake edge in the Eagle Cap Wilderness. All sites occurred in U-shaped, low-gradient valleys. Soils were Cryaquepts. Soils were poorly drained, silt loams to sandy clays. Depth to water table ranged from the surface early in the season to 41 cm in late summer. Redoximorphic features were present in all soils sampled. Available water-holding capacity ranged from 9 to 17 (avg. 13) cm/m.

Sierra hare sedge (avg. 86 percent) forms a near monoculture often co-occurring with Holm's Rocky Mountain Sedge (avg. 5 percent). Other species include: darkthroat shootingstar, aquatic sedge, and spikerush.

Adjacent riparian/wetland vegetation types:
Floodplains and meadows: CASC12, CANI2, KAMI/CANI2, SABO2/CASC12, and ABLA-PIEN/LEGL–FLOODPLAIN.

The Sierra hare sedge plant association has not previously been described.

Lakeshore Sedge Plant Association

Carex lenticularis

MM2919 CALE8 N = 1

This association occurred on a steep (10 percent) spring above a high-gradient (>8 percent) headwater stream in the Strawberry Mountain Wilderness at 2104 m. The soil was poorly drained, very fine sandy loam over very gravelly loam. The water table was perched in the upper 32 cm of soil, and the available water capacity was 9 cm/m.

Lakeshore sedge (40 percent) and tall mannagrass (40 percent) abound. The graminoid-rich herbaceous layer includes woodrush, Jones', and smallwing sedge, few-flowered spikerush, swordleaf rush, and woodrush. Forbs include tinker's penny, monkeyflower, arrowleaf groundsel, and brook saxifrage. Total forage biomass was 1904 kg/ha. Wildlife use is high at these springs especially late in the season when water is difficult to find.

Adjacent riparian/wetland vegetation types:
Floodplains: SETR-MILE2, ALIN2/GLEL, RUOC2.

Adjacent upland type: ABLA/CAGE2.

Lakeshore sedge types have been described by Crowe and Clausnitzer (1997) and Diaz and Mellon (1996) for midmontane riparian/wetlands of northeastern Oregon and northwestern Oregon, respectively.

Big-Leaved Sedge Plant Association

Carex amplifolia

MM2921 CAAM10 N = 2

The big-leaved sedge plant association occurred in low-gradient (<2 percent) springs of the Strawberry Mountain Wilderness (2024 m) and the Umatilla National Forest (805 m). Sample sites occurred in low-gradient (<3 percent), trough-shaped valleys. Soils were Endoaqualfs and Haplosaprists. Soils were poorly drained, organic-rich loams to silt loams over clays.

Big-leaved sedge (avg. 30 percent) and tall mannagrass (avg. 50 percent) occur in approximately equal abundance forming a dense graminoid cover over an array of forbs and graminoids including willowherb, American speedwell, threepetal bedstraw, leafy white orchis, muskflower, seep monkeyflower, ladyfern, Pacific onion, arrowleaf groundsel, swordleaf rush, and brown sedge. This type is floristically similar to water birch/wet sedge association with the exception of water birch.

The big-leaved sedge plant association is self-perpetuating with dense rhizomes excluding the establishment of trees and shrubs. Water birch could potentially occur at these sites given a disturbance resulting in patches of bare mineral soil.

Adjacent riparian/wetland vegetation types:
Floodplains and terraces:
ABGR/TABR2/LIBO3–FLOODPLAIN.
Meadows:
RUOC2, ALIN2/GLEL.

Adjacent upland vegetation type:
Sideslopes: ABLA/CAGE2.

Crowe and Clausnitzer (1997) described a big-leaved sedge plant association for the midmontane riparian/wetlands of northeastern Oregon that is similar to the type described above.

Floristically similar types include tall mannagrass (Crowe and Clausnitzer 1997).

Holm's Rocky Mountain Sedge Plant Association

Carex scopulorum

MS3111 CASC12 N = 38

Aaron Wells

Landform environment (n = 38)		Mean	Range
Elevation (m)		2212	1945–2579
Plot slope (percent)		3	0–15
Aspect	All		

Valley environment (n = 32)		Mode	Range
Valley gradient (percent)		<1	<1–>8
Valley width (m)		30–100	<10–>300
Valley aspect	All		

Soil surface cover (n = 33)	Mean	Range
Submerged (percent)	6	0–45
Bare ground	8	0–35
Gravel	1	0–5
Rock	1	0–4
Bedrock	0	
Litter	46	0–90
Moss	31	0–95

Soil profile characteristics (n = 35)			
Parent material	Mazama ash, sedge peat, granite, quartz diorite, alluvium		
Great group(s)	Endoaqualfs, Cryofluvents, Cryaquands, Cryohemists, Cryofluvents, Cryofibrists, Cryorthents, Haplocryands, Cryosaprists, Cryaquepts, Cryaquents		
		Mean	**Range**
Water table depth (cm)			0–>102
Rock fragments (percent)		4	0–35
Available water capacity of pit (cm/m)		19	7–49
pH (n = 25)		5.64	4.76–6.32
Depth to redoximorphic features (cm)			13–52
Occurrence of redoximorphic features (percentage of soils)		37	
Surface organic layer (cm)			0–65
Surface layers			
Thickness (cm)			5–>104
Texture(s)[a]	CL, SICL, SIL, SL, LS, S, fibric, hemic, sapric		
Redoximorphic features	Depletions, iron oxide concentrations		
Subsurface layers			
Thickness (cm)			3–>72
Texture(s)[a]	CL, SICL, SCL, SIL, SL, LS, S, fibric, hemic, sapric		
Redoximorphic features	Depletions, iron oxide concentrations		

[a] See "Soil Texture Codes" section.

Physical environment—

The Holm's Rocky Mountain sedge plant association is a common association throughout the upper reaches (1900 to 2600 m) of the Blue Mountains Province occurring in moist/wet meadows, springs, floodplains, and swales. Sample sites occurred in low-gradient (typically <3 percent), U-, V-, and trough-shaped valleys. Landform slope was mostly less than or equal to 2 percent; when slope was greater than 2 percent a perennial source of water, such as a spring or lateral seepage, was present supplying a continual flow of water to the site.

Soils were poorly drained with an often thick (30 to 65 cm) organic layer overlying deeper loams to silty clay loams. Coarse-textured soils, sands and loamy sands, are typical of fluvially active sites such as floodplains and springs. Available water capacity of the soils ranged from 7 to 49 cm/m. Sites with available water capacity below 20 cm/m typically had a perennial source of water available from a spring, lateral seepage, or shallow water table. Depth to water table ranged from 0 to 102 cm and often was perched above an impervious soil horizon. Redoximorphic features were common throughout.

Vegetation composition—

Holm's Rocky Mountain sedge forms a thick, robust herbaceous layer, its dense rhizomes aggressively monopolizing resources. High mountain cinquefoil, alpine meadow butterweed, and alpine shootingstar commonly co-occur with Holm's sedge. Few-flowered spikerush commonly occurs in the wettest portions of these sites, sometimes at high abundance.

Principal species			CON	COV	MIN	MAX
				Percent		
Forbs:						
DOAL	Alpine shootingstar	*Dodecatheon alpinum*	47	16	1	75
POFL3	High mountain cinquefoil	*Potentilla flabellifolia*	60	10	1	35
SECY	Alpine meadow butterweed	*Senecio cymbalarioides*	63	10	1	60
Sedges and other grasslikes:						
CASC12	Holm's Rocky Mountain sedge	*Carex scopulorum*	100	65	25	95
ELPA6	Fewi-flowered spikerush	*Eleocharis pauciflora*	50	25	2	75

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Other species occur scattered throughout and may include Pacific onion, licorice-root, Sierra shootingstar, tufted hairgrass, explorer's gentian, elephanthead lousewort, American bistort, and sheep sedge.

Adjacent riparian/wetland vegetation types:
- Floodplains and meadows: ALIN2/GLEL, SCMI2, CAMU7, ALVA-CASC12, ELPA6, PIEN/CASC12, SABO2/CASC12, VERAT, CALU7, DECE, CAPR5, ABLA-PIEN/LEGL–FLOODPLAIN, PHEM MOUNDS, CAAQ, CANI2, CAUT.
- Lakes: SPAN2.

Adjacent upland vegetation types:
- Sideslopes and footslopes: ABLA/VASC, ABLA/VAUL, and various ABLA-PIAL types.

Management considerations—

Elk and deer can often be seen grazing in the large, open meadows characteristic of this association. The total forage biomass ranged from 504 to 2724 (avg. 1447) kg/ha. Holm's Rocky Mountain sedge is moderately palatable to domestic and wild ungulates. As grazing pressure increases, the competitive advantage shifts toward forbs, with a consequent increase in forb cover. Holm's Rocky Mountain sedge is highly fire tolerant (USDA NRCS 2002b) and will resprout from underground rhizomes following all but the most intense fire, although fire is rare in this moist community. Dense rhizomes hold soil tenaciously often leading to undercut streambanks, a favorite hiding place for trout. Possible successional trajectories: PIEN/CASC12, PIEN-ABLA/LEGL, CACA4, SABO2/CASC12, SACO2/CASC12, ELPA6, CAAQ.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: emergent wetland
Subclass: persistent
Water regime: (nontidal) seasonally flooded to saturated.

Adjacent riparian/wetland classifications—

The Holm's Rocky Mountain sedge plant association has been described for riparian/wetland sites in midmontane northeastern Oregon (Crowe and Clausnitzer 1997), central Oregon (Kovalchik 1987), eastern Washington (Kovalchik and Clausnitzer 2004); Montana (Hansen et al. 1995), and Nevada and eastern California (Manning and Padgett 1995). Kovalchik and Clausnitzer (2004) also described a saw-toothed sedge (*Carex scopulorum* var. *prionophylla*) type, a variety of Holm's Rocky Mountain sedge. Floristically similar types include Pacific onion–Holm's Rocky Mountain sedge (p. 152).

Northern Singlespike Sedge–Brook Saxifrage–Spring Plant Association

Carex scirpoidea–Saxifraga arguta

MS2113 CASC10–SAAR13–SPRING N = 4

Aaron Wells

Landform environment (n = 4)		Mean	Range
Elevation (m)		2088	1909–2262
Plot slope (percent)		10	2–18
Aspect	All		

Valley environment (n = 4)		Mode	Range
Valley gradient (percent)		>8	1–5, >8
Valley width (m)		10–30	10–300
Valley aspect	All		

Soil surface cover (n = 4)	Mean	Range
Submerged (percent)	19	15–25
Bare ground	4	0–10
Gravel	5	3–5
Rock	10	5–15
Bedrock	0	
Litter	40	15–55
Moss	23	10–40

Soil profile characteristics (n = 4)		Mean	Range
Parent material	Basalt, alluvium, colluvium		
Great group(s)	Cryaquents, Cryofluvents, Cryaqualfs		
		Mean	**Range**
Water table depth (cm)			0–>68
Rock fragments (percent)		51	30–75
Available water capacity of pit (cm/m)		8	3–14
pH (n = 3)		6.01	5.72–6.17
Depth to redoximorphic features (cm)			6–37
Occurrence of redoximorphic features (percentage of soils)		75	
Surface organic layer (cm)			0–14
Surface layers			
Thickness (cm)			13–15
Texture(s)[a]	CL, L, S, SIL, SL		
Redoximorphic features	None		
Subsurface layers			
Thickness (cm)			16–>51
Texture(s)[a]	L, LS, SL		
Redoximorphic features	Depletions, iron oxide concentrations		

[a] See “Soil Texture Codes” section.

Physical environment—

The northern singlespike sedge-brook saxifrage–spring plant association was found along small, steep (2 to 18, avg. 9.5 percent), headwater springs in the Strawberry Mountain Wilderness. Sample sites were located between 1909 to 2262 m in low (1 to 3 percent)- to high (>8 percent)-gradient, V- and trough-shaped valleys. Soils ranged from cobbly/bouldery streambanks to somewhat poorly drained, moderately deep, silt loam to clay loam over very gravelly loamy sand to sandy loam. Depth to water table ranged from surface flow to greater than 68 cm, with water being continually supplied to the soil by perennial springs. Redoximorphic features were common.

Vegetation composition—

Northern singlespike sedge occurs throughout with brook saxifrage growing directly along the spring channel(s). Various conifer seedlings can be found throughout the understory, and overstory trees may be hanging over the spring from adjacent uplands. Alpine laurel, whortleberry, and western moss heather are sometimes found scattered throughout the community.

A diverse understory of forbs and graminoids characterized by Pacific onion, elephanthead lousewort, explorer’s gentian, alpine meadow butterweed, and few-flowered spikerush is typical of lower gradient (≤4 percent) sites. Fringed grass of Parnassus, Canadian burnet, arrowleaf groundsel, western featherbells, and leafy white orchis are more prominent at higher gradient sites (>4 percent). The presence of woodrush sedge is indicative of disturbance, including grazing by wild and domestic ungulates. Other species include felwort, alpine and Sierra shootingstar.

Adjacent riparian/wetland vegetation types: owing to the narrow nature of these springs, there were no adjacent riparian types.

Adjacent upland vegetation types:

Sideslopes and ridges: ABLA/ARCO9, ABLA/VASC, ABLA-JUOC, PSME-ABGR/duff.

Principal species			CON	COV	MIN	MAX
				Percent		
Shrubs:						
KAMI	Alpine laurel	*Kalmia microphylla*	50	3	3	3
VAMY2	Whortleberry	*Vaccinium myrtillus*	50	2	1	3
Forbs:						
ALVA	Pacific onion	*Allium validum*	100	11	5	20
DOAL	Alpine shootingstar	*Dodecatheon alpinum*	50	4	3	5
ERPE3	Subalpine fleabane	*Erigeron peregrinus*	100	10	3	20
GECA	Explorer's gentian	*Gentiana calycosa*	75	5	5	5
HADI7	Leafy white orchis	*Habenaria dilatata*	100	4	3	5
LICA2	Canby's licorice-root	*Ligusticum canbyi*	75	3	1	5
MIGU	Seep monkeyflower	*Mimulus guttatus*	50	6	3	10
PAFI3	Fringed grass of Parnassus	*Parnassia fimbriata*	100	8	5	10
PEGR2	Elephanthead lousewort	*Pedicularis groenlandica*	100	5	3	10
SAAR13	Brook saxifrage	*Saxifraga arguta*	100	4	1	10
SASI10	Canadian burnet	*Sanguisorba sitchensis*	100	8	3	15
SECY	Alpine meadow butterweed	*Senecio cymbalarioides*	50	10	5	15
SETR	Arrowleaf groundsel	*Senecio triangularis*	100	4	1	10
STOC	Western featherbells	*Stenanthium occidentale*	100	3	1	5
SWPE	Felwort	*Swertia perennis*	75	4	3	5
Grasses:						
AGTH2	Thurbers' bentgrass	*Agrostis thurberiana*	50	3	1	5
DECE	Tufted hairgrass	*Deschampsia cespitosa*	75	8	5	15
GLEL	Tall mannagrass	*Glyceria elata*	50	3	1	5
Sedges and other grasslikes:						
CALU7	Woodrush sedge	*Carex luzulina*	75	8	5	15
CASC10	Northern singlespike sedge	*Carex scirpoidea*	100	40	20	50
ELPA6	Few-flowered spikerush	*Eleocharis pauciflora*	50	15	10	20
JUME3	Mertens' rush	*Juncus mertensianus*	50	2	1	3

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Management considerations—

Total forage biomass ranged from 896 to 1400 (avg. 1148) kg/ha. These sites are important foraging and watering holes for wildlife ranging from ruffed grouse to elk and deer. In some instances, these sites represent the only perennial water available for miles around.

Northern singlespike sedge is highly fire tolerant (USDA NRCS 2002b) and will resprout vigorously following fire, which can be quite common in the dry southwestern portion of the Blue Mountains. The strong roots of northern singlespike sedge and brook saxifrage are important for soil stability along these steep springs. As long as the springs continue to flow, this association represents climax vegetation at these sites.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: emergent wetland
Subclass: persistent
Water regime: (nontidal) seasonally flooded to saturated.

Adjacent riparian/wetland classifications—

The northern singlespike sedge-brook saxifrage–spring plant association has not previously been described. A floristically similar type is Pacific onion–Holm's Rocky Mountain sedge (p. 152).

Woodrush Sedge Plant Association

Carex luzulina

MM2916 CALU7 N = 10

Landform environment (n = 10)		Mean	Range
Elevation (m)		2099	1640–2229
Plot slope (percent)		3	<1–9
Aspect	Mostly southerly		

Valley environment (n = 8)		Mode	Range
Valley gradient (percent)		<1	<1–3, >8
Valley width (m)		30 – 100	30–300
Valley aspect	All		

Soil surface cover (n = 10)	Mean	Range
Submerged (percent)	3	0–20
Bare ground	7	0–50
Gravel	0	
Rock	0	
Bedrock	0	
Litter	30	0–75
Moss	60	20–98

Soil profile characteristics (n = 10)		Mean	Range
Parent material	Mazama ash, peat, alluvium		
Great group(s)	Cryaquands, Cryaquents, Cryaquepts, Cryofibrists, Cryohemists		
Water table depth (cm)			0–114
Rock fragments (percent)		1	0–6
Available water capacity of pit (cm/m)		29	11–46
pH (n = 6)		6.00	5.66–6.20
Depth to redoximorphic features (cm)			10–45
Occurrence of redoximorphic features (percentage of soils)		40	
Surface organic layer (cm)			0–>106
Surface layers			
Thickness (cm)			15–106
Texture(s)[a]	LS, SIL, fibric		
Redoximorphic features	Iron oxide concentrations		
Subsurface layers			
Thickness (cm)			13–60
Texture(s)[a]	SI, SIL, SL, sapric		
Redoximorphic features	Depletions, iron oxide concentrations		

[a] See “Soil Texture Codes” section.

Physical environment—

The woodrush sedge plant association occurred on high-elevation (1945 to 2229 m) floodplains and moist/wet meadows. One site was located at 1640 m along the Minam River in the Eagle Cap Wilderness. Sample sites were located in mostly low-gradient (<3 percent), U- and trough-shaped valleys. One exception was Lake Creek in the Elkhorn Mountains, which had a very high (>8 percent) gradient. Meadow soils were typically poorly drained, deep (>50 cm), organic sedge peats. Available water capacity of meadow sites averaged 33 cm/m. The soils of the floodplain type were organic-rich silt loams over sand. Floodplain soil available water capacity was 14 cm/m. Depth to water table ranged from the surface to 114 cm, and redoximorphic features were common.

Vegetation composition—

Woodrush sedge is prominent in the herbaceous layer and is joined by few-flowered spikerush and aquatic sedge in wetter portions of the site. A careful look at the understory will reveal a diversity of forbs and graminoids, including Holm’s Rocky Mountain sedge, Pacific onion, alpine and Sierra shootingstar, explorer’s gentian, elephanthead lousewort, Canadian burnet, hooded ladies’-tresses, alpine meadow butterweed, tufted hairgrass, slender muhly, and alpine timothy.

Principal species			CON	COV	MIN	MAX
				Percent		
Forbs:						
ALVA	Pacific onion	*Allium validum*	50	4	1	13
DOAL	Alpine shootingstar	*Dodecatheon alpinum*	60	10	1	40
DOJE	Sierra shootingstar	*Dodecatheon jeffreyi*	40	1	1	1
GECA	Explorer's gentian	*Gentiana calycosa*	40	1	1	1
HADI7	Leafy white orchis	*Habenaria dilatata*	40	1	1	1
LITE2	Idaho licorice-root	*Ligusticum tenuifolium*	40	10	1	35
PEGR2	Elephanthead lousewort	*Pedicularis groenlandica*	50	2	1	3
POBI6	American bistort	*Polygonum bistortoides*	40	2	1	3
POFL3	High mountain cinquefoil	*Potentilla flabellifolia*	40	4	1	10
SASI10	Canadian burnet	*Sanguisorba sitchensis*	50	5	1	20
SECY	Alpine meadow butterweed	*Senecio cymbalarioides*	70	4	1	15
SPRO	Hooded ladies'-tresses	*Spiranthes romanzoffiana*	40	1	1	1
Grasses:						
DECE	Tufted hairgrass	*Deschampsia cespitosa*	70	17	1	70
MUFI2	Slender muhly	*Muhlenbergia filiformis*	90	18	1	80
PHAL2	Alpine timothy	*Phleum alpinum*	40	1	1	1
Sedges and other grasslikes:						
CAAQ	Aquatic sedge	*Carex aquatilis*	40	25	10	50
CAJO	Jones' sedge	*Carex jonesii*	40	2	1	3
CALU7	Woodrush sedge	*Carex luzulina*	100	61	20	95
CASC12	Holm's Rocky Mountain sedge	*Carex scopulorum*	90	7	1	20
ELPA6	Few-flowered spikerush	*Eleocharis pauciflora*	90	18	1	60
LUCA2	Field woodrush	*Luzula campestris*	50	2	1	5

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Adjacent riparian/wetland vegetation types:
Floodplains and meadows:
CAUT, PIEN-ABLA/CASC12, CASC12, ELPA6, ALVA-CASC12, CACA4, DECE, CAPR5, ABLA/VAME, CAJO, SACO2/CASC12, and VERAT.

Adjacent upland vegetation type:
Sideslopes: ABLA/VASC.

Management considerations—

Total forage biomass ranged from 747 to 2987 (avg. 1734) kg/ha. Elk and deer use ranges from low early on to high later in the season after the soils have dried out a bit. The wet nature of these sites make them especially important habitat for amphibians. Woodrush sedge is considered an increaser, and this association may represent disturbed versions of the Holm's Rocky Mountain sedge, few-flowered spikerush, or aquatic sedge plant associations (Kovalchik 2004). The potential exists for a shift back to the above plant associations with a decrease in disturbance frequency or intensity.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: emergent wetland
Subclass: persistent
Water regime: (nontidal) seasonally flooded to saturated.

Adjacent riparian/wetland classifications—

Crowe and Clausnitzer (1997) described a woodrush sedge plant association for the midmontane riparian/wetlands of northeastern Oregon. The association described above extends the range and extent of this type in the Blue Mountains.

Floristically similar types include aquatic sedge (p. 125), few-flowered spikerush (p. 131), tufted hairgrass (p. 148), and Holm's Rocky Mountain sedge (Crowe and Clausnitzer 1997).

Black Alpine Sedge Plant Association

Carex nigricans

MS2111 CANI2 N = 11

Aaron Wells

Landform environment (n = 11)		Mean	Range
Elevation (m)		2282	2177–2409
Plot slope (percent)		2	<1–7
Aspect	Mostly northerly		

Valley environment (n = 11)		Mode	Range
Valley gradient (percent)		<1	<1–3, 6–8
Valley width (m)		30–100	10–300
Valley aspect	Mostly northerly		

Soil surface cover (n = 10)	Mean	Range
Submerged (percent)	0	
Bare ground	3	0–10
Gravel	0	
Rock	4	0–40
Bedrock	0	
Litter	62	5–90
Moss	17	1–50

Soil profile characteristics (n = 11)			
Parent material	Mazama ash, quartz diorite, sedge peat		
Great group(s)	Cryaquands, Cryaquents, Cryaquepts, Cryofluvents, Cryohemists, Haplocryalfs		
		Mean	**Range**
Water table depth (cm)			13–69
Rock fragments (percent)		1	0–8
Available water capacity of pit (cm/m)		14	11–17
pH (n = 9)		5.52	4.92–6.21
Depth to redoximorphic features (cm)			13–30
Occurrence of redoximorphic features (percentage of soils)		64	
Surface organic layer (cm)			0–8
Surface layers			
Thickness (cm)			5–57
Texture(s)[a]	L, LS, SIL, SL		
Redoximorphic features	Iron oxide concentrations		
Subsurface layers			
Thickness (cm)			10–>80
Texture(s)[a]	L, LS, SIL, SCL, SI, SIC, SICL, SIL, SL		
Redoximorphic features	Depletions, iron oxide concentrations		

[a] See “Soil Texture Codes” section.

Physical environment—

The black alpine sedge plant association occurred in moist, headwater meadows above 2134 m elevation in the northern and central Blue Mountains. Valley types ranged from low-gradient (<3 percent), U- and trough-shaped, and flat to one high-gradient (6 to 8 percent) trough-shaped valley. Soils were moderately well drained, moist throughout the growing season, and lack the thick organic cap common to the Holm’s Rocky Mountain sedge plant association. Soils may be briefly inundated just following snowmelt but dry out early in summer. Available water capacity ranged between 11 and 17 (avg. 14) cm/m corresponding to medium-textured, fine sandy loam to clay loam soils. The water table ranged from 13 to 69 cm, and redoximorphic features were common.

Vegetation composition—

Black alpine sedge forms a thick sod with Holm’s Rocky Mountain sedge often growing along the slightly moister edges of the association. Scattered forbs and graminoids include Idaho licorice-root, explorer’s gentian, alpine meadow butterweed, high mountain cinquefoil, yellow Wallowa Indian paintbrush, tufted hairgrass, sheep sedge, and Drummond’s rush. Few-flowered spikerush is sometimes found growing in wet depressions scattered throughout the association. The black alpine sedge plant association often occurrs on the slightly higher, drier margins of Holm’s Rocky Mountain sedge and few-flowered spike rush meadows.

Principal species			CON	COV	MIN	MAX
				Percent		
Forbs:						
ALVA	Pacific onion	*Allium validum*	27	9	1	25
ANAL4	Alpine pussytoes	*Antennaria alpina*	36	6	1	20
ASOC	Western mountain aster	*Aster occidentalis*	36	5	2	15
CACH16	Yellow Wallowa Indian paintbrush	*Castilleja chrysantha*	54	1	1	1
ERPE3	Subalpine fleabane	*Erigeron peregrinus*	27	9	1	15
GECA	Explorer's gentian	*Gentiana calycosa*	72	4	1	10
LITE2	Idaho licorice-root	*Ligusticum tenuifolium*	72	12	1	40
POFL3	High mountain cinquefoil	*Potentilla flabellifolia*	81	22	1	70
SECY	Alpine meadow butterweed	*Senecio cymbalarioides*	72	9	1	25
SPRO	Hooded ladies'-tresses	*Spiranthes romanzoffiana*	27	1	1	1
Grasses:						
DAIN	Timber oatgrass	*Danthonia intermedia*	36	3	1	10
DECE	Tufted hairgrass	*Deschampsia cespitosa*	45	4	1	6
MUFI2	Slender muhly	*Muhlenbergia filiformis*	27	8	2	20
PHAL2	Alpine timothy	*Phleum alpinum*	27	1	1	1
Sedges and other grasslikes:						
CAIL	Sheep sedge	*Carex illota*	54	7	1	30
CAJO	Jones' sedge	*Carex jonesii*	27	11	1	30
CANI2	Black alpine sedge	*Carex nigricans*	100	48	20	70
CASC12	Holm's Rocky Mountain sedge	*Carex scopulorum*	90	12	1	25
ELPA6	Few-flowered spikerush	*Eleocharis pauciflora*	27	20	5	30
JUDR	Drummond's rush	*Juncus drummondii*	63	2	1	5
LUCA2	Field woodrush	*Luzula campestris*	27	1	1	1

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Adjacent riparian/wetland vegetation types:

Floodplains and meadows:

ELPA6, ALVA-CASC12, PHEM MOUNDS, CALU7, CACA4, ABLA-PIEN/LEGL–FLOODPLAIN, CASC12, SABO2/CASC12, KAMI/CANI2, SALIX/CACA4.

Springs and seeps: ELPA6, CASC12.

Lake edges: CAAQ.

Adjacent upland vegetation type:

Sideslopes and footslope: ABLA/VASC.

Management considerations—

Forage values ranged from 215 to 1680 (avg. 1007) kg/ha. Elk and deer use is fairly high in these meadows, although Kovalchik (1987) commented that the palatability and forage value of black alpine sedge is unknown but assumed to be moderately low. Black alpine sedge forms a fairly resilient sod layer that can withstand moderate trampling by wild and domestic ungulates and backpackers. Overuse can result in increased prevalence of forbs and an increase in bare ground; therefore, concentrated use should be avoided. Rather, managers should encourage diffuse recreational use throughout this association. The dense rhizomes of black alpine sedge provide soil stability to the banks of the many small, meandering rivulets characteristic to these headwater basins. Possible successional trajectories include PHEM MOUNDS, KAMI/CANI2, and ABLA/VASC.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: emergent wetland
Subclass: persistent
Water regime: (nontidal) saturated to temporarily flooded.

Adjacent riparian/wetland classifications—

Black alpine sedge types have been described for central Oregon (Kovalchik 1987), eastern Washington (Kovalchik and Clausnitzer 2004), and Alaska (Viereck et al. 1992). Kovalchik (1987) further described a Holm's Rocky Mountain sedge-black alpine sedge-tufted hairgrass type that may also be present in northeastern Oregon but was not encountered in this classification effort.

Floristically similar types include tufted hairgrass (p. 148) and sheep sedge (Kovalchik and Clausnitzer 2004).

Bluejoint Reedgrass Plant Association

Calamagrostis canadensis

GM4111 CACA4 N = 8

Aaron Wells

Landform environment (n = 8)		Mean	Range
Elevation (m)		2132	1921–2287
Plot slope (percent)		2	<1–5
Aspect	Mostly northerly		

Valley environment (n = 8)		Mode	Range
Valley gradient (percent)		1–3	1–5
Valley width (m)		100–300	<10, 30–>300
Valley aspect	Mostly northerly		

Soil surface cover (n = 8)	Mean	Range
Submerged (percent)	2	0–10
Bare ground	8	0–25
Gravel	0	
Rock	0	
Bedrock	0	
Litter	73	50–100
Moss	15	0–50

Soil profile characteristics (n = 8)		Mean	Range
Parent material	Mazama ash, quartz diorite, peat		
Great group(s)	Cryaquepts, Cryofluvents, Cryorthents, Haplocryalfs		
Water table depth (cm)			10–>97
Rock fragments (percent)		7	0–26
Available water capacity of pit (cm/m)		14	9–23
pH (n = 7)		5.34	4.64–6.13
Depth to redoximorphic features (cm)			10–19
Occurrence of redoximorphic features (percentage of soils)		38	
Surface organic layer (cm)			0–20
Surface layers			
Thickness (cm)			9–48
Texture(s)[a]	CL, L, LS, SIL, SL, hemic		
Redoximorphic features	Depletions		
Subsurface layers			
Thickness (cm)			39–65
Texture(s)[a]	CL, L, LS, SCL, SICL, SIL, SL		
Redoximorphic features	Depletions, iron oxide concentrations		

[a] See “Soil Texture Codes” section.

Physical environment—

The bluejoint reedgrass plant association occurred in high-elevation (1921 to 2287 m) moist meadows and stream terraces throughout the Blue Mountains. Sample sites occurred in U- and trough-shaped and flat valleys of very low (<1 percent) to moderate (4 to 5 percent) gradient. Soils were moderately well-drained, gravelly loams to silt loams often over a slowly permeable layer of sandy clay loam to clay loam. A thick, dry, sod often overlies the mineral soil. Available water capacity ranged from 9 to 23 (avg. 14) cm/m. Depth to water table was typically deep (>50 cm), and redoximorphic features were uncommon.

Vegetation composition—

Bluejoint reedgrass forms a dense stand often joined by Holm’s Rocky Mountain sedge along slightly moister edges of the association. The thick sod layer of accumulated rhizomes atop mineral soil excludes a diverse forb understory.

Scattered forbs and graminoids may include high mountain cinquefoil, Columbian monkshood, willowherb, hairy arnica, largeleaf avens, muskflower, alpine meadow butterweed, violets, and smallwing sedge.

Adjacent riparian/wetland vegetation types:
Floodplains and meadows:
SCMI2, ALIN2/GLEL, CANI2, ABLA-PIEN/LEGL–FLOODPLAIN, CAUT, SALIX/CAUT, SABO2/CASC12, CAVE6.

Adjacent upland vegetation type:
Sideslopes: ABLA/VASC.

Principal species			CON	COV	MIN	MAX
				Percent		
Forbs:						
ACCO4	Columbian monkshood	*Aconitum columbianum*	37	15	3	40
EPGL4	Fringed willowherb	*Epilobium glandulosum*	37	4	3	5
POFL3	High mountain cinquefoil	*Potentilla flabellifolia*	75	12	3	30
VIOLA	Violet	*Viola*	50	6	1	10
Grasses						
CACA4	Bluejoint reedgrass	*Calamagrostis canadensis*	100	72	20	90
Sedges and other grasslikes						
CAREX	Sedge	Carex	37	9	1	20
CASC12	Holm's Rocky Mountain sedge	*Carex scopulorum*	62	18	10	30

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Management considerations—

Forage biomass values ranged from 821 to 2576 (avg. 2068) kg/ha. Bluejoint reedgrass is a preferred food item of wild ungulates, but palatability varies from moderate to high depending on the season (Hansen et al. 1995). These sites are relatively resilient to grazing pressure given the strong rhizomes, thick sod, and the fact that soil surface layers are wet for only short periods after melt-off. Sustained high levels of grazing can result in breakup of the sod layer and a shift to forbs and other graminoids. These sites provide habitat for small mammals including voles, deer mice, weasels, and snowshoe hares. Bluejoint reedgrass has low fire tolerance and may be completely destroyed by moderate- to high-intensity fires capable of burning the dry sod layer. This association is self-perpetuating and may represent climax ecological status in moist subalpine meadows unless a disturbance event(s) shifts the balance to other species.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: emergent wetland
Subclass: persistent
Water regime: (nontidal) seasonally flooded to saturated.

Adjacent riparian/wetland classifications—

Bluejoint reedgrass types have been described for mid-montane northeastern Oregon (Crowe and Clausnitzer 1997), Montana (Hansen et al. 1995), eastern Washington (Kovalchik and Clausnitzer 2004), Utah and southeastern Idaho (Padgett et al. 1989), and Alaska (Viereck et al. 1992).

There are no floristically similar types.

Miscellaneous Moist Graminoid Types

Tufted Hairgrass Plant Association

Deschampsia cespitosa

MM1912 DECE N = 3

The tufted hairgrass plant association occurred in moist meadows between 2079 and 2216 m elevation in the Eagle Cap Wilderness. Sample sites were located in low-gradient (1 to 3 percent), U- and trough-shaped valleys. Soils were Cryaquepts. Soils were somewhat poorly drained loam to silt loam surface layers over clay loam to silty clay loam subsurface layers.

Tufted hairgrass (avg. 63 percent) occurs in bunches throughout the community. Other species include high mountain cinquefoil, willowherb, alpine meadow butterweed, Holm's Rocky Mountain sedge, and bladder sedge. It is best to graze the tufted hairgrass association from mid to late summer. It is relatively tolerant of grazing, but a high level of grazing can result in a shift in species composition to the detriment of tufted hairgrass.

Tufted hairgrass types have been described throughout the Western United States including midmontane northeastern Oregon (Crowe and Clausnitzer 1997), Montana (Hansen et al. 1995), central Oregon (Kovalchik 1987), eastern Washington (Kovalchik and Clausnitzer 2004), Nevada and eastern California (Manning and Padgett 1995), Utah and southeastern Idaho (Padgett et al. 1989), and eastern Idaho-western Wyoming (Youngblood et al. 1985).

Floristically similar types include black alpine sedge (p. 144), woodrush sedge (p. 142) and Holm's Rocky Mountain sedge-black alpine sedge-tufted hairgrass association (Kovalchik 1987).

Basin Wildrye Plant Community Type

Elymus cinereus

GB7111 ELCI2 N = 1

The basin wildrye community type was found on a terrace of Murderers' Creek in the Malheur National Forest at 994 m elevation. Soils were Haplustalfs. The soil was shallow to alluvium, well-drained silt loam over silty clay loam. Available water capacity was 19 cm/m. Grasses are the primary life form consisting of clumps of basin wildrye (40 percent) with annual brome grasses (20 percent) and Kentucky bluegrass (10 percent) interspersed between clumps. Creeping bentgrass, western needlegrass, and timothy were found at low abundance (≤5 percent). Trace amounts of Wood's rose, common snowberry, thistle, teasel, western coneflower, common yarrow, prickly lettuce, and red clover were found throughout. Total forage biomass was 1398 kg/ha. Basin wildrye is a high-protein forage species for wild and domestic ungulates. Ideally, grazing of this community is delayed until fall when the protein content is highest and damage to the elevated growing point is minimized (USDA NRCS 2002b). Basin wildrye is also an important erosion control species and helps maintain soil integrity. The presence of weedy species suggests past or present grazing influences at this site. In fact, cow trails were found throughout the terrace.

Crawford (2003) described three basin wildrye types for the Columbia River basin: basin wildrye/clustered field sedge, basin wildrye-saltgrass (*Distichlis spicata*), basin wildrye/cheatgrass.

Star Sedge Plant Community Type

Carex muricata

MS3112 CAMU7 N = 3

The star sedge plant community type occurred in moist/wet headwater basins of the Elkhorn and Strawberry Mountains. Soil great groups were Cryofibrists and Cryohemists. Soils were typically poorly drained sedge peats, with an average available water capacity of 41 cm/m.

Star sedge (avg. 68 percent) forms a thick stand with few-flowered spikerush (avg. 23 percent) occurring in the wetter portions of the community. Alpine and Sierra shootingstar, alpine meadow butterweed, leafy white orchis, tufted hairgrass, aquatic sedge, and Holm's Rocky Mountain sedge are often found scattered throughout the community.

Total forage biomass ranged from 523 to 1897 (avg. 1195) kg/ha. Deer and elk use is moderate to high in these meadows, especially in the Strawberry Mountain Wilderness where, late in the season, water and high-quality forage are scarce.

Adjacent riparian/wetland vegetation types:
Meadows: CALU7, ALVA-CASC12, SCMI2, CAUT, PIEN/CASC12, DECE, CAAQ.

Adjacent upland vegetation type:
Sideslopes: ABLA/VASC.

Crowe and Clausnitzer (1997) described a similar community type for the midmontane riparian/wetlands of the Blue Mountains. Floristically similar types include few-flowered spikerush (p. 131).

Jones' Sedge Plant Community

Carex jonesii

MM2933 CAJO N = 1

The Jones' sedge plant community was located along a seep in the high-gradient (6 to 8 percent) headwaters of the North Fork John Day River in the Elkhorn Mountains at 2287 m. Soil great groups were Cryaquands. Soils were somewhat poorly drained silt loams over granite parent material with iron oxide concentrations throughout the subsurface layers (24 to 50 cm).

Jones' sedge (60 percent), Holm's Rocky Mountain sedge (25 percent), and few-flowered spikerush (5 percent) make up the thick graminoid layer. Trace amounts of woodrush sedge, alpine leafybract aster, high mountain cinquefoil, and tinker's penny occurred throughout.

Adjacent riparian/wetland vegetation types:
Seeps: ELPA6, CANI2.

This community has not previously been described.

Nebraska Sedge Plant Community Type

Carex nebrascensis

MM2912 CANE2 N = 1

The Nebraska sedge plant community type was found on a seepy floodplain along the east fork of Pine Creek in the Wallowa-Whitman National Forest at 1985 m elevation. Soil great groups were Cryofluvents. The soil was shallow to alluvium, poorly drained loam to silt loam over gravelly fine sandy loam.

Nebraska sedge (75 percent), Holm's Rocky Mountain sedge (15 percent), and tufted hairgrass (15 percent) form a thick graminoid cover. Other species including weak alkaligrass, alpine timothy, Columbian monkshood, northern bedstraw, Pacific onion, largeleaf avens, high mountain cinquefoil, and alpine meadow butterweed occurred at low abundance throughout the site. Total forage biomass was 1624 kg/ha. Nebraska sedge provides high-quality forage for wild and domestic ungulates and is resistant to moderately high levels of grazing (Crowe and Clausnitzer 1997).

Nebraska sedge types have been described throughout the Western United States including the Columbia River basin (Crawford 2003), midmontane northeastern Oregon (Crowe and Clausnitzer 1997), Montana (Hansen et al. 1995), southwestern Idaho (Jankovsky-Jones, 2001), central Oregon (Kovalchik 1987), Nevada and eastern California (Manning and Padgett 1995), Utah and southeastern Idaho (Padgett et al. 1989), and eastern Idaho-western Wyoming (Youngblood et al. 1985). The occurrence described above may represent the upper elevational range of this type in the Blue Mountains.

Brown Sedge Plant Community

Carex subfusca

MM2930 CASU6 N = 1

The brown sedge plant community was found on a steep (12 percent) seepy slope in the upper reaches of the East Fork of Canyon Creek in the Strawberry Mountain Wilderness at 2104 m. Soil great groups were Cryofluvents. Soils were moderately deep, somewhat poorly drained, very gravelly/cobbly loams over boulders. Available water capacity of the soil was 9 cm/m. Redoximorphic features occurred within the upper 20 cm of the soil profile.

Brown sedge (60 percent), the principal herbaceous species, is joined by tall mannagrass (20 percent), widefruit sedge (30 percent), woodrush sedge, spikerush, Baltic rush, and alpine bentgrass. Forbs included fringed willowherb, threepetal bedstraw, monkeyflowers, American speedwell, and arrowleaf groundsel. Total forage biomass was 3808 kg/ha. Wildlife use is high at these springs, especially late in the season when water is difficult to find.

Adjacent riparian/wetland vegetation types:
Spring: RUOC2, ALIN2/GLEL.

Adjacent upland vegetation types:
Sideslopes: ABLA/VASC, ABLA/ANMA, FEVI/LUPIN.

The brown sedge plant community has not previously been described.

Smallwing Sedge Plant Community Type

Carex microptera

MM2929 CAMI7 N = 1

The smallwing sedge plant community type was found on a seepy terrace of the North Fork Imnaha River in the Eagle Cap Wilderness at 1966 m. Soil great groups were Cryorthents. The soil was deep, well-drained loam over sandy loam. The water table was deeper than 1 m and the available water capacity of the soil was 12 cm/m.

Smallwing sedge (65 percent) forms a thick herbaceous cover intermingled with a diversity of forbs and grasses, including slender cinquefoil, glaucus willowherb, Virginia strawberry, American speedwell, falsegold groundsel, western needlegrass, and California brome. Species indicative of grazing pressure include Kentucky bluegrass (15 percent), bearded wheatgrass (5 percent), common yarrow (15 percent), and Canada thistle (5 percent). The terrace was located near a popular camping spot, and evidence of horse pasturing was found throughout.

Adjacent riparian/wetland vegetation types:

Seeps: CAUT,

Floodplains and terraces: JUBA.

Smallwing sedge types have been described by Youngblood et al. (1985) and Padgett et al. (1989).

Baltic Rush Plant Community Type

Juncus balticus

MW3912 JUBA N = 1

The Baltic rush plant community type was found on a seepy terrace of the North Fork Imnaha River in the Eagle Cap Wilderness at 1966 m. Soil great groups were Cryorthents. The soil was deep, well-drained, sandy loams to loams over very gravelly/cobbly loamy sand. Available water capacity of the soil was 6 cm/m. Baltic rush (90 percent) forms a thick sward of wiry stems through which grows an array of forbs and graminoids including slender cinquefoil, falsegold groundsel, tall bluebells, monkey-flowers, common horsetail, smallwing sedge, western needlegrass, and California brome. Species indicative of grazing pressure include Kentucky bluegrass (5 percent), common yarrow (3 percent), and Canada thistle (15 percent). The terrace was near a popular camping spot and evidence of horse pasturing was found throughout.

Baltic rush is resilient to grazing pressure owing to its low palatability to ungulates, strong rhizomatous roots, and rapid growth rate (USDA NRCS 2002b). Baltic rush has nitrogen-fixing capabilities, stabilizes streambanks, and acts as a filter for sediment and nutrients.

Adjacent riparian/wetland vegetation types:

Seeps: CAUT.

Floodplains and terraces: CAMI7.

Baltic rush types have been described throughout the Western States including the Columbia River basin (Crawford 2003), midmontane northeastern Oregon (Crowe and Clausnitzer 1997), Montana (Hansen et al. 1995), southwestern Idaho (Jankovsky-Jones et al. 2001), Nevada and eastern California (Manning and Padgett 1995), Malheur National Forest, Oregon (Padgett 1981), Utah and southeastern Idaho (Padgett et al. 1989), and eastern Idaho-western Wyoming (Youngblood et al. 1985). The occurrence described above may represent the upper elevational range of this type in the Blue Mountains.

Pacific Onion-Holm's Rocky Mountain Sedge Plant Association

Allium validum-Carex scopulorum

FW7111 ALVA-CASC12 N = 20

Aaron Wells

Landform environment (n = 20)		Mean	Range
Elevation (m)		2233	2034–2424
Plot slope (percent)		7	0.5–30
Aspect	All		

Valley environment (n = 18)		Mode	Range
Valley gradient (percent)		1–3	<1–>8
Valley width (m)		30–100	<10–>300
Valley aspect	All		

Soil surface cover (n = 16)	Mean	Range
Submerged (percent)	4	0–20
Bare ground	6	0–20
Gravel	3	0–15
Rock	3	0–15
Bedrock	0	
Litter	28	3–75
Moss	52	10–90

Soil profile characteristics (n = 20)		Mean	Range
Parent material	Mazama ash, granite, quartz diorite, peat, alluvium, colluvium		
Great group(s)	Cryorthents, Cryofluvents, Cryaquepts, Haplocryands, Cryaquands, Cryohemists, Cryosaprists, Cryofibrists, Hapludands, Dystrocryepts		
Water table depth (cm)			15–>60
Rock fragments (percent)		6	0–66
Available water capacity of pit (cm/m)		20	5–48
pH (n = 15)		5.90	5.16–6.96
Depth to redoximorphic features (cm)			10–60
Occurrence of redoximorphic features (percentage of soils)		40	
Surface organic layer (cm)			0–>50
Surface layers			
Thickness (cm)			7–53
Texture(s)[a]	SIL, L, SL, LS, fibric, hemic		
Redoximorphic features	Iron oxide concentrations		
Subsurface layers			
Thickness (cm)			7–>74
Texture(s)[a]	CL, SIL, L, SL, fibric		
Redoximorphic features	Iron oxide concentrations		

[a] See "Soil Texture Codes" section.

Physical environment—

The Pacific onion-Holm's Rocky Mountain Sedge plant association occurred at high-elevation (2000 to 2400 m) moist/wet meadows, springs, and floodplains of the Eagle Cap Wilderness, Strawberry Mountain Wilderness, and Elkhorn Mountains. Sample sites were located in very low (<1 percent)- to very high (>8 percent)- gradient, U-, V-, and trough-shaped valleys. Landform slope ranged from <1 to 30 (avg. 7 percent). When slope was greater than 2 percent, a perennial source of water, such as a spring or lateral seepage, was present supplying a continual flow of water to the site.

The surface was often covered by a thick (10 to 35 cm) organic horizon. Soil texture was almost exclusively silt loam in the surface and subsurface layers with a few occurrences of coarse sands to loams. Soils were poorly drained with a shallow (surface) to moderately deep (>60 cm) water table. Redoximorphic features were very common.

Vegetation composition—

Pacific onion forms a dense herbaceous layer with Holm's Rocky Mountain sedge scattered throughout. Arrowleaf groundsel tends to fill in for Holm's sedge at sites with slopes greater than 6 percent.

Other species include alpine shootingstar, explorer's gentian, elephanthead lousewort, high mountain cinquefoil, alpine meadow butterweed, licorice-root, brook saxifrage, tufted hairgrass, woodrush sedge, black alpine sedge, and common horsetail.

Principal species			CON	COV	MIN	MAX
				Percent		
Forbs:						
ALVA	Pacific onion	*Allium validum*	100	69	30	100
DOAL	Alpine shootingstar	*Dodecatheon alpinum*	55	5	1	20
ERPE3	Subalpine fleabane	*Erigeron peregrinus*	45	12	1	50
GECA	Explorer's gentian	*Gentiana calycosa*	50	12	1	30
LITE2	Idaho licorice-root	*Ligusticum tenuifolium*	45	1	1	2
PEGR2	Elephanthead lousewort	*Pedicularis groenlandica*	65	4	1	20
POFL3	High mountain cinquefoil	*Potentilla flabellifolia*	55	12	1	40
SECY	Alpine meadow butterweed	*Senecio cymbalarioides*	45	10	1	50
Grasses:						
DECE	Tufted hairgrass	*Deschampsia cespitosa*	45	18	1	60
Sedges and other grasslikes:						
CANI2	Black alpine sedge	*Carex nigricans*	40	7	1	25
CASC12	Holm's Rocky Mountain Sedge	*Carex scopulorum*	75	7	1	20
Ferns and horsetails:						
EQAR	Common horsetail	*Equisetum arvense*	40	8	1	25

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Adjacent riparian/wetland vegetation types:
Floodplains and meadows:
CASC12, CAMU7, SCMI2, CAUT, ABLA-PIEN/LEGL–FLOODPLAIN, ELPA6, CANI2, PHEM MOUNDS, CALU7, SABO2/CASC12, SALIX/MESIC FORB, ALSI3/MESIC FORB.

Adjacent upland vegetation types:
Sideslopes and footslope: ABLA/VASC, ABLA/VAUL, various ABLA/PIAL types.

Management considerations—

Pacific onion is not adapted to coarse-textured soils, such as sands and loamy sands, as evidenced by the strong affinity to silt-loam and organic soils. The ALVA-CASC12 plant association may shift to the CASC12 plant association given an influx of coarse sediments into a site. Forage values ranged from 502 to 3871 (avg. 1542) kg/ha. Deer and elk use is typically high in these meadows, but not necessarily in this association. These sites are particularly important for wildlife in the Strawberry Mountain Wilderness where watering holes are few and far between late in the season. Many of these sites are unsuitable for camping and horse pasturing owing to the wet organic soils. Wranglers should look to slightly drier, more resilient meadows, such as bluejoint reedgrass, Holm's Rocky Mountain sedge, and willow/mesic forb adjacent to the ALVA-CASC12 association for pasturing opportunities. The dense stems of Pacific onion trap silt very effectively, making this association an important nutrient filter for steep headwater streams.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: emergent wetland
Subclass: persistent
Water regime: (nontidal) permanently flooded [springs and seeps] to saturated [meadows].

Adjacent riparian/wetland classifications—

The Pacific onion-Holm's Rocky Mountain sedge plant association has not previously been described. Crowe and Clausnitzer (1997) described a Pacific [swamp] onion community type in their midmontane wetland guide to northeastern Oregon that, based on the community description, fits into the Pacific onion-Holm's Rocky Mountain sedge plant association.

Floristically similar types include Holm's Rocky Mountain sedge (p. 138), northern singlespike sedge-brook saxifrage (p. 140), and Holm's Rocky Mountain sedge (Crowe and Clausnitzer 1997).

Arrowleaf Groundsel-Purple Monkeyflower Plant Association

Senecio triangularis-Mimulus lewisii

FW4214 SETR-MILE2 N = 11

Aaron Wells

Landform environment (n = 11)		Mean	Range
Elevation (m)		2163	2049–2424
Plot slope (percent)		11	3–25
Aspect	All		

Valley environment (n = 11)		Mode	Range
Valley gradient (percent)		>8	1–>8
Valley width (m)		<10	<10–100
Valley aspect	All		

Soil surface cover (n = 11)	Mean	Range
Submerged (percent)	23	0–50
Bare ground	7	0–32
Gravel	6	0–22
Rock	20	0–40
Bedrock	0	
Litter	13	0–30
Moss	25	0–85

Soil profile characteristics (n = 10)			
Parent material	Alluvium		
Great group(s)	Cryaquents, Cryorthents		
		Mean	**Range**
Water table depth (cm)			0–65
Rock fragments (percent)		70	18–100
Available water capacity of pit (cm/m)		5	1–18
pH (n = 4)		6.07	5.76–6.60
Depth to redoximorphic features (cm)		30	
Occurrence of redoximorphic features (percentage of soils)		10	
Surface organic layer (cm)		0	
Surface layers			
Thickness (cm)			8–>30
Texture(s)[a]	L, SICL, SIL, SL, cobble, boulders		
Redoximorphic features	Iron oxide concentrations		
Subsurface layers			
Thickness (cm)			0–41
Texture(s)[a]	L, SICL, SL, cobble, boulders		
Redoximorphic features	None		

[a] See “Soil Texture Codes” section.

Physical environment—

The arrowleaf groundsel-purple monkeyflower plant association occurred on steep (3 to 25, avg. 11 percent) floodplains, rocky bars, and streambanks along high-elevation (2049 to 2424 m) cascading streams throughout the Eagle Cap Wilderness, Strawberry Mountain Wilderness, and Seven Devils Mountains. Valleys were mostly high-gradient (>6 percent), narrow (<30 m), V-, U-, and trough-shaped. Soils ranged from exposed cobble/boulder bars, to moss-covered boulders, to very gravelly/cobbly sandy loams to sandy clay loams overlying rocky alluvium. A continuous flow of cold, well-aerated water is supplied to the plant roots throughout the year.

Vegetation composition—

The stream provides the canvas upon which an impressionist’s palette of colors explodes across a boulder-strewn channel. Arrowleaf groundsel and purple monkeyflower are typically rooted on rocky streambanks and midstream boulders. Brook saxifrage is often found growing below arrowleaf groundsel and purple monkeyflower along the stream edge.

Other species include Columbian monkshood, fringed grass of Parnassus, common cowparsnip, fivestamen miterwort, muskflower, seep monkeyflower, drooping woodreed, and tall mannagrass.

Adjacent upland vegetation types:
  Sideslopes: ABLA/VASC, ABLA/CAGE2,
    and ABGR/VASC.

Principal species			CON	COV	MIN	MAX
				Percent		
Forbs:						
MILE2	Purple monkeyflower	*Mimulus lewisii*	90	18	2	60
SAAR13	Brook saxifrage	*Saxifraga arguta*	72	24	3	50
SETR	Arrowleaf groundsel	*Senecio triangularis*	100	41	10	85
Grasses:						
CILA2	Drooping woodreed	*Cinna latifolia*	54	5	1	10
Sedges and other grasslikes:						
JUME3	Mertens' rush	*Juncus mertensianus*	27	1	1	1

Note: CON = percentage of plots in which the species occurred; COV = average canopy cover in plots in which the species occurred.

Management considerations—

The arrowleaf groundsel-purple monkey flower plant association provides soil stablility and shade to steep, headwater streams. In lower gradient streams, fish take refuge under overhanging vegetation provided by this association. Forage biomass ranges from 485 to 2203 (avg. 1170) kg/ha. These sites receive low to moderate impact from browse animals for most of the year, but can provide very important feeding and watering habitat later in the season, especially in the Strawberry Mountain Wilderness. Fires are infrequent at these wet sites. In the event of a fire, the community structure of this association would not be significantly altered (Kovalchik 1987). Possible successional trajectories include: PIEN-ABLA/SETR.

USDI Fish and Wildlife Service wetlands classification—

System: palustrine
Class: emergent wetland
Subclass: persistent
Water regime: (nontidal) seasonally flooded to saturated.

Adjacent riparian/wetland classifications—

The arrowleaf groundsel-purple monkeyflower plant association has not previously been described. Arrowleaf groundsel types have been described for riparian/wetland sites in midmontane northeastern Oregon (Crowe and Clausnitzer 1997), Montana (Hansen et al. 1995), and central Oregon (Kovalchik 1987), but purple monkeyflower is noticeably absent from each of these types. Kovalchik and Clausnitzer (2004) described a Lewis monkeyflower (Mimulus lewisii) type that is similar to the arrowleaf groundsel-purple monkeyflower association but features purple monkeyflower as the indicator species and arrowleaf groundsel only occasionally occurring at low abundance.

Other floristically similar types: brook saxifrage, drooping woodreed (Crowe and Clausnitzer 1997).

Miscellaneous Forb Types

Narrowleaf Bur-Reed Plant Association

Sparganium angustifolium

WL0108 SPAN2 N = 3

The narrowleaf bur-reed plant association was found growing in subalpine lakes of the Strawberry Mountain Wilderness and Seven Devils Mountains. Sites were located in 0.5 to 3 m of water, and the community was growing out of organic lake sediments.

Narrowleaf bur-reed (avg. 72 percent) can be readily seen at the water surface, a thin leaf lying flat on top of the water with a stem standing straight up supporting a bur-like flower. Bolander's quillwort (avg. 33 percent) is often present and is completely submerged, growing at the lake bottom. In shallow sections of this association, bladder or inflated sedge may be found growing alongside narrowleaf bur-reed.

The narrowleaf bur-reed plant association provides cover for trout and habitat for tadpoles and other amphibians. The narrowleaf bur-reed plant association has not previously been described.

Kovalchik and Clausnitzer (2004) described a bur-reed association for eastern Washington that featured simplestem bur-reed (*Sparganium erectum* L.), small bur-reed (*S. natans* L.), or other bur-reed species, but Bolander's quillwort was absent from this type.

Rocky Mountain Pond-Lily Plant Association

Nuphar polysepala

MT10 NUPO2 N = 2

The Rocky Mountain pond-lily plant association was found growing in subalpine lakes (2226 and 2265 m) of the Seven Devils Mountains. Rocky Mountain pond-lily (avg. 45 percent) is rooted in organic substrates at the lake bottom with broad leaves and yellow flowers floating at the surface. Occasionally, pondweed, and in shallow sections of this association, few-flowered spikerush occur with Rocky Mountain pond-lily. The Rocky Mountain pond-lily plant community type provides cover for trout and habitat for tadpoles and other amphibians. Kovalchik and Clausnitzer (2004) described an Indian pond-lily (*Nuphar polysepala*) association for eastern Washington, and Viereck et al. (1992) described a *Nuphar polysepala-Potamogeton* type for Alaska. A floristically similar type is pondweed (Kovalchik and Clausnitzer 2004).

Common Cattail Plant Community

Typha latifolia

MT8121 TYLA N = 1

The common cattail plant community was found in a swale associated with Lightning Creek in Hells Canyon National Recreation Area at 707 m elevation. Soil great groups were Endoaqualfs. Soils were very poorly drained sandy loams to silt loams over sandy clays to silty clays. Depth to water table was 65 cm, and available water capacity of the soil was 15 cm/m. Common cattail (25 percent) was scattered thoughout the plot with a continuous cover of low-growing common horsetail. The rich herbaceous layer included heartleaf bittercress, enchanter's nightshade, giant goldenrod, rough bluegrass, watercress, big-leaved sedge, smallwing sedge, and saw-beak sedge. Teasel and common St. Johnswort were also present at low abundance and are indicative of the cattle activity in the area. Common cattail and common horsetail slow floodwaters, thus reducing erosion, and act as a nutrient and sediment filter. Muskrats and Canada geese feed on the stems and roots of common cattail (USDA NRCS 2002b). In the spring, red-winged blackbirds are often heard cackling, red and black fluttering against green and brown. Common cattail types have been described by Crowe and Clausnitzer (1997), Hansen et al. (1995), Jankovsky-Jones et al. (2001), and Kovalchik and Clausnitzer (2004).

Common Cowparsnip-Blue Wildrye Plant Community

Heracleum lanatum-Elymus glaucus

SW3124 HELA4-ELGL N = 1

This community occurred on a steep (8 percent), seepy floodplain of a high-gradient (>8 percent) tributary to the West Fork Wallowa River in the Eagle Cap Wilderness at 1683 m elevation. The soil was shallow loam over granite bedrock. Common cowparsnip (60 percent) and blue wildrye (60 percent) occurred in equal proportions throughout the floodplain. Engelmann spruce (5 percent) occurred scattered across the landform with the occasional twinberry honeysuckle. Herbaceous species include tall fringed bluebells, heartleaf bittercress, stinging nettle, fragrant bedstraw, western mountain aster, bluejoint reedgrass, drooping woodreed, and smallwing sedge. Total forage biomass was 896 kg/ha. This community has not previously been described. A floristically similar type is sand ryegrass (*Elymus arenarius*)-cow parsnip (*Heracleum lanatum*) (Viereck et al. 1992).

False Hellebore Plant Community Type

Veratrum spp.

FW51 VERAT N = 3

Crowe and Clausnitzer (1997) described a similar type for the midmontane Blue Mountain wetlands. The same naming convention has been adapted here owing to the difficulty in differentiating *Veratrum californicum* (California false hellebore) from *V. viride* (green false hellebore), both of which occur in the Blue Mountains. Sites were located in dry/moist basins and on a stream terrace between 1662 and 2253 m. Soil great groups were Cryaquents and Cryorthents, respectively. Soils were well-drained, medium-textured loams to clay loams over sands. Depth to water table ranged from 42 cm to greater than 1 m.

False hellebore (avg. 30 percent) stands out against the more diminutive species one might expect to occur in these meadows. A closer inspection will reveal a rich herbaceous layer that may include alpine leafybract aster, common cowparsnip, heartleaf minerslettuce, arrowleaf groundsel, tall bluebells, smallwing sedge, burdocks, duncecap larkspur, and mountain tansymustard, among others.

These sites are often indicative of areas that have experienced present or past overgrazing (Crowe and Clausnitzer 1997). Vegetation potential at these sites, given suitable soil moisture, may be common cowparsnip-blue wildrye, tufted hairgrass, or Holm's Rocky Mountain sedge.

Manning and Padgett (1995) and Padget et al. (1989) described *Veratrum californicum* (California false hellebore) types for Nevada/eastern California and Utah/southeastern Idaho, respectively. A floristically similar type is bluejoint reedgrass (p. 146).

Western Coneflower Plant Community Type

Rudbeckia occidentalis

FS8101 RUOC2 N = 2

The western coneflower plant community type occurred in high-elevation (2104 and 2159 m) moist meadows and floodplains of the Eagle Cap and Strawberry Mountain Wilderness. Soils were Cryorthents. Soils were shallow, moderately well-drained, cobbly silt loams. Western coneflower (avg. 25 percent) co-occurs with a variety of forb and graminoid species. The western coneflower plant community commonly occurs throughout the Blue Mountains in areas of present or past overgrazing. Often, this type occurs in areas where down-cutting of the stream has lowered the water table and soils have dried out and compacted. Vegetation potential at these sites, given suitable soil moisture, is most likely ALSI3/MESIC FORB, ALIN2/GLEL, ALVA-CASC12, or CASC12.

Adjacent riparian/wetland vegetation types:
- Floodplains: SETR/MILE2, ALIN2/GLEL.
- Springs: CALE8.

Adjacent upland vegetation type: ABLA/CAGE2.

Johnson (2004a) described a western coneflower-cluster tarweed community for alpine uplands of northeastern Oregon similar to the western coneflower plant community type described here. A floristically similar type is *Mertensia ciliata* (tall fringed bluebells) (Padgett et al. 1989).

White Sagebrush Plant Community Type

Artemisia ludoviciana

SD01 ARLU N = 1

This community type occurred on a steep (25 percent) cobble bar associated with a high-gradient (>8 percent) tributary to East Eagle Creek in the Eagle Cap Wilderness at 1695 meters. White sagebrush was growing in loamy coarse sand between cobbles and boulders. Scattered forbs and grasses include western coneflower, Rocky Mountain goldenrod, nettleleaf horsemint, boreal sweetvetch, tall fringed bluebells, snowbed draba, tasselflower brickellbush, and western needlegrass. Total forage biomass was 1120 kg/ha. White sagebrush provides food and cover for deer, elk, sage grouse, rabbits, chipmunks, and other small mammals (USDA NRCS 2002b). Cattle will also browse on white sagebrush. This community is resilient to grazing owing to the rocky soils and rapid growth of white sagebrush.

Adjacent upland vegetation types:
Meadows and sideslopes: CAHO5, ABGR/VASC.

Potential successional trajectories: SAEX.

White sagebrush types have been described for the Columbia River basin and southwestern Idaho by Crawford (2001) and Jankovsky-Jones et al. (2001), respectively.

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English Equivalents

When you know:	Multiply by:	To find:
Millimeters	0.0394	Inches
Centimeters (cm)	0.394	Inches
Meters (m)	3.28	Feet
Meters	1.094	Yards
Kilometers (km)	0.6215	Miles
Hectares (ha)	2.47	Acres
Square meters (m^2)	10.76	Square feet
Square kilometers (km^2)	0.386	Square miles
Kilograms per hectare (kg/ha)	0.893	Pounds per acre
Square meters per hectare (m^2/ha)	4.37	Square feet per acre
Centimeters per meter	0.12	Inches per foot
Bar	14.5	Pounds per square inch

Soil Texture Codes

Texture code:	Texture explained:
C	Clay
CL	Clay loam
CS	Clayey sand
ECS	Extremely cobbly sand
FSCL	Fine sandy clay loam
FSL	Fine sandy loam
L	Loam
LCS	Loamy coarse sand
LS	Loamy sand
S	Sand
SC	Sandy clay
SCL	Sandy clay loam
SI	Silt
SICL	Silty clay loam
SIL	Silt loam
SL	Sandy loam
VFSL	Very fine sandy loam

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Glossary

alluvium—Sediments deposited on land by streams and rivers.

alluvial fan—A low, outspread mass of loose materials or rock material, commonly with gentle slopes, shaped like an open fan or a segment of a cone, deposited by a stream (best expressed in semiarid regions) at the place where it issues from a narrow mountain or upland valley; or where a tributary stream is near or at its junction with the main stream (USDA NRCS 2002a).

alpine—The area above the upper limits of (erect) tree growth.

anaerobic—A condition characterized by the absence of free oxygen.

aquatic ecosystem—The stream channel or lake bed, the water, and the vegetative communities associated with them, forming an interacting system.

aquic (soil moisture regime)—A reducing regime in a soil that is virtually free of dissolved oxygen because it is saturated by water (USDA NRCS 1998).

available water capacity (AWC)—An estimate of the water available to plants between permanent wilting point and field capacity **after** hydric soils have been drained by gravity.

average cover—The average percentage of canopy cover of a species for the sample stands where it was recorded. For example, a vegetation type may be composed of 12 sample stands, but a particular species may be present in only 5 of those stands. The average cover for that species is calculated as the average canopy cover in those five stands.

bank or streambank—The sloping land bordering a channel. The bank has a steeper slope than the bottom of the channel and is usually steeper than the land surrounding the channel.

bar, cobble bar, gravel bar, or rocky bar—A general term for a ridgelike accumulation of sand, gravel, or other alluvial material formed in the channel, along the banks, or at the mouth of a stream where a decrease in velocity induces deposition: e.g. a channel bar or a meander bar (USDA NRCS 2002a).

basal area—The area of the cross section of a tree trunk 4.5 ft above the ground, usually expressed as the sum of tree basal areas in square feet per acre.

basin—A depression or hollow in the land surface surrounded by higher ground.

bog—A soil/vegetation complex in which the upper part is living plant tissue gradually changing to partially decomposed plant tissue (peat) in the lower part. Usually saturated, relatively acid, and dominated at ground level by mosses. Bogs may be either forested or open. They are distinguished from swamps and fens by the dominance of mosses and the presence of peat deposits.

boulder—Rock fragments greater than 600 mm (24 in) in diameter.

browse—Shrubby or woody forage used especially by big game.

canyon—A long, deep, narrow, very steep-sided valley with high and precipitous walls in an area of high local relief.

channel—An open conduit either naturally or artificially created that periodically or continuously contains moving water, or that forms a connecting link between two bodies of standing water.

cirque—A steep-walled, half bowl-like recess or hollow, crescent-shaped or semicircular in plan, commonly situated at the head of a glaciated mountain valley or high on the side of a mountain, and produced by the erosive activity of a mountain glacier (USDA NRCS 2002a).

classification—The orderly arrangement of objects according to their differences and similarities.

clay—Soil particles less than 0.002 mm in diameter.

climax—Climax has been defined as the kind of plant community that will come to occupy a site under existing hydrology (flooding regime and mean annual water table depth ranges), soils (parent material, particle size, chemistry), microclimate and fluvial surface. It is the "stable state" where change in the vegetation is minimal over time and competition is so great from prevailing species that "invaders" are excluded and "increasers" are held to low levels. The plant association is the climax plant community on a site.

climax species—A species that is self-regenerating, in the absence of change in the hydrology, soils, and microclimate (see above definition) with no evidence of replacement by other species.

cobble—Rock fragments greater than 75 mm (3 in) and less than 250 mm (10 in) in diameter.

colluvial—Pertaining to material transported and deposited by gravitational action and local unconcentrated runoff on and at the base of steep slopes.

colluvium—Unconsolidated earth material deposited on and at the base of steep slopes by direct gravitational action and local unconcentrated runoff.

common—When relating to plant coverage any species having a canopy coverage of 5 percent or more in a stand.

constancy—The percentage of sample stands in which each species occurs.

cover, canopy cover—When relating to plant species, cover is the area covered by the generalized outline of an individual plant's foliage, or collectively covered by all individuals of a species within a stand or sample area. Canopy coverage is expressed as a percentage of the total area of the plot.

cryic (soil temperature regime)—Soils in this temperature regime have a mean annual temperature lower than 8 °C but do not have permafrost (USDA NRCS 1998).

depauperate—An unusually sparse coverage of undergrowth vegetation. This condition usually develops beneath an especially dense forest canopy, often on sites having a deep layer of duff.

disturbed—Directly or indirectly altered, by humans, from a natural condition, yet retaining some natural characteristics.

diversity—The number of species in a community, and their relative abundances, per unit area or volume.

ecological status—The degree of departure of the current vegetation from climax. Cause of departure is not considered; therefore, ecological status may include, but is not limited to, the concept of range condition. The only consideration is the difference in species density and composition between existing and climax vegetation. Three classes are used: climax/late seral, mid seral, and early seral.

ecosystem—A complete interacting system of organisms and their environment.

ecotone—A boundary between adjacent plant communities.

edaphic—Owing to soil or topography rather than general climate.

emergent vegetation—Dominated by erect, rooted, herbaceous angiosperms that may be temporarily to permanently flooded at the base but that do not tolerate prolonged inundation of the entire plant.

entisol—Those soils that normally have little or no evidence of pedogenic processes, and are subsequently very little developed.

ephemeral stream or spring—A stream, reach of a stream, or spring that flows for only part of the year, generally coinciding with contributions from melting snow or seasonal subsurface sources.

erosion—The wearing away of the land surface by running water, waves, moving ice and wind, or by such processes as mass wasting and corrosion.

flood storage—The process by which peak flows (from precipitation, runoff, groundwater discharge, etc.) enter a wetland and are delayed in their downslope journey.

fluvial—Pertaining to or produced by the action of a stream or river.

fluvial surface(s)—The various land surfaces associated with the riparian zone such as active and inactive floodplains, active channel shelves, streambanks, and overflow channels.

floodplain—The nearly level plain that borders a stream and is subject to inundation under flood-stage conditions. It is usually a constructional landform built of sediment deposited during overflow and lateral migration of the streams (USDA NRCS 2002a).

forage—The aboveground biomass (air-dried kilograms per hectare) of all grasses, sedges, and forbs; no allowance is made for proper use factors.

foraging/feeding—Collection or consumption of food, gravel, or necessities for nutrition.

forb—Any herbaceous plant, usually broad leaved, that is not a graminoid.

forbs (vegetation key)—*Adiantum pedatum, Allium validum, Artemisia ludoviciana, Equisetum arvense, Heracleum lanatum, Menyanthes trifoliata, Mimulus lewisii, Nuphar polysepala, Rudbeckia occidentalis, Saxifraga arguta, Senecio triangularis, Sparganium angustifolium, Typha latifolia, Veratrum* spp., *Veronica americana*.

forest or forested—An area of the Earth's surface, greater than or equal to 1/10 acre, with at least 10 percent cover of primary or subordinate overstory tree species. Forest or forested does not include areas with overhanging tree limbs.

geomorphology—The science that treats the general configuration of the Earth's surface; specifically the study of the classification, description, nature, origin, and development of landforms and their relationships to underlying structures and of the history of geologic changes as recorded by these surface features.

glacial till—Unsorted and unstratified glacial drift, generally unconsolidated, deposited directly by a glacier without subsequent reworking by water from the glacier.

gradient (valley gradient)—The slope of the valley floor in percent:

very low	Less than 1 percent
low	1–3 percent
moderate	4–5 percent.
high	6–8 percent
very high	Greater than 8 percent

graminoid—Grass or grasslike plant, such as bluegrass (*Poa*), sedge (*Carex*), and rush (*Juncus*) species.

gravel—Rock fragments greater than 2 mm (0.1 in) and less than 75 mm (3 in) in diameter.

groundwater—Subsurface water in porous strata within the zone of saturation.

habitat type—All the land capable of producing similar plant communities at climax.

herbaceous—Nonwoody vegetation, such as grasses and forbs.

hydric soils—Soils that form under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (USDA NRCS 2002a).

indicator species—Indicator species are plants that designate thresholds of environmental change along gradients (Johnson 2004a).

krummholz—Trees dwarfed and twisted because of severe climate (wind, low temperature, etc.) at the high-elevation limits of forest development.

lacustrine—Permanently flooded lakes and reservoirs, whose total area exceeds 8 ha (19.8 acres) or whose maximum depth exceeds 2 meters at low water.

lakeshore—Land on or near a lake between the ordinary high-water mark and low-water mark.

landform—Any element of the landscape characterized by a distinctive surface expression, internal structure, or both, and sufficiently conspicuous to be included in a physiographic description.

low elevation—The elevation range between sea level and the midmontane zone. Note: The upper limit of this region varies with microclimatic conditions and may extend above the base of adjacent foothills.

low shrub—A woody plant, which at maturity is usually less than 1 m (~3 ft) tall, and generally exhibits several erect, spreading, or prostrate stems and has a bushy appearance; e.g., pink mountainheath (*Phyllodoce empetriformis*) or shrubby cinquefoil (*Potentilla fruiticosa*).

low shrubs (vegetation key)—*Artemisia cana*, *Artemisia tridentata* var. *vaseyana*, *Kalmia microphylla*, *Ledum gladulosum*, *Phyllodoce empetriformis*, *Potentilla fruiticosa*

meander—A meander is one of a series of sinuous loops, with sine wave form, in the course of a stream channel. Meandering stream channels commonly have cross sections with low width-to-depth ratios, fine-grained bank materials, and low gradient.

moderate elevation (midmontane)—A zone identified by characteristic vegetation, which does not extend below the upper elevation of adjacent foothills or into the subalpine. The boundary between the midmontane and subalpine zones varies considerably from one geographical region to another and with microclimatic conditions.

microsites—Relatively small, scattered areas on a landform having environmental conditions uncharacteristic of the landform at large.

mineral soil—Soil composed of predominantly mineral rather than organic materials.

moist graminoids (vegetation key)—*Agrostis diegoensis, Agrostis stolonifera*, *Alopechurus pratensis*, *Calamagrostis canadensis*, *Carex jonesii*, *Carex laeviculmis*, *Carex luzulina*, *Carex microptera*, *Carex muricata*, *Carex nebrascensis*, *Carex nigricans*, *Carex praegracilis*, *Carex scirpoidea*, *Carex scopulorum*, *Carex sheldonii*, *Carex subfusca*, *Cinna latifolia*, *Deschampsia cespitosa*, *Elymus glauca*, *Juncus balticus*, *Poa pratensis*, *Puccinellia pauciflora*

moist meadow—A meadow, or part of a meadow, in which the soils are not completely saturated for any part of the year; or if so, saturated for only a short period early in the growing season.

moraine—A rounded ridge, hill, or mound of rubble left behind by a retreating glacier.

natural—primarily composed of native biota, and occurring within a physical system that has developed through natural processes without human intervention.

organic loam—A generalized name for soils having more than 12 percent organic particles in addition to clay, silt, and sand.

organic soil—Soil composed of at least 12 percent or more organic carbon if the mineral fraction contains 60 percent or less clay; or at least 18 percent organic carbon if the mineral fraction contains more than 60 percent. Equivalent to Histosol in soil taxonomy.

other tall shrubs (vegetation key)—*Acer glabrum*, *Amelanchier alnifolia*, *Betula occidentalis*, *Celtis reticulata*, *Cornus stolonifera*, *Lonicera involucrata*, *Philadelphus lewisii*, *Physocarpus* spp., *Ribes* spp., *Rubus bartonianus*, *Rubus discolor*, *Rubus parviflorus*, *Symphoricarpos albus*.

palustrine—Tidal and nontidal wetlands dominated by trees, shrubs, persistent emergents, and emergent mosses or lichens where salinity owing to ocean derived salts is below 0.5 parts per thousand (ppt); also included are wetlands without such vegetation, but with all of the following characteristics: (1) area less than 8 hectares; (2) active wave formed or bedrock shoreline features lacking; maximum water depth less than 2 m at low water; (3) ocean-derived salinity less than 0.5 ppt.

peat—Unconsolidated soil material consisting largely of decomposed or only slightly decomposed organic mater accumulated under conditions of excessive soil moisture.

__moss peat__—Peat soil composed of partially decomposed sphagnum or other mosses.

__sedge peat__—Peat soil composed of partially decomposed sedges, bulrushes, rushes, etc.

__woody peat__—Peat soil composed of partially decomposed wood.

perched water table—Zone of saturated soil that lies above a zone of unsaturated soil within 200 cm of the soil surface. Also called episaturation.

perennial stream—A stream that runs aboveground throughout its length and throughout the year.

permanently flooded—Water covers the land surface throughout the year in all years.

pioneer plants—Herbaceous annual and seedling perennial plants that colonize bare areas as a first stage in secondary succession.

plant association—As defined by Kovalchik (1987): "an assemblage of native vegetation in equilibrium with the environment on a specific fluvial surface." The implication is that as the environment (water regime, soils, etc.) changes through time, the vegetative potential shifts.

plant community—An assemblage of plants living together and interacting among themselves in a specific location.

plant community type—A set of plant communities with similar structure and floristic composition that are seral in nature and often follow directly from a disturbance event (fire, flooding, etc.). Assuming a constant environment over a given time, a plant community type will undergo a natural shift in floristic composition through plant succession.

point bar—One of a series of low, arcuate ridges of sand and gravel developed on the inside of a growing meander by the slow addition of individual accretions accompanying migration of the channel toward the outer bank (USDA NRCS 2002a).

primary overstory tree—A tree whose crown is positioned in the uppermost canopy layer in a forest.

redoximorphic concentrations—Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation (USDA NRCS 2002c).

redoximorphic depletions—Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation (USDA NRCS 2002c).

redoximorphic features—Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha, alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation (USDA NRCS 2002c).

reduced matrix—A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III) (USDA NRCS 2002c).

rhizome—A creeping underground stem from which aerial stems arise.

rhizomatous—Bearing rhizomes.

riparian zone (ecosystem)—Riparian zones are defined more specifically as the strip of land along streams or rivers that is affected by stream processes (flooding, sedimentation, etc.) and that, in turn, affects stream structure and function.

rock fragments—Any pieces of rock larger that 2 mm located in a soil profile including gravels (2 to 75 mm), cobbles (75 to 250 mm), stones (250 to 600 mm), and boulders (>600 mm).

root crown—The persistent base of an herbaceous perennial. Also used in this book as the top of the root system of a shrub from which multiple aerial stems arise.

rootstock—A thickened root that can branch and from which aboveground stems arise.

saturated—The substrate is inundated with water to the surface for extended periods during the growing season, but surface water is seldom present.

scarce—When relating to plant coverage in the vegetation key, any species that is absent or has a canopy coverage of less than 1 percent.

seasonal channel—A stream channel that contains running water only in spring during the annual flood event. Often, standing water remains in the lowest sections until the next flood event.

seasonally flooded—Surface water is present for extended periods especially early in the growing season, but is absent by the end of the season in most years. When surface water is absent, the water table is often near the land surface. (See also *semipermanently flooded*.)

sediment—Solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by water and has come to rest on the Earth's surface.

sedimentary (rock)—A consolidated deposit of clastic particles, chemical precipitates, or organic remains accumulated at or near the surface of the Earth under "normal" low temperature and pressure conditions. Sedimentary rocks include consolidated equivalents of alluvium, colluvium, drift, and eolian, lacustrine, marine deposits; e.g., sandstone, siltstone, mudstone, clay-stone, shale, conglomerate, limestone, dolomite, coal, etc. (USDA NRCS 2002a).

seep—An area, generally small, where water percolates slowly to the ground surface. For water, it may be considered as a seepage spring, but it is used in some cases for flows too small to be considered as springs (USDA NRCS 2002a).

seral—Refers to species or communities that are eventually replaced by other species or communities within a successional sere.

shrub—A woody plant that at maturity is usually less than 6 m (20 ft) tall and generally exhibits several erect, spreading, or prostrate stems and has a bushy appearance; e.g., mountain alder (*Alnus incana*) or Booth's willow (*Salix boothii*).

silt—Soil particles between 0.02 mm and 0.002 mm in diameter; as a textural class, a mixture of 20 to 50 percent sand, 30 to 80 percent silt, and 10 to 30 percent clay-sized particles.

spring or groundwater spring—An area where groundwater flows onto the Earth's surface.

stand—An existing plant community that is relatively uniform in composition, structural, and site conditions; thus, it may serve as a local example of a community type or association.

stolon—An elongate, creeping stem on the surface of the ground.

stoloniferous—Bearing stolons.

stone—Rock fragments greater than 250 mm (10 in) and less than 600 mm (24 in) in diameter.

stream channel—The hollow bed where a natural body of surface water flows or may flow (USDA NRCS 2002a).

subalpine—The elevational region, identifiable by characteristic vegetation, between the midmontane and alpine zones. The boundaries between these zones vary considerably from one geographical region to another and with microclimatic conditions.

subordinate overstory tree—A tree whose crown is positioned slightly below the uppermost canopy layer of a forest.

succession—The progressive changes in plant communities toward a steady state. Primary succession begins on a bare surface not previously occupied by plants, such as a recently deposited gravel bar. Secondary succession occurs following disturbances on sites that previously supported vegetation.

swale—A microtopographical depression (typically less than 50 cm deep) on a floodplain that retains water longer than surrounding, slightly higher soil surfaces.

sward (turf)—A covering of grass or grasslike plants, with its matted roots, forming the surface of a grassland, meadow, etc.

tall shrub—A woody plant, that at maturity is usually greater than or equal to 1 m (~3 ft) and less than 6 m (20 ft) tall, and generally exhibits several erect, spreading, or prostrate stems and has a bushy appearance; e.g., water birch (*Betula occidentalis*) or netleaf hackberry (*Celtis reticulata*).

terrace or stream terrace—One or a series of platforms in a stream valley, flanking and more or less parallel to the stream channel, originally formed near the level of the stream, and representing the remnants of an abandoned floodplain, streambed, or valley floor produced during a former state of fluvial erosion or deposition (i.e., currently very rarely or never floods, inactive cut and fill or scour and fill processes) (USDA NRCS 2002a).

topography—The relative positions and elevations of the natural or manmade features of an area that describe the configuration of its surface.

tree—A woody plant that at maturity is usually 6 m (20 ft) or more in height and generally has a single trunk unbranched to about l m (3 ft) above the ground and a more or less definite crown.

understory tree—A tree with a diameter at breast height (4.5 ft) less than 5 in.

upland—Land at a higher elevation, in general, than the alluvial plain or low stream terrace.

ustic (soil moisture regime)—A soil in which moisture is limited but is present at a time when conditions are suitable for plant growth (USDA NRCS 1998).

valley—An elongate, relatively large, externally drained depression of the Earth's surface.

vegetation type—A general term referring to plant associations, plant community types, and plant communities.

volcanic—Pertaining to the structures, rocks, and landforms produced by volcanic action.

water path—Used in the description of bogs such as the few-flowered spikerush association to describe shallow, wide depressions in which water collects and flows during periods of high water. These are not streambeds (Kovalchik 1987).

water table—The depth below which the ground is saturated with water. The depth to standing water.

weathering—All physical and chemical changes produced in rocks or other deposits at or near the Earth's surface by atmospheric agents with essentially no transport of the altered material. These changes result in disintegration and decomposition of the material.

wet graminoids (vegetation key)—*Carex amplifolia*, *Carex aquatilis*, *Carex canascens*, *Carex cusickii*, *Carex eurycarpa*, *Carex lanuginosa*, *Carex lasiocarpa*, *Carex lenticularis*, *Carex leporinella*, *Carex limosa*, *Carex nudata*, *Carex simulata*, *Carex stipata*, *Carex utriculata*, *Carex vesicaria*, *Eleocharis bella, Eleocharis palustris*, *Eleocharis pauciflora*, *Glyceria elata*, *Scirpus microcarpus*.

wet meadow—A meadow, or part of a meadow, in which the soil is completely saturated for most to all of the year.

wetland—Lands within or adjacent to, and hydrologically influenced by, streams, rivers, lakes, meadows, and seeps (Cowardin et al. 1979)

wetland/riparian species (hydrophytes)—Plant species occurring within the wetland/riparian zone. Obligate species require the environmental conditions within the wetland zone. Facultative species tolerate the environmental conditions but may also occur away from the wetland zone.

xeric (soil moisture regime)—In areas of a xeric moisture regime, the soil moisture, in normal years, is dry in all parts for 45 or more consecutive days in the 4 months following the summer solstice and moist in all parts for 45 or more consecutive days in the 4 months following the winter solstice (USDA NRCS 1998).

Appendix A: Total Species List

A listing of all plant species encountered during the field sampling effort including Code—the USDA Plants code (USDA NRCS 2002b); Scientific Name—Latin name, including author epithet, of each species following Hitchcock and Cronquist (1973); Common Name—a common name for each species.

Appendix A-1—Total species sorted in alphabetical order by USDA Plants Code

Code	Scientific name	Common name
Trees:		
ABGR	*Abies grandis* (Dougl. ex D. Don) Lindl.	grand fir
ABLA	*Abies lasiocarpa* (Hook.) Nutt.	subalpine fir
ACNE2	*Acer negundo* L.	boxelder
ALRH2	*Alnus rhombifolia* Nutt.	white alder
ALRU2	*Alnus rubra* Bong.	red alder
BEPAS	*Betula papyrifera* Marsh. var. *subcordata* (Rydb.) Sarg.	heartleaved paper birch
JUNI	*Juglans nigra* L.	black walnut
JUOC	*Juniperus occidentalis* Hook.	western juniper
LAOC	*Larix occidentalis* Nutt.	western larch
PIAL	*Pinus albicaulis* Engelm.	whitebark pine
PICO	*Pinus contorta* Dougl. ex Loud.	lodgepole pine
PIEN	*Picea engelmannii* Parry ex Engelm.	Engelmann spruce
PIPO	*Pinus ponderosa* P.& C. Lawson	ponderosa pine
POTR15	*Populus trichocarpa* Torr. & Gray ex Hook.	black cottonwood
PRAM	*Prunus americana* Marsh.	American plum
PRAV	*Prunus avium* (L.) L.	sweet cherry
PSME	*Pseudotsuga menziesii* (Mirbel) Franco	Douglas-fir
ROPS	*Robinia pseudoacacia* L.	black locust
TSME	*Tsuga mertensiana* (Bong.) Carr.	mountain hemlock
Shrubs:		
ACER	*Acer* L.	maple
ACGL	*Acer glabrum* Torr.	Rocky Mountain maple
ACGLD4	*Acer glabrum* Torr. var. *douglasii* (Hook.) Dipple	Douglas Rocky Mountain maple
ALIN2	*Alnus incana* (L.) Moench	mountain alder
ALSI3	*Alnus sinuata* (Regel) Rydb.	Sitka alder
AMAL2	*Amelanchier alnifolia* (Nutt.) Nutt. ex M. Roemer	western serviceberry
ARCA13	*Artemisia cana* Pursh	silver sagebrush
ARTRV	*Artemisia tridentata* Nutt. ssp. *vaseyana* (Rydb.) Beetle	mountain big sagebrush
ARUV	*Arctostaphylos uva-ursi* (L.) Spreng.	kinnikinnick
BEAQ	*Berberis aquifolium* Pursh	hollyleaved barberry
BEGL	*Betula glandulosa* Michx.	bog birch
BEOC2	*Betula occidentalis* Hook.	water birch
BERE	*Berberis repens* Lindl.	Oregon grape
BETUL	*Betula* L.	birch
CAME7	*Cassiope mertensiana* (Bong.) D. Don	western moss heather
CASSI3	*Cassiope* D. Don	moss heather
CELE3	*Cercocarpus ledifolius* Nutt.	curl-leaf mountain mahogany
CERE2	*Celtis reticulata* Torr.	netleaf hackberry
CESA	*Ceanothus sanguineus* Pursh	redstem ceanothus
CHME	*Chimaphila menziesii* (R. Br. ex D. Don) Spreng.	little prince's pine
CHUM	*Chimaphila umbellata* (L.) W. Bart.	pipsissewa
CLCO2	*Clematis columbiana* (Nutt.) Torr. & Gray	rock clematis
CLEMA	*Clematis* L.	clematis
CLLI2	*Clematis ligusticifolia* Nutt.	western white clematis
COST4	*Cornus stolonifera* Michx.	red-oiser dogwood
CRDO2	*Crataegus douglasii* Lindl.	black hawthorn
EMNI	*Empetrum nigrum* L.	black crowberry
GAHU	*Gaultheria humifusa* (Graham) Rydb.	alpine spicywintergreen
GLNE	*Glossopetalon nevadense* Gray	spiny greasebush
HODI	*Holodiscus discolor* (Pursh) Maxim.	oceanspray
HODU	*Holodiscus dumosus* (Nutt. ex Hook.) Heller	rock spirea
KAMI	*Kalmia microphylla* (Hook.) Heller	alpine laurel
KAOC	*Kalmia occidentalis* Small	western laurel
LEDE5	*Ledum decumbens* (Ait.) Lodd. ex Steud.	marsh Labrador tea
LEGL	*Ledum glandulosum* Nutt.	Labrador tea

Appendix A-1—Total species sorted in alphabetical order by USDA Plants Code (continued)

Code	Scientific name	Common name
LIBO3	*Linnaea borealis* L.	twinflower
LOCI3	*Lonicera ciliosa* (Pursh) Poir. ex DC.	orange honeysuckle
LOIN5	*Lonicera involucrata* Banks ex Spreng.	twinberry honeysuckle
LOUT2	*Lonicera utahensis* S. Wats.	Utah honeysuckle
MEFE	*Menziesia ferruginea* Sm.	rusty menziesia
MYGA	*Myrica gale* L.	sweetgale
OPHO	*Oplopanax horridus* Miq.	devilsclub
PAMY	*Paxistima myrsinites* (Pursh) Raf.	Oregon boxleaf
PHCA11	*Physocarpus capitatus* (Pursh) Kuntze	Pacific ninebark
PHEM	*Phyllodoce empetriformis* (Sm.) D. Don	pink mountainheath
PHLE4	*Philadelphus lewisii* Pursh	Lewis' mock orange
PHMA5	*Physocarpus malvaceus* (Greene) Kuntze	mallow ninebark
POBA2	*Populus balsamifera* L.	balsam poplar
POFR4	*Potentilla fruticosa* auct. non L.	shrubby cinquefoil
PRAR3	*Prunus armeniaca* L.	apricot
PRCE	*Prunus cerasus* L.	sour cherry
PRDO	*Prunus domestica* L.	European plum
PREM	*Prunus emarginata* (Dougl. ex Hook.) D. Dietr.	bitter cherry
PRUNU	*Prunus* L.	plum
PRVI	*Prunus virginiana* L.	chokecherry
QUGA4	*Quercus garryana* Dougl. ex Hook.	Oregon white oak
RHAL2	*Rhododendron albiflorum* Hook.	Cascade azalea
RHGL	*Rhus glabra* L.	smooth sumac
RHPU	*Rhamnus purshiana* DC.	alder-leaved buckthorn
RHRA6	*Rhus radicans* L.	poison ivy
RIBES	*Ribes* L.	currant
RICE	*Ribes cereum* Dougl.	wax currant
RICO	*Ribes cognatum* Greene	stream currant
RIHU	*Ribes hudsonianum* Richards.	stinking currant
RIIN2	*Ribes inerme* Rydb.	whitestem gooseberry
RIIR	*Ribes irriguum* Dougl.	Idaho gooseberry
RILA	*Ribes lacustre* (Pers.) Poir.	prickly currant
RIMO2	*Ribes montigenum* McClatchie	gooseberry currant
RINI2	*Ribes niveum* Lindl.	snow currant
RIWO	*Ribes wolfii* Rothrock	Wolf's currant
ROGY	*Rosa gymnocarpa* Nutt.	dwarf rose
RONU	*Rosa nutkana* K. Presl	Nootka rose
ROSA5	*Rosa* L.	rose
ROWO	*Rosa woodsii* Lindl.	Woods' rose
RUBA	*Rubus bartonianus* M.E. Peck	Barton's raspberry
RUBUS	*Rubus* L.	blackberry
RUDI2	*Rubus discolor* Weihe & Nees	Himalayan blackberry
RUID	*Rubus idaeus* L.	red raspberry
RULA	*Rubus laciniatus* Willd.	cutleaf blackberry
RULE	*Rubus leucodermis* Dougl. ex Torr. & Gray	whitebark raspberry
RUPA	*Rubus parviflorus* Nutt.	thimbleberry
SAAR27	*Salix arctica* Pallas	arctic willow
SABA3	*Salix barclayi* Anderss.	Barclay's willow
SABE2	*Salix bebbiana* Sarg.	Bebb's willow
SABO2	*Salix boothii* Dorn	Booth's willow
SACE3	*Sambucus cerulea* Raf.	blue elderberry
SACO2	*Salix commutata* Bebb	undergreen willow
SADR	*Salix drummondiana* Barratt ex Hook.	Drummond's willow
SAEA	*Salix eastwoodiae* Cockerell ex Heller	Eastwood willow
SAEX	*Salix exigua* Nutt.	coyote willow
SAFA	*Salix farriae* Ball	Farr's willow
SAGE2	*Salix geyeriana* Anderss.	Geyer willow
SALA5	*Salix lasiandra* Benth.	Pacific willow
SALA6	*Salix lasiolepis* Benth.	arroyo willow
SALE	*Salix lemmonii* Bebb	Lemmon's willow
SALIX	*Salix* L.	willow
SAMBU	*Sambucus* L.	elderberry
SAMY	*Salix myrtillifolia* Anderss.	blueberry willow
SAPL2	*Salix planifolia* Pursh	planeleaf willow

Appendix A-1—Total species sorted in alphabetical order by USDA Plants Code (continued)

Code	Scientific name	Common name
SARA2	*Sambucus racemosa* L.	red elderberry
SARI2	*Salix rigida* Muhl.	rigid willow
SASC	*Salix scouleriana* Barratt ex Hook.	Scouler's willow
SASI2	*Salix sitchensis* Sanson ex Bong.	Sitka willow
SATW	*Salix tweedyi* (Bebb ex Rose) Ball	Tweedy's willow
SAWO	*Salix wolfii* Bebb	Wolf's willow
SHCA	*Shepherdia canadensis* (L.) Nutt.	russet buffaloberry
SOAU	*Sorbus aucuparia* L.	European mountain ash
SOSC2	*Sorbus scopulina* Greene	Greene's mountain ash
SPBE2	*Spiraea betulifolia* Pallas	white spirea
SPDE	*Spiraea densiflora* Nutt. ex Greenm.	rose meadowsweet
SPDO	*Spiraea douglasii* Hook.	Douglas spiraea
SPIRA	*Spiraea* L.	spirea
SYAL	*Symphoricarpos albus* (L.) Blake	common snowberry
SYOR2	*Symphoricarpos oreophilus* Gray	mountain snowberry
TABR2	*Taxus brevifolia* Nutt.	Pacific yew
VACA13	*Vaccinium caespitosum* Michx.	dwarf bilberry
VACCI	*Vaccinium* L.	blueberry
VAME	*Vaccinium membranaceum* Dougl. ex Torr.	big huckleberry
VAMY2	*Vaccinium myrtillus* L.	whortleberry
VASC	*Vaccinium scoparium* Leib. ex Coville	grouse huckleberry
VAUL	*Vaccinium uliginosum* L.	bog blueberry
Forbs:		
ABCA	*Abronia carletonii* Coult. & Fisher	Carleton's sand verbena
ACCO4	*Aconitum columbianum* Nutt.	Columbian monkshood
ACMI2	*Achillea millefolium* L.	common yarrow
ACRU2	*Actaea rubra* (Ait.) Willd.	red baneberry
ADBI	*Adenocaulon bicolor* Hook.	American trailplant
AGAST	*Agastache* Clayton ex Gronov.	giant hyssop
AGAU2	*Agoseris aurantiaca* (Hook.) Greene	orange agoseris
AGOSE	*Agoseris* Raf.	agoseris
AGUR	*Agastache urticifolia* (Benth.) Kuntze	nettleleaf horsemint
ALAC4	*Allium acuminatum* Hook.	tapertip onion
ALVA	*Allium validum* S. Wats.	Pacific onion
AMLY	*Amsinckia lycopsoides* Lehm.	tarweed fiddleneck
AMRE2	*Amsinckia retrorsa* Suksdorf	Menzies' fiddleneck
ANAL4	*Antennaria alpina* (L.) Gaertn.	alpine pussytoes
ANAR3	*Angelica arguta* Nutt.	Lyall's angelica
ANEMO	*Anemone* L.	anemone
ANMA	*Anaphalis margaritacea* (L.) Benth.	western pearly everlasting
ANMI3	*Antennaria microphylla* Rydb.	littleleaf pussytoes
ANPI	*Anemone piperi* Britt. ex Rydb.	Piper's anemone
ANRA	*Antennaria racemosa* Hook.	raceme pussytoes
ANSC8	*Anthriscus scandicina* (Weber ex Wiggers) Mansf.	chervil
ANTEN	*Antennaria* Gaertn.	pussytoes
ANUM	*Antennaria umbrinella* Rydb.	umber pussytoes
APAN2	*Apocynum androsaemifolium* L.	spreading dogbane
APIACF	Apiaceae	carrot family
AQFL	*Aquilegia flavescens* S. Wats.	yellow columbine
AQFO	*Aquilegia formosa* Fisch. ex DC.	western columbine
AQUIL	*Aquilegia* L.	columbine
ARAM2	*Arnica amplexicaulis* Nutt.	clasping arnica
ARCH3	*Arnica chamissonis* Less.	Chamisso arnica
ARCO9	*Arnica cordifolia* Hook.	heartleaf arnica
ARCTI	*Arctium* L.	burdock
ARDI2	*Arabis ×divaricarpa* A. Nels. (pro sp.)	spreadingpod rockcress
ARFU3	*Arnica fulgens* Pursh	foothill arnica
ARGL	*Arabis glabra* (L.) Bernh.	tower rockcress
ARLA8	*Arnica latifolia* Bong.	broadleaf arnica
ARLO6	*Arnica longifolia* D.C. Eat.	spearleaf arnica
ARLU	*Artemisia ludoviciana* Nutt.	white sagebrush
ARMA18	*Arenaria macrophylla* Hook.	largeleaf sandwort
ARMI2	*Arctium minus* Bernh.	lesser burdock
ARMO4	*Arnica mollis* Hook.	hairy arnica

Appendix A-1—Total species sorted in alphabetical order by USDA Plants Code (continued)

Code	Scientific name	Common name
ARNIC	*Arnica* L.	arnica
ARPA13	*Arnica parryi* Gray	Parry's arnica
ARSE2	*Arenaria serpyllifolia* L.	thymeleaf sandwort
ASAL2	*Aster alpigenus* (Torr. & Gray) Gray	tundra aster
ASAL7	*Astragalus alpinus* L.	alpine milkvetch
ASCA11	*Astragalus canadensis* L.	Canadian milkvetch
ASCA2	*Asarum caudatum* Lindl.	British Columbia wildginger
ASCH2	*Aster chilensis* Nees	Pacific aster
ASCO3	*Aster conspicuus* Lindl.	eastern showy aster
ASCU5	*Astragalus cusickii* Gray	Cusick's milkvetch
ASEA	*Aster eatonii* (Gray) T.J. Howell	Eaton's aster
ASFO	*Aster foliaceus* Lindl. ex DC.	alpine leafybract aster
ASMO3	*Aster modestus* Lindl.	giant mountain aster
ASOC	*Aster occidentalis* (Nutt.) Torr. & Gray	western mountain aster
ASPR	*Asperugo procumbens* L.	German-madwort
ASRO	*Astragalus robbinsii* (Oakes) Gray	Robbins' milkvetch
ASTER	*Aster* L.	aster
ASTERF	Asteraceae	aster family
ASTRA	*Astragalus* L.	milkvetch
BASA3	*Balsamorhiza sagittata* (Pursh) Nutt.	arrowleaf balsamroot
BICE	*Bidens cernua* L.	nodding beggartick
BRDO	*Brodiaea douglasii* S. Wats.	largeflower triteleia
BRGR	*Brickellia grandiflora* (Hook.) Nutt.	tasselflower brickellbush
BRHO	*Brodiaea howellii* S. Wats.	Howell's triteleia
BRHY2	*Brodiaea hyacinthina* (Lindl.) Baker	white brodiaea
BRODI	*Brodiaea* Sm.	brodiaea
CABI2	*Caltha biflora* DC.	Howell's marshmarigold
CABU2	*Capsella bursa-pastoris* (L.) Medik.	shepherd's purse
CACH16	*Castilleja chrysantha* Greenm.	yellow Wallowa Indian paintbrush
CACO6	*Cardamine cordifolia* Gray	heartleaf bittercress
CACU7	*Castilleja cusickii* Greenm.	Cusick's Indian paintbrush
CALE4	*Caltha leptosepala* DC.	white marsh marigold
CALLI6	*Callitriche* L.	water-starwort
CALOC	*Calochortus* Pursh	mariposa lily
CALTH	*Caltha* L.	marsh marigold
CAMI12	*Castilleja miniata* Dougl. ex Hook.	giant red Indian paintbrush
CAMPA	*Campanula* L.	bellflower
CAOL	*Cardamine oligosperma* Nutt.	little western bittercress
CARDA	*Cardamine* L.	bittercress
CARDU	*Carduus* L.	plumeless thistle
CARH4	*Castilleja rhexiifolia* Rydb.	splitleaf Indian paintbrush
CARO2	*Campanula rotundifolia* L.	bluebell bellflower
CARYOF	Caryophyllaceae	pink family
CASTI2	*Castilleja* Mutis ex L. f.	Indian paintbrush
CEAR4	*Cerastium arvense* L.	field chickweed
CENU2	*Cerastium nutans* Raf.	nodding chickweed
CERAS	*Cerastium* L.	mouse-ear chickweed
CEVI3	*Cerastium viscosum* auct. non L.	sticky chickweed
CEVU	*Cerastium vulgatum* L. 1762, non 1755	big chickweed
CHHY	*Chenopodium hybridum* auct. non L.	mapleleaf goosefoot
CHLE80	*Chrysanthemum leucanthemum* L.	oxeye daisy
CHTE2	*Chorispora tenella* (Pallas) DC.	crossflower
CIAL	*Circaea alpina* L.	enchanter's nightshade
CIAR4	*Cirsium arvense* (L.) Scop.	Canada thistle
CICA6	*Cirsium canovirens* (Rydb.) Petrak	graygreen thistle
CIDO	*Cicuta douglasii* (DC.) Coult. & Rose	western water hemlock
CIRSI	*Cirsium* P. Mill.	thistle
CIUN	*Cirsium undulatum* (Nutt.) Spreng.	wavyleaf thistle
CIVU	*Cirsium vulgare* (Savi) Ten.	bull thistle
CLME	*Claytonia megarhiza* (Gray) Parry ex S. Wats.	alpine springbeauty
CLUN2	*Clintonia uniflora* (Menzies ex J.A. & J.H. Schultes) Kunth	queen's cup beadlily
COAR4	*Convolvulus arvensis* L.	field bindweed
COCA13	*Cornus canadensis* L.	bunchberry dogwood
COCA5	*Conyza canadensis* (L.) Cronq.	Canadian horseweed

Appendix A-1—Total species sorted in alphabetical order by USDA Plants Code (continued)

Code	Scientific name	Common name
COGR4	*Collomia grandiflora* Dougl. ex Lindl.	grand collomia
COLI2	*Collomia linearis* Nutt.	tiny trumpet
COMA4	*Corallorrhiza maculata* (Raf.) Raf.	summer coralroot
COOR	*Conringia orientalis* (L.) Dumort.	hare's ear mustard
COPA3	*Collinsia parviflora* Lindl.	maiden blue eyed Mary
CRFR2	*Cryptantha fragilis* M.E. Peck	clearwater cryptantha
CRUCIF	Cruciferae	mustard family
CYOF	*Cynoglossum officinale* L.	gypsyflower
DEDE2	*Delphinium depauperatum* Nutt.	slim larkspur
DELPH	*Delphinium* L.	larkspur
DEOC	*Delphinium* × *occidentale* (S. Wats.) S. Wats. (pro sp.) [*barbeyi* × *glaucum*]	duncecap larkspur
DERI2	*Descurainia richardsonii* O.E. Schulz	mountain tansymustard
DICU	*Dicentra cucullaria* (L.) Bernh.	dutchman's breeches
DIHO3	*Disporum hookeri* (Torr.) Nichols.	drops of gold
DISM2	*Disporum smithii* (Hook.) Piper	largeflower fairybells
DISPO	*Disporum* Salisb. ex D. Don	fairybells
DISY	*Dipsacus sylvestris* Huds.	teasel
DITR2	*Disporum trachycarpum* (S. Wats.) Benth. & Hook. f.	roughfruit fairybells
DOAL	*Dodecatheon alpinum* (Gray) Greene	alpine shootingstar
DODEC	*Dodecatheon* L.	shootingstar
DOJE	*Dodecatheon jeffreyi* Van Houtte	Sierrra shootingstar
DOPU	*Dodecatheon pulchellum* (Raf.) Merr.	darkthroat shootingstar
DRCR2	*Draba crassifolia* Graham	snowbed draba
DRST2	*Draba stenoloba* Ledeb.	Alaska draba
EPAL	*Epilobium alpinum* L. p.p.	pimpernel willowherb
EPAN2	*Epilobium angustifolium* L.	fireweed
EPGI	*Epipactis gigantea* Dougl. ex Hook.	stream orchid
EPGL	*Epilobium glaberrimum* Barbey	glaucus willowherb
EPGL4	*Epilobium glandulosum* Lehm.	fringed willowherb
EPHA	*Epilobium halleanum* Hausskn.	glandular willowherb
EPILO	*Epilobium* L.	willowherb
EPLA	*Epilobium latifolium* L.	dwarf fireweed
EPMI	*Epilobium minutum* Lindl. ex Lehm.	chaparral willowherb
EPPA2	*Epilobium paniculatum* Nutt. ex Torr. & Gray	tall annual willowherb
EPWA3	*Epilobium watsonii* Barbey	Watson's willowherb
ERAS2	*Erysimum asperum* (Nutt.) DC.	sanddune wallflower
ERCO6	*Erigeron coulteri* Porter	large mountain fleabane
ERGR9	*Erythronium grandiflorum* Pursh	yellow avalanche-lily
ERIGE2	*Erigeron* L.	fleabane
ERPE3	*Erigeron peregrinus* (Banks ex Pursh) Greene	subalpine fleabane
ERPH	*Erigeron philadelphicus* L.	Philadelphia fleabane
ERSP4	*Erigeron speciosus* (Lindl.) DC.	aspen fleabane
FRASE	*Frasera* Walt.	green gentian
FRSP	*Frasera speciosa* Dougl. ex Griseb.	elkweed
FRVE	*Fragaria vesca* L.	woodland strawberry
FRVI	*Fragaria virginiana* Duchesne	Virginia strawberry
GAAP2	*Galium aparine* L.	cleavers
GAAS3	*Galium asperrimum* Gray	Mexican bedstraw
GABI	*Galium bifolium* S. Wats.	twinleaf bedstraw
GABO2	*Galium boreale* L.	northern bedstraw
GAHU2	*Gayophytum humile* Juss.	dwarf groundsmoke
GALIU	*Galium* L.	bedstraw
GAMU2	*Galium multiflorum* Kellogg	shrubby bedstraw
GATR2	*Galium trifidum* L.	threepetal bedstraw
GATR3	*Galium triflorum* Michx.	fragrant bedstraw
GEAL3	*Geum aleppicum* Jacq.	yellow avens
GEBI2	*Geranium bicknellii* Britt.	Bicknell's cranesbill
GECA	*Gentiana calycosa* Griseb.	explorer's gentian
GEMA4	*Geum macrophyllum* Willd.	largeleaf avens
GENTI	*Gentiana* L.	gentian
GEPU2	*Geranium pusillum* L.	small geranium
GERAN	*Geranium* L.	geranium
GEUM	*Geum* L.	avens

Appendix A-1—Total species sorted in alphabetical order by USDA Plants Code (continued)

Code	Scientific name	Common name
GEVI2	*Geranium viscosissimum* Fisch. & C.A. Mey. ex C.A. Mey.	sticky purple geranium
GIAG	*Gilia aggregata* (Pursh) Spreng.	scarlet gilia
GICO2	*Gilia congesta* Hook.	ballhead ipomopsis
GILIA	*Gilia* Ruiz & Pavón	gilia
GOOB2	*Goodyera oblongifolia* Raf.	western rattlesnake plantain
HABEN	*Habenaria* Willd.	bog orchid
HACKE	*Hackelia* Opiz	stickseed
HADI7	*Habenaria dilatata* (Pursh) Hook.	leafy white orchis
HAMI	*Hackelia micrantha* (Eastw.) J.L. Gentry	Jessica sticktight
HASA	*Habenaria saccata* Greene	slender bog orchid
HAUN	*Habenaria unalascensis* (Spreng.) S. Wats.	slender-spire orchid
HEBO	*Hedysarum boreale* Nutt.	boreal sweetvetch
HELA4	*Heracleum lanatum* Michx.	common cowparsnip
HEMI7	*Heuchera micrantha* Dougl. ex Lindl.	crevice alumroot
HEUCH	*Heuchera* L.	alumroot
HIAL2	*Hieracium albiflorum* Hook.	white hawkweed
HIERA	*Hieracium* L.	hawkweed
HIGR	*Hieracium gracile* Hook.	slender hawkweed
HYAN2	*Hypericum anagalloides* Cham. & Schlecht.	tinker's penny
HYCA4	*Hydrophyllum capitatum* Dougl. ex Benth.	ballhead waterleaf
HYDRO4	*Hydrophyllum* L.	waterleaf
HYFE	*Hydrophyllum fendleri* (Gray) Heller	Fendler's waterleaf
HYFON	*Hypericum formosum* Kunth var. *nortoniae* (M.E. Jones) C.L. Hitchc.	Norton's St. Johnswort
HYFOS	*Hypericum formosum* Kunth var. *scouleri* (Hook.) Coult.	Scouler's St. Johnswort
HYOC	*Hydrophyllum occidentale* (S. Wats.) Gray	western waterleaf
HYPE	*Hypericum perforatum* L.	common St. Johnswort
HYPER	*Hypericum* L.	St. Johnswort
ILRI	*Iliamna rivularis* (Dougl. ex Hook.) Greene	streambank wild hollyhock
ISBO	*Isoetes bolanderi* Engelm.	Bolander's quillwort
LAAM	*Lamium amplexicaule* L.	henbit deadnettle
LABI	*Lactuca biennis* (Moench) Fern.	tall blue lettuce
LABIAF	Labiatae	mint family
LACO3	*Lapsana communis* L.	common nipplewort
LACTU	*Lactuca* L.	lettuce
LANE3	*Lathyrus nevadensis* S. Wats.	Sierra pea
LAPA5	*Lathyrus pauciflorus* Fern.	fewflower pea
LASE	*Lactuca serriola* L.	prickly lettuce
LATHY	*Lathyrus* L.	pea
LEGUMF	Legumaceae	pea family
LEMI3	*Lemna minor* L.	common duckweed
LEPY2	*Lewisia pygmaea* (Gray) B.L. Robins.	alpine lewisia
LICA2	*Ligusticum canbyi* Coult. & Rose	Canby's licorice-root
LICO6	*Listera cordata* (L.) R. Br. ex Ait. f.	heartleaf twayblade
LIGR	*Ligusticum grayi* Coult. & Rose	Gray's licorice-root
LIGUS	*Ligusticum* L.	licorice-root
LILIAF	Liliaceae	lily family
LIPA5	*Lithophragma parviflorum* (Hook.) Nutt. ex Torr. & Gray	smallflower woodland-star
LISTE	*Listera* R. Br. ex Ait. f.	twayblade
LITE2	*Ligusticum tenuifolium* S. Wats.	Idaho licorice-root
LOCO6	*Lotus corniculatus* L.	birdfoot deervetch
LODI	*Lomatium dissectum* (Nutt.) Mathias & Constance	fernleaf biscuitroot
LOMAT	*Lomatium* Raf.	desertparsley
LOPU3	*Lotus purshianus* F.E. & E.G. Clem.	American bird's-foot trefoil
LULE3	*Lupinus leucophyllus* Dougl. ex Lindl.	velvet lupine
LUPIN	*Lupinus* L.	lupine
LUPO2	*Lupinus polyphyllus* Lindl.	bigleaf lupine
LYAL	*Lychnis alba* P. Mill.	bladder campion
LYAN2	*Lycopodium annotinum* L.	stiff clubmoss
LYCO	*Lychnis coronaria* (L.) Desr.	rose campion
LYUN	*Lycopus uniflorus* Michx.	northern bugleweed
MAGR3	*Madia gracilis* (Sm.) Keck & J. Clausen ex Applegate	grassy tarweed
MAVU	*Marrubium vulgare* L.	horehound
MEAL2	*Melilotus albus* Medik.	yellow sweetclover

Appendix A-1—Total species sorted in alphabetical order by USDA Plants Code (continued)

Code	Scientific name	Common name
MEAR4	*Mentha arvensis* L.	wild mint
MECI3	*Mertensia ciliata* (James ex Torr.) G. Don	tall fringed bluebells
MELU	*Medicago lupulina* L.	black medick
MENTH	*Mentha* L.	mint
MEOF	*Melilotus officinalis* (L.) Lam.	yellow sweetclover
MEPA	*Mertensia paniculata* (Ait.) G. Don	tall bluebells
MEPI	*Mentha ×piperita* L. (pro sp.) [*aquatica* × *spicata*]	peppermint
MERTE	*Mertensia* Roth	bluebells
METR3	*Menyanthes trifoliata* L.	buckbean
MIGR	*Microsteris gracilis* (Hook.) Greene	slender phlox
MIGU	*Mimulus guttatus* DC.	seep monkeyflower
MILE2	*Mimulus lewisii* Pursh	purple monkeyflower
MIMO3	*Mimulus moschatus* Dougl. ex Lindl.	muskflower
MIMUL	*Mimulus* L.	monkeyflower
MINU	*Microseris nutans* (Hook.) Schultz-Bip.	nodding microceris
MIPE	*Mitella pentandra* Hook.	fivestamen miterwort
MIPR	*Mimulus primuloides* Benth.	primrose monkeyflower
MIST3	*Mitella stauropetala* Piper	smallflower miterwort
MITEL	*Mitella* L.	miterwort
MOCO4	*Montia cordifolia* (S. Wats.) Pax & K. Hoffmann	heartleaf minerslettuce
MONTI	*Montia* L.	minerslettuce
MOOD	*Monardella odoratissima* Benth.	mountain monardella
MOPA2	*Montia parvifolia* (Moc. ex DC.) Greene	littleleaf minerslettuce
MOPE3	*Montia perfoliata* (Donn ex Willd.) T.J. Howell	perfoliated minerslettuce
MOSI2	*Montia sibirica* (L.) T.J. Howell	Siberian minerslettuce
MOUN3	*Monotropa uniflora* L.	Indianpipe
MYMI	*Myosotis micrantha* auct. non Pallas ex Lehm.	strict forget-me-not
MYOSO	*Myosotis* L.	forget-me-not
NEPA	*Nemophila parviflora* Dougl. ex Benth.	smallflower nemophila
NUPO2	*Nuphar polysepala* Engelm.	Rocky Mountain pond-lily
OSCH	*Osmorhiza chilensis* Hook. & Arn.	mountain sweetcicely
OSMOR	*Osmorhiza* Raf.	sweetcicely
OSOC	*Osmorhiza occidentalis* (Nutt. ex Torr. & Gray) Torr.	western sweetcicely
PAFI3	*Parnassia fimbriata* Koenig	fringed grass of Parnassus
PAPE5	*Parietaria pensylvanica* Muhl. ex Willd.	Pennsylvania pellitory
PEBR	*Pedicularis bracteosa* Benth.	bracted lousewort
PEFRP	*Petasites frigidus* (L.) Fries var. *palmatus* (Ait.) Cronq.	sweet coltsfoot
PEGL5	*Penstemon globosus* (Piper) Pennell & Keck	globe penstemon
PEGR2	*Pedicularis groenlandica* Retz.	elephanthead lousewort
PENST	*Penstemon* Schmidel	beardtongue
PEPA3	*Pedicularis parryi*Gray	Parry's lousewort
PEPA29	*Penstemon payettensis* A. Nels. & J.F. Macbr.	Payette beardtongue
PERA	*Pedicularis racemosa* Dougl. ex Benth.	sickletop lousewort
PHCO10	*Phlox colubrina* Wherry & Constance	Snake River phlox
PHHA	*Phacelia hastata* Dougl. ex Lehm.	silverleaf phacelia
PLLA	*Plantago lanceolata* L.	narrowleaf plantain
PLMA2	*Plantago major* L.	common plantain
PLSC2	*Plagiobothrys scouleri* (Hook. & Arn.) I.M. Johnston	Scouler's popcornflower
POAR7	*Potentilla arguta* Pursh	tall cinquefoil
POBI6	*Polygonum bistortoides* Pursh	American bistort
POBI7	*Potentilla biennis* Greene	biennial cinquefoil
POCU6	*Polygonum cuspidatum* Sieb. & Zucc.	Japanese knotweed
PODI2	*Potentilla diversifolia* Lehm.	varileaf cinquefoil
POFL3	*Potentilla flabellifolia* Hook. ex Torr. & Gray	high mountain cinquefoil
POGL9	*Potentilla glandulosa* Lindl.	sticky cinquefoil
POGR9	*Potentilla gracilis* Dougl. ex Hook.	slender cinquefoil
POLA4	*Polygonum lapathifolium* L.	curlytop knotweed
POLEM	*Polemonium* L.	Jacob's-ladder
POLYG4	*Polygonum* L.	knotweed
POOC2	*Polemonium occidentale* Greene	western polemonium
POOV2	*Potentilla ovina* Macoun ex J.M. Macoun	sheep cinquefoil
POPH	*Polygonum phytolaccifolium* Meisn. ex Small	poke knotweed
POPU3	*Polemonium pulcherrimum* Hook.	Jacob's-ladder
POTAM	*Potamogeton* L.	pondweed

Appendix A-1—Total species sorted in alphabetical order by USDA Plants Code (continued)

Code	Scientific name	Common name
POTEN	*Potentilla* L.	cinquefoil
POVI3	*Polygonum viviparum* L.	alpine smartweed
PRVU	*Prunella vulgaris* L.	common selfheal
PTAN2	*Pterospora andromedea* Nutt.	woodland pinedrops
PYAS	*Pyrola asarifolia* Michx.	liverleaf wintergreen
PYMI	*Pyrola minor* L.	snowline wintergreen
PYROL	*Pyrola* L.	wintergreen
PYSE	*Pyrola secunda* L.	sidebells wintergreen
RAAC3	*Ranunculus acris* L.	tall buttercup
RAAL	*Ranunculus alismifolius* Geyer ex Benth.	plantainleaf buttercup
RAES	*Ranunculus eschscholtzii* Schlecht.	Eschscholtz's buttercup
RANUN	*Ranunculus* L.	buttercup
RAOC	*Ranunculus occidentalis* Nutt.	western buttercup
RAPO	*Ranunculus populago* Greene	popular buttercup
RARE3	*Ranunculus repens* L.	creeping buttercup
RAUN	*Ranunculus uncinatus* D. Don ex G. Don	woodland buttercup
ROCU	*Rorippa curvisiliqua* (Hook.) Bess. ex Britt.	curvepod yellowcress
RONA2	*Rorippa nasturtium-aquaticum* (L.) Hayek	watercress
RUAC2	*Rumex acetosa* L.	garden sorrel
RUCR	*Rumex crispus* L.	curly dock
RUMEX	*Rumex* L.	dock
RUOB	*Rumex obtusifolius* L.	bitter dock
RUOC2	*Rudbeckia occidentalis* Nutt.	western coneflower
RUOC3	*Rumex occidentalis* S. Wats.	western dock
RUPA5	*Rumex patientia* L.	patience dock
RUSA	*Rumex salicifolius* Weinm.	willow dock
SAAM3	*Saussurea americana* D.C. Eat.	American saw-wort
SAAR13	*Saxifraga arguta* auct. non D. Don	brook saxifrage
SAIN4	*Saxifraga integrifolia* Hook.	wholeleaf saxifrage
SAMI3	*Sanguisorba minor* Scop.	small burnet
SAOR2	*Saxifraga oregana* T.J. Howell	Oregon saxifrage
SASA	*Sagina saginoides* (L.) Karst.	arctic pearlwort
SASI10	*Sanguisorba sitchensis* C.A. Mey.	Canadian burnet
SAXIF	*Saxifraga* L.	saxifrage
SCAN2	*Scleranthus annuus* L.	German knotgrass
SCLA	*Scrophularia lanceolata* Pursh	lanceleaf figwort
SECY	*Senecio cymbalarioides* Buek	alpine meadow butterweed
SEDUM	*Sedum* L.	stonecrop
SEFO	*Senecio foetidus* J.T. Howell	tall groundsel
SEIN2	*Senecio integerrimus* Nutt.	lambstongue ragwort
SENEC	*Senecio* L.	ragwort
SEPS2	*Senecio pseudaureus* Rydb.	falsegold groundsel
SESE2	*Senecio serra* Hook.	tall ragwort
SEST2	*Sedum stenopetalum* Pursh	wormleaf stonecrop
SETR	*Senecio triangularis* Hook.	arrowleaf groundsel
SIAC	*Silene acaulis* (L.) Jacq.	moss campion
SIAL2	*Sisymbrium altissimum* L.	tall tumblemustard
SIME	*Silene menziesii* Hook.	Menzies' campion
SINO	*Silene noctiflora* L.	nightflowering silene
SIOR	*Sidalcea oregana* (Nutt. ex Torr. & Gray) Gray	Oregon checkerbloom
SIPR	*Sibbaldia procumbens* L.	creeping sibbaldia
SMILA	*Smilacina* Desf.	false Solomon's seal
SMRA	*Smilacina racemosa* (L.) Desf.	feathery false Solomon's seal
SMST	*Smilacina stellata* (L.) Desf.	starry false Solomon's seal
SOCA6	*Solidago canadensis* L.	Canada goldenrod
SODU	*Solanum dulcamara* L.	climbing nightshade
SOGI	*Solidago gigantea* Ait.	giant goldenrod
SOLID	*Solidago* L.	goldenrod
SOMU	*Solidago multiradiata* Ait.	Rocky Mountain goldenrod
SOSP	*Solidago spathulata* DC.	Mt. Albert goldenrod
SPAN2	*Sparganium angustifolium* Michx.	narrowleaf bur-reed
SPCA5	*Sphenosciadium capitellatum* Gray	woollyhead parsnip
SPER	*Sparganium erectum* L.	simplestem bur-reed
SPNA	*Sparganium natans* L.	small bur-reed

Appendix A-1—Total species sorted in alphabetical order by USDA Plants Code (continued)

Code	Scientific name	Common name
SPRO	*Spiranthes romanzoffiana* Cham.	hooded ladies'-tresses
STAM2	*Streptopus amplexifolius* (L.) DC.	claspleaf twistedstalk
STCA	*Stellaria calycantha* (Ledeb.) Bong.	northern starwort
STCR2	*Stellaria crispa* Cham. & Schlecht.	curled starwort
STELL	*Stellaria* L.	starwort
STLO	*Stellaria longifolia* Muhl. ex Willd.	longleaf starwort
STLO2	*Stellaria longipes* Goldie	longstalk starwort
STME2	*Stellaria media* (L.) Vill.	common chickweed
STOB	*Stellaria obtusa* Engelm.	Rocky Mountain chickweed
STOC	*Stenanthium occidentale* Gray	western featherbells
STREP3	*Streptopus* Michx.	twistedstalk
SWPE	*Swertia perennis* L.	felwort
SYMI	*Synthyris missurica* (Raf.) Pennell	tailed kittentails
TAOF	*Taraxacum officinale* G.H. Weber ex Wiggers	common dandelion
TARAX	*Taraxacum* G.H. Weber ex Wiggers	dandelion
THAL	*Thalictrum alpinum* L.	alpine meadow-rue
THALI2	*Thalictrum* L.	meadow-rue
THOC	*Thalictrum occidentale* Gray	western meadow-rue
THVE	*Thalictrum venulosum* Trel.	veiny meadow-rue
TITR	*Tiarella trifoliata* L.	threeleaf foamflower
TOFL	*Tonella floribunda* Gray	manyflower tonella
TRCA	*Trautvetteria caroliniensis* (Walt.) Vail	false bugbane
TRDU	*Tragopogon dubius* Scop.	yellow salsify
TRIFO	*Trifolium* L.	clover
TRLA14	*Trollius laxus* Salisb.	American globeflower
TRLA6	*Trientalis latifolia* Hook.	broadleaf starflower
TRLA8	*Trifolium latifolium* (Hook.) Greene	twin clover
TRLO	*Trifolium longipes* Nutt.	longstalk clover
TROV2	*Trillium ovatum* Pursh	Pacific trillium
TRPE3	*Trillium petiolatum* Pursh	Idaho trillium
TRPR2	*Trifolium pratense* L.	red clover
TRRE3	*Trifolium repens* L.	white clover
TRWO	*Trifolium wormskioldii* Lehm.	cow clover
TYLA	*Typha latifolia* L.	common cattail
UMBELF	Umbelliferae	carrot family
URDI	*Urtica dioica* L.	stinging nettle
VALO	*Valerianella locusta* (L.) Lat.	Lewiston cornsalad
VASI	*Valeriana sitchensis* Bong.	Sitka valerian
VEAM2	*Veronica americana* Schwein. ex Benth.	American speedwell
VEAN2	*Veronica anagallis-aquatica* L.	water speedwell
VECA2	*Veratrum californicum* Dur.	California false hellebore
VECU	*Veronica cusickii* Gray	Cusick's speedwell
VEPE2	*Veronica peregrina* L.	neckweed
VERAT	*Veratrum* L.	false hellebore
VERON	*Veronica* L.	speedwell
VESE	*Veronica serpyllifolia* L.	thymeleaf speedwell
VETH	*Verbascum thapsus* L.	common mullein
VEVI	*Veratrum viride* Ait.	green false hellebore
VEWO2	*Veronica wormskjoldii* Roemer & J.A. Schultes	American alpine speedwell
VIAD	*Viola adunca* Sm.	hookedspur violet
VIAM	*Vicia americana* Muhl. ex Willd.	American vetch
VICA4	*Viola canadensis* L.	Canadian white violet
VICIA	*Vicia* L.	vetch
VIGL	*Viola glabella* Nutt.	pioneer violet
VIMA2	*Viola macloskeyi* Lloyd	small white violet
VIOLA	*Viola* L.	violet
VIOR	*Viola orbiculata* Geyer ex Holz.	darkwoods violet
VIPA4	*Viola palustris* L.	marsh violet
XETE	*Xerophyllum tenax* (Pursh) Nutt.	common beargrass
ZIEL2	*Zigadenus elegans* Pursh	mountain deathcamas
Grasses:		
AGAL3	*Agrostis alba* auct. non L.	redtop
AGCA2	*Agropyron caninum* (L.) Beauv.	bearded wheatgrass
AGDI	*Agrostis diegoensis* Vasey	thin bentgrass

Appendix A-1—Total species sorted in alphabetical order by USDA Plants Code (continued)

Code	Scientific name	Common name
AGEX	*Agrostis exarata* Trin.	spike bentgrass
AGHU	*Agrostis humilis* Vasey	alpine bentgrass
AGIN5	*Agropyron inerme* (Scribn. & J.G. Sm.) Rydb.	beardless wheatgrass
AGRE2	*Agropyron repens* (L.) Beauv.	quackgrass
AGROP2	*Agropyron* Gaertn.	wheatgrass
AGROS2	*Agrostis* L.	bentgrass
AGSC5	*Agrostis scabra* Willd.	rough bentgrass
AGSP	*Agropyron spicatum* (Pursh) Scribn. & J.G. Sm.	bluebunch wheatgrass
AGST2	*Agrostis stolonifera* L.	creeping bentgrass
AGTE	*Agrostis tenuis* Sibthorp	colonial bentgrass
AGTH2	*Agrostis thurberiana* A.S. Hitchc.	Thurber's bentgrass
AGVA	*Agrostis variabilis* Rydb.	mountain bentgrass
ALAE	*Alopecurus aequalis* Sobol.	shortawn foxtail
ALPR3	*Alopecurus pratensis* L.	meadow foxtail
ANOD	*Anthoxanthum odoratum* L.	sweet vernalgrass
AREL3	*Arrhenatherum elatius* (L.) Beauv. ex J.& K. Presl	tall oatgrass
BRAN	*Bromus anomalus* Rupr. ex Fourn.	nodding brome
BRBR5	*Bromus briziformis* Fisch. & C.A. Mey.	rattlesnake brome
BRCA5	*Bromus carinatus* Hook. & Arn.	California brome
BRCI2	*Bromus ciliatus* L.	fringed brome
BRJA	*Bromus japonicus* Thunb. ex Murr.	Japanese brome
BROMU	*Bromus* L.	brome
BROR2	*Bromus orcuttianus* Vasey	Orcutt's brome
BRPA3	*Bromus pacificus* Shear	Pacific brome
BRRI8	*Bromus rigidus* Roth	ripgut brome
BRSE	*Bromus secalinus* L.	rye brome
BRST2	*Bromus sterilis* L.	poverty brome
BRSU2	*Bromus suksdorfii* Vasey	Suksdorf's brome
BRTE	*Bromus tectorum* L.	cheatgrass
BRVU	*Bromus vulgaris* (Hook.) Shear	Columbia brome
CAAQ3	*Catabrosa aquatica* (L.) Beauv.	water whorlgrass
CACA4	*Calamagrostis canadensis* (Michx.) Beauv.	bluejoint reedgrass
CALAM	*Calamagrostis* Adans.	reedgrass
CAPU	*Calamagrostis purpurascens* R. Br.	purple reedgrass
CARU	*Calamagrostis rubescens* Buckl.	pinegrass
CILA2	*Cinna latifolia* (Trev. ex Goepp.) Griseb.	drooping woodreed
DAGL	*Dactylis glomerata* L.	orchardgrass
DAIN	*Danthonia intermedia* Vasey	timber oatgrass
DECE	*Deschampsia cespitosa* (L.) Beauv. **[**orthographic variant**]**	tufted hairgrass
DEEL	*Deschampsia elongata* (Hook.) Munro	slender hairgrass
DISP	*Distichlis spicata* (L.) Greene	saltgrass
ELCI2	*Elymus cinereus* Scribn. & Merr.	basin wildrye
ELGL	*Elymus glaucus* Buckl.	blue wildrye
FEAR3	*Festuca arundinacea* Schreb.	tall fescue
FEID	*Festuca idahoensis* Elmer	Idaho fescue
FEOC	*Festuca occidentalis* Hook.	western fescue
FEPR	*Festuca pratensis* Huds.	meadow ryegrass
FESTU	*Festuca* L.	fescue
FESU	*Festuca subulata* Trin.	bearded fescue
FEVI	*Festuca viridula* Vasey	greenleaf fescue
GLEL	*Glyceria elata* (Nash ex Rydb.) M.E. Jones	tall mannagrass
GLGR	*Glyceria grandis* S. Wats.	American mannagrass
GLST	*Glyceria striata* (Lam.) A.S. Hitchc.	fowl mannagrass
GLYCE	*Glyceria* R. Br.	mannagrass
KOCR	*Koeleria cristata* auct. p.p. non Pers.	prairie Junegrass
MESM	*Melica smithii* (Porter ex Gray) Vasey	Smith's melicgrass
MESP	*Melica spectabilis* Scribn.	purple oniongrass
MESU	*Melica subulata* (Griseb.) Scribn.	Alaska oniongrass
MUAN	*Muhlenbergia andina* (Nutt.) A.S. Hitchc.	foxtail muhly
MUFI2	*Muhlenbergia filiformis* (Thurb. ex S. Wats.) Rydb.	slender muhly
PHAL2	*Phleum alpinum* L.	alpine timothy
PHAR3	*Phalaris arundinacea* L.	reed canarygrass
PHPR3	*Phleum pratense* L.	timothy
POA	*Poa* L.	bluegrass

Appendix A-1—Total species sorted in alphabetical order by USDA Plants Code (continued)

Code	Scientific name	Common name
POACF	Poaceae	grass family
POBU	*Poa bulbosa* L.	bulbous bluegrass
POCO	*Poa compressa* L.	Canada bluegrass
POCU3	*Poa cusickii* Vasey	Cusick's bluegrass
POLE2	*Poa leptocoma* Trin.	marsh bluegrass
PONE2	*Poa nervosa* (Hook.) Vasey	Wheeler bluegrass
POPA2	*Poa palustris* L.	fowl bluegrass
POPR	*Poa pratensis* L.	Kentucky bluegrass
POSA12	*Poa sandbergii*	Sandberg's bluegrass
POSC	*Poa scabrella* (Thurb.) Benth. ex Vasey	pine bluegrass
POTR2	*Poa trivialis* L.	rough bluegrass
PUPA3	*Puccinellia pauciflora* (J. Presl) Munz	weak alkaligrass
STIPA	*Stipa* L.	needlegrass
STOC2	*Stipa occidentalis* Thurb. ex S. Wats.	western needlegrass
TRCA21	*Trisetum canescens* Buckl.	tall trisetum
TRCE2	*Trisetum cernuum* Trin.	tall trisetum
TRSP2	*Trisetum spicatum* (L.) Richter	spike trisetum
TRWO3	*Trisetum wolfii* Vasey	Wolf's trisetum
Grasslikes:		
CAAB2	*Carex abrupta* Mackenzie	abruptbeak sedge
CAAM10	*Carex amplifolia* Boott	big-leaved sedge
CAAQ	*Carex aquatilis* Wahlenb.	aquatic sedge
CAAR2	*Carex arcta* Boott	northern cluster sedge
CAAT3	*Carex athrostachya* Olney	slenderbeak sedge
CAAU3	*Carex aurea* Nutt.	golden sedge
CABA3	*Carex backii* Boott	Back's sedge
CABI10	*Carex bipartita* All.	twotipped sedge
CACA11	*Carex canescens* L.	silvery sedge
CACA12	*Carex capillaris* L.	hairlike sedge
CACO11	*Carex concinnoides* Mackenzie	northwestern sedge
CACU5	*Carex cusickii* Mackenzie ex Piper & Beattie	Cusick's sedge
CADE9	*Carex deweyana* Schwein.	Dewey sedge
CADI6	*Carex disperma* Dewey	soft-leaved sedge
CAEU2	*Carex eurycarpa* Holm	widefruit sedge
CAGE2	*Carex geyeri* Boott	elk sedge
CAHE7	*Carex hendersonii* Bailey	Henderson's sedge
CAHO5	*Carex hoodii* Boott	Hood's sedge
CAIL	*Carex illota* Bailey	sheep sedge
CAJO	*Carex jonesii* Bailey	Jones' sedge
CALA11	*Carex lasiocarpa* Ehrh.	slender sedge
CALA13	*Carex laeviculmis* Meinsh.	smooth-stemmed sedge
CALA30	*Carex lanuginosa* auct. non Michx.	woolly sedge
CALE8	*Carex lenticularis* Michx.	lakeshore sedge
CALE9	*Carex leporinella* Mackenzie	Sierra hare sedge
CALEL	*Carex lenticularis* Michx. var. *lenticularis*	densely-tufted sedge
CALI7	*Carex limosa* L.	mud sedge
CALU7	*Carex luzulina* Olney	woodrush sedge
CAMI7	*Carex microptera* Mackenzie	smallwing sedge
CAMU7	*Carex muricata* L.	star sedge
CANE2	*Carex nebrascensis* Dewey	Nebraska sedge
CANI2	*Carex nigricans* C.A. Mey.	black alpine sedge
CANU5	*Carex nudata* W. Boott	torrent sedge
CAPA14	*Carex pachystachya* Cham. ex Steud.	chamisso sedge
CAPA18	*Carex parryana* Dewey	Parry's sedge
CAPR4	*Carex praeceptorium* Mackenzie	early sedge
CAPR5	*Carex praegracilis* W. Boott	clustered field sedge
CAPR7	*Carex praticola* Rydb.	meadow sedge
CARA6	*Carex raynoldsii* Dewey	Raynolds' sedge
CAREX	*Carex* L.	sedge
CARO5	*Carex rossii* Boott	Ross' sedge
CARO6	*Carex rostrata* Stokes	beaked sedge
CASA10	*Carex saxatilis* L.	rock sedge
CASC10	*Carex scirpoidea* Michx.	northern singlespike sedge
CASC12	*Carex scopulorum* Holm	Holm's Rocky Mountain sedge

Appendix A-1—Total species sorted in alphabetical order by USDA Plants Code (continued)

Code	Scientific name	Common name
CASCP	*Carex scopulorum* Holm var. *prionophylla* (Holm) L.A. Standley	saw-leaved sedge
CASH	*Carex sheldonii* Mackenzie	Sheldon's sedge
CASI2	*Carex simulata* Mackenzie	short-beaked sedge
CASP5	*Carex spectabilis* Dewey	showy sedge
CAST5	*Carex stipata* Muhl. ex Willd.	saw-beak sedge
CASU6	*Carex subfusca* W. Boott	brown sedge
CASU7	*Carex subnigricans* Stacey	nearlyblack sedge
CAUT	*Carex utriculata* Boott	bladder sedge
CAVE6	*Carex vesicaria* L.	inflated sedge
ELBE	*Eleocharis bella* (Piper) Svens.	delicate spikerush
ELEOC	*Eleocharis* R. Br.	spikerush
ELPA3	*Eleocharis palustris* (L.) Roemer & J.A. Schultes	creeping spikerush
ELPA6	*Eleocharis pauciflora* (Lightf.) Link	few-flowered spikerush
JUBA	*Juncus balticus* Willd.	Baltic rush
JUBR3	*Juncus brachyphyllus* Wieg.	tuftedstem rush
JUCO2	*Juncus confusus* Coville	Colorado rush
JUDR	*Juncus drummondii* E. Mey.	Drummond's rush
JUEF	*Juncus effusus* L.	common rush
JUEN	*Juncus ensifolius* Wikstr.	swordleaf rush
JUFI	*Juncus filiformis* L.	thread rush
JUME3	*Juncus mertensianus* Bong.	Mertens' rush
JUNCU	*Juncus* L.	rush
JUPA	*Juncus parryi* Engelm.	Parry's rush
KOSI2	*Kobresia simpliciuscula* (Wahlenb.) Mackenzie	simple bog sedge
LUCA2	*Luzula campestris* (L.) DC.	field woodrush
LUHI4	*Luzula hitchcockii* Hämet-Ahti	Hitchcock's smooth woodrush
LUPA4	*Luzula parviflora* (Ehrh.) Desv.	smallflowered woodrush
LUZUL	*Luzula* DC.	woodrush
SCCY	*Scirpus cyperinus* (L.) Kunth	woolgrass
SCIRP	*Scirpus* L.	bulrush
SCMI2	*Scirpus microcarpus* J.& K. Presl	small-fruit bulrush
Ferns and horsetails:		
ADPE	*Adiantum pedatum* L.	maidenhair
ATFI	*Athyrium filix-femina* (L.) Roth	ladyfern
BOVI	*Botrychium virginianum* (L.) Sw.	rattlesnake fern
CYFR2	*Cystopteris fragilis* (L.) Bernh.	brittle bladderfern
DRAU8	*Dryopteris austriaca* (Jacq.) Woynar ex Schinz & Thellung	mountain woodfern
DRFI2	*Dryopteris filix-mas* (L.) Schott	male fern
EQAR	*Equisetum arvense* L.	common horsetail
EQHY	*Equisetum hyemale* L.	scouringrush horsetail
EQLA	*Equisetum laevigatum* A. Braun	smooth horsetail
EQPA	*Equisetum palustre* L.	marsh horsetail
EQUIS	*Equisetum* L.	horsetail
EQVA	*Equisetum variegatum* Schleich. ex F. Weber & D.M.H. Mohr	variegated scouringrush
GYDR	*Gymnocarpium dryopteris* (L.) Newman	oakfern
POMU	*Polystichum munitum* (Kaulfuss) K. Presl	western swordfern
PTAQ	*Pteridium aquilinum* (L.) Kuhn	western brackenfern
WOOR	*Woodsia oregana* D.C. Eat.	Oregon cliff fern
Mosses:		
SPHAG2	*Sphagnum* L.	spagnum moss

Appendix A-2—Total species sorted in alphabetical order by common name

Common name	Code	Scientific name
Trees:		
American plum	PRAM	*Prunus americana* Marsh.
Black cottonwood	POTR15	*Populus trichocarpa* Torr. & Gray ex Hook.
Black locust	ROPS	*Robinia pseudoacacia* L.
Black walnut	JUNI	*Juglans nigra* L.
Boxelder	ACNE2	*Acer negundo* L.
Douglas-fir	PSME	*Pseudotsuga menziesii* (Mirbel) Franco
Engelmann spruce	PIEN	*Picea engelmannii* Parry ex Engelm.
Grand fir	ABGR	*Abies grandis* (Dougl. ex D. Don) Lindl.
Heartleaved paper birch	BEPAS	*Betula papyrifera* Marsh. var. *subcordata* (Rydb.) Sarg.
Lodgepole pine	PICO	*Pinus contorta* Dougl. ex Loud.
Mountain hemlock	TSME	*Tsuga mertensiana* (Bong.) Carr.
Ponderosa pine	PIPO	*Pinus ponderosa* P.& C. Lawson
Red alder	ALRU2	*Alnus rubra* Bong.
Subalpine fir	ABLA	*Abies lasiocarpa* (Hook.) Nutt.
Sweet cherry	PRAV	*Prunus avium* (L.) L.
Western juniper	JUOC	*Juniperus occidentalis* Hook.
Western larch	LAOC	*Larix occidentalis* Nutt.
White alder	ALRH2	*Alnus rhombifolia* Nutt.
Whitebark pine	PIAL	*Pinus albicaulis* Engelm.
Shrubs**:**		
Alder-leaved buckthorn	RHPU	*Rhamnus purshiana* DC.
Alpine laurel	KAMI	*Kalmia microphylla* (Hook.) Heller
Alpine spicywintergreen	GAHU	*Gaultheria humifusa* (Graham) Rydb.
Apricot	PRAR3	*Prunus armeniaca* L.
Arctic willow	SAAR27	*Salix arctica* Pallas
Arroyo willow	SALA6	*Salix lasiolepis* Benth.
Balsam poplar	POBA2	*Populus balsamifera* L.
Barclay's willow	SABA3	*Salix barclayi* Anderss.
Barton's raspberry	RUBA	*Rubus bartonianus* M.E. Peck
Bebb's willow	SABE2	*Salix bebbiana* Sarg.
Big huckleberry	VAME	*Vaccinium membranaceum* Dougl. ex Torr.
Birch	BETUL	*Betula* L.
Bitter cherry	PREM	*Prunus emarginata* (Dougl. ex Hook.) D. Dietr.
Black crowberry	EMNI	*Empetrum nigrum* L.
Black hawthorn	CRDO2	*Crataegus douglasii* Lindl.
Blackberry	RUBUS	*Rubus* L.
Blue elderberry	SACE3	*Sambucus cerulea* Raf.
Blueberry	VACCI	*Vaccinium* L.
Blueberry willow	SAMY	*Salix myrtillifolia* Anderss.
Bog birch	BEGL	*Betula glandulosa* Michx.
Bog blueberry	VAUL	*Vaccinium uliginosum* L.
Booth's willow	SABO2	*Salix boothii* Dorn
Cascade azalea	RHAL2	*Rhododendron albiflorum* Hook.
Chokecherry	PRVI	*Prunus virginiana* L.
Clematis	CLEMA	*Clematis* L.
Common snowberry	SYAL	*Symphoricarpos albus* (L.) Blake
Coyote willow	SAEX	*Salix exigua* Nutt.
Curl-leaf mountain mahogany	CELE3	*Cercocarpus ledifolius* Nutt.
Currant	RIBES	*Ribes* L.
Cutleaf blackberry	RULA	*Rubus laciniatus* Willd.
Devilsclub	OPHO	*Oplopanax horridus* Miq.
Douglas Rocky Mountain maple	ACGLD4	*Acer glabrum* Torr. var. *douglasii* (Hook.) Dipple
Douglas spiraea	SPDO	*Spiraea douglasii* Hook.
Drummond's willow	SADR	*Salix drummondiana* Barratt ex Hook.
Dwarf bilberry	VACA13	*Vaccinium caespitosum* Michx.
Dwarf rose	ROGY	*Rosa gymnocarpa* Nutt.
Eastwood willow	SAEA	*Salix eastwoodiae* Cockerell ex Heller
Elderberry	SAMBU	*Sambucus* L.
European mountain ash	SOAU	*Sorbus aucuparia* L.
European plum	PRDO	*Prunus domestica* L.
Farr's willow	SAFA	*Salix farriae* Ball
Geyer willow	SAGE2	*Salix geyeriana* Anderss.
Gooseberry currant	RIMO2	*Ribes montigenum* McClatchie

Appendix A-2—Total species sorted in alphabetical order by common name (continued)

Common name	Code	Scientific name
Greene's mountain ash	SOSC2	*Sorbus scopulina* Greene
Grouse huckleberry	VASC	*Vaccinium scoparium* Leib. ex Coville
Himalayan blackberry	RUDI2	*Rubus discolor* Weihe & Nees
Hollyleaved barberry	BEAQ	*Berberis aquifolium* Pursh
Idaho gooseberry	RIIR	*Ribes irriguum* Dougl.
Kinnikinnick	ARUV	*Arctostaphylos uva-ursi* (L.) Spreng.
Labrador tea	LEGL	*Ledum glandulosum* Nutt.
Lemmon's willow	SALE	*Salix lemmonii* Bebb
Lewis' mock orange	PHLE4	*Philadelphus lewisii* Pursh
Little prince's pine	CHME	*Chimaphila menziesii* (R. Br. ex D. Don) Spreng.
Mallow ninebark	PHMA5	*Physocarpus malvaceus* (Greene) Kuntze
Maple	ACER	*Acer* L.
Marsh Labrador tea	LEDE5	*Ledum decumbens* (Ait.) Lodd. ex Steud.
Moss heather	CASSI3	*Cassiope* D. Don
Mountain alder	ALIN2	*Alnus incana* (L.) Moench
Mountain big sagebrush	ARTRV	*Artemisia tridentata* Nutt. ssp. *vaseyana* (Rydb.) Beetle
Mountain snowberry	SYOR2	*Symphoricarpos oreophilus* Gray
Netleaf hackberry	CERE2	*Celtis reticulata* Torr.
Nootka rose	RONU	*Rosa nutkana* K. Presl
Oceanspray	HODI	*Holodiscus discolor* (Pursh) Maxim.
Orange honeysuckle	LOCI3	*Lonicera ciliosa* (Pursh) Poir. ex DC.
Oregon boxleaf	PAMY	*Paxistima myrsinites* (Pursh) Raf.
Oregon grape	BERE	*Berberis repens* Lindl.
Oregon white oak	QUGA4	*Quercus garryana* Dougl. ex Hook.
Pacific ninebark	PHCA11	*Physocarpus capitatus* (Pursh) Kuntze
Pacific willow	SALA5	*Salix lasiandra* Benth.
Pacific yew	TABR2	*Taxus brevifolia* Nutt.
Pink mountainheath	PHEM	*Phyllodoce empetriformis* (Sm.) D. Don
Pipsissewa	CHUM	*Chimaphila umbellata* (L.) W. Bart.
Planeleaf willow	SAPL2	*Salix planifolia* Pursh
Plum	PRUNU	*Prunus* L.
Poison ivy	RHRA6	*Rhus radicans* L.
Prickly currant	RILA	*Ribes lacustre* (Pers.) Poir.
Red elderberry	SARA2	*Sambucus racemosa* L.
Red raspberry	RUID	*Rubus idaeus* L.
Red-oiser dogwood	COST4	*Cornus stolonifera* Michx.
Redstem ceanothus	CESA	*Ceanothus sanguineus* Pursh
Rigid willow	SARI2	*Salix rigida* Muhl.
Rock clematis	CLCO2	*Clematis columbiana* (Nutt.) Torr. & Gray
Rock spirea	HODU	*Holodiscus dumosus* (Nutt. ex Hook.) Heller
Rocky Mountain maple	ACGL	*Acer glabrum* Torr.
Rose	ROSA5	*Rosa* L.
Rose meadowsweet	SPDE	*Spiraea densiflora* Nutt. ex Greenm.
Russet buffaloberry	SHCA	*Shepherdia canadensis* (L.) Nutt.
Rusty menziesia	MEFE	*Menziesia ferruginea* Sm.
Scouler's willow	SASC	*Salix scouleriana* Barratt ex Hook.
Shrubby cinquefoil	POFR4	*Potentilla fruticosa* auct. non L.
Silver sagebrush	ARCA13	*Artemisia cana* Pursh
Sitka alder	ALSI3	*Alnus sinuata* (Regel) Rydb.
Sitka willow	SASI2	*Salix sitchensis* Sanson ex Bong.
Smooth sumac	RHGL	*Rhus glabra* L.
Snow currant	RINI2	*Ribes niveum* Lindl.
Sour cherry	PRCE	*Prunus cerasus* L.
Spiny greasebush	GLNE	*Glossopetalon nevadense* Gray
Spirea	SPIRA	*Spiraea* L.
Stinking currant	RIHU	*Ribes hudsonianum* Richards.
Stream currant	RICO	*Ribes cognatum* Greene
Sweetgale	MYGA	*Myrica gale* L.
Thimbleberry	RUPA	*Rubus parviflorus* Nutt.
Tweedy's willow	SATW	*Salix tweedyi* (Bebb ex Rose) Ball
Twinberry honeysuckle	LOIN5	*Lonicera involucrata* Banks ex Spreng.
Twinflower	LIBO3	*Linnaea borealis* L.
Undergreen willow	SACO2	*Salix commutata* Bebb
Utah honeysuckle	LOUT2	*Lonicera utahensis* S. Wats.

Appendix A-2—Total species sorted in alphabetical order by common name (continued)

Common name	Code	Scientific name
Water birch	BEOC2	*Betula occidentalis* Hook.
Wax currant	RICE	*Ribes cereum* Dougl.
Western laurel	KAOC	*Kalmia occidentalis* Small
Western moss heather	CAME7	*Cassiope mertensiana* (Bong.) D. Don
Western serviceberry	AMAL2	*Amelanchier alnifolia* (Nutt.) Nutt. ex M. Roemer
Western white clematis	CLLI2	*Clematis ligusticifolia* Nutt.
White spirea	SPBE2	*Spiraea betulifolia* Pallas
Whitebark raspberry	RULE	*Rubus leucodermis* Dougl. ex Torr. & Gray
Whitestem gooseberry	RIIN2	*Ribes inerme* Rydb.
Whortleberry	VAMY2	*Vaccinium myrtillus* L.
Willow	SALIX	*Salix* L.
Wolf's currant	RIWO	*Ribes wolfii* Rothrock
Wolf's willow	SAWO	*Salix wolfii* Bebb
Woods' rose	ROWO	*Rosa woodsii* Lindl.
Forbs**:**		
Agoseris	AGOSE	*Agoseris* Raf.
Alaska draba	DRST2	*Draba stenoloba* Ledeb.
Alpine leafybract aster	ASFO	*Aster foliaceus* Lindl. ex DC.
Alpine lewisia	LEPY2	*Lewisia pygmaea* (Gray) B.L. Robins.
Alpine meadow butterweed	SECY	*Senecio cymbalarioides* Buek
Alpine meadow-rue	THAL	*Thalictrum alpinum* L.
Alpine milkvetch	ASAL7	*Astragalus alpinus* L.
Alpine pussytoes	ANAL4	*Antennaria alpina* (L.) Gaertn.
Alpine shootingstar	DOAL	*Dodecatheon alpinum* (Gray) Greene
Alpine smartweed	POVI3	*Polygonum viviparum* L.
Alpine springbeauty	CLME	*Claytonia megarhiza* (Gray) Parry ex S. Wats.
Alumroot	HEUCH	*Heuchera* L.
American alpine speedwell	VEWO2	*Veronica wormskjoldii* Roemer & J.A. Schultes
American bird's-foot trefoil	LOPU3	*Lotus purshianus* F.E. & E.G. Clem.
American bistort	POBI6	*Polygonum bistortoides* Pursh
American globeflower	TRLA14	*Trollius laxus* Salisb.
American saw-wort	SAAM3	*Saussurea americana* D.C. Eat.
American speedwell	VEAM2	*Veronica americana* Schwein. ex Benth.
American trailplant	ADBI	*Adenocaulon bicolor* Hook.
American vetch	VIAM	*Vicia americana* Muhl. ex Willd.
Anemone	ANEMO	*Anemone* L.
Arctic pearlwort	SASA	*Sagina saginoides* (L.) Karst.
Arnica	ARNIC	*Arnica* L.
Arrowleaf balsamroot	BASA3	*Balsamorhiza sagittata* (Pursh) Nutt.
Arrowleaf groundsel	SETR	*Senecio triangularis* Hook.
Aspen fleabane	ERSP4	*Erigeron speciosus* (Lindl.) DC.
Aster	ASTER	*Aster* L.
Aster family	ASTERF	Asteraceae
Avens	GEUM	*Geum* L.
Ballhead ipomopsis	GICO2	*Gilia congesta* Hook.
Ballhead waterleaf	HYCA4	*Hydrophyllum capitatum* Dougl. ex Benth.
Beardtongue	PENST	*Penstemon* Schmidel
Bedstraw	GALIU	*Galium* L.
Bellflower	CAMPA	*Campanula* L.
Bicknell's cranesbill	GEBI2	*Geranium bicknellii* Britt.
Biennial cinquefoil	POBI7	*Potentilla biennis* Greene
Big chickweed	CEVU	*Cerastium vulgatum* L. 1762, non 1755
Bigleaf lupine	LUPO2	*Lupinus polyphyllus* Lindl.
Birdfoot deervetch	LOCO6	*Lotus corniculatus* L.
Bitter dock	RUOB	*Rumex obtusifolius* L.
Bittercress	CARDA	*Cardamine* L.
Black medick	MELU	*Medicago lupulina* L.
Bladder campion	LYAL	*Lychnis alba* P. Mill.
Bluebell bellflower	CARO2	*Campanula rotundifolia* L.
Bluebells	MERTE	*Mertensia* Roth
Bog orchid	HABEN	*Habenaria* Willd.
Bolander's quillwort	ISBO	*Isoetes bolanderi* Engelm.
Boreal sweetvetch	HEBO	*Hedysarum boreale* Nutt.
Bracted lousewort	PEBR	*Pedicularis bracteosa* Benth.

Appendix A-2—Total species sorted in alphabetical order by common name (continued)

Common name	Code	Scientific name
British Columbia wildginger	ASCA2	*Asarum caudatum* Lindl.
Broadleaf arnica	ARLA8	*Arnica latifolia* Bong.
Broadleaf starflower	TRLA6	*Trientalis latifolia* Hook.
Brodiaea	BRODI	*Brodiaea* Sm.
Brook saxifrage	SAAR13	*Saxifraga arguta* auct. non D. Don
Buckbean	METR3	*Menyanthes trifoliata* L.
Bull thistle	CIVU	*Cirsium vulgare* (Savi) Ten.
Bunchberry dogwood	COCA13	*Cornus canadensis* L.
Burdock	ARCTI	*Arctium* L.
Buttercup	RANUN	*Ranunculus* L.
California false hellebore	VECA2	*Veratrum californicum* Dur.
Canada goldenrod	SOCA6	*Solidago canadensis* L.
Canada thistle	CIAR4	*Cirsium arvense* (L.) Scop.
Canadian burnet	SASI10	*Sanguisorba sitchensis* C.A. Mey.
Canadian horseweed	COCA5	*Conyza canadensis* (L.) Cronq.
Canadian milkvetch	ASCA11	*Astragalus canadensis* L.
Canadian white violet	VICA4	*Viola canadensis* L.
Canby’s licorice-root	LICA2	*Ligusticum canbyi* Coult. & Rose
Carleton’s sand verbena	ABCA	*Abronia carletonii* Coult. & Fisher
Carrot family	APIACF	Apiaceae
Carrot family	UMBELF	Umbelliferae
Chamisso arnica	ARCH3	*Arnica chamissonis* Less.
Chaparral willowherb	EPMI	*Epilobium minutum* Lindl. ex Lehm.
Chervil	ANSC8	*Anthriscus scandicina* (Weber ex Wiggers) Mansf.
Cinquefoil	POTEN	*Potentilla* L.
Clasping arnica	ARAM2	*Arnica amplexicaulis* Nutt.
Claspleaf twistedstalk	STAM2	*Streptopus amplexifolius* (L.) DC.
Clearwater cryptantha	CRFR2	*Cryptantha fragilis* M.E. Peck
Cleavers	GAAP2	*Galium aparine* L.
Climbing nightshade	SODU	*Solanum dulcamara* L.
Clover	TRIFO	*Trifolium* L.
Columbian monkshood	ACCO4	*Aconitum columbianum* Nutt.
Columbine	AQUIL	*Aquilegia* L.
Common beargrass	XETE	*Xerophyllum tenax* (Pursh) Nutt.
Common cattail	TYLA	*Typha latifolia* L.
Common chickweed	STME2	*Stellaria media* (L.) Vill.
Common cowparsnip	HELA4	*Heracleum lanatum* Michx.
Common dandelion	TAOF	*Taraxacum officinale* G.H. Weber ex Wiggers
Common duckweed	LEMI3	*Lemna minor* L.
Common mullein	VETH	*Verbascum thapsus* L.
Common nipplewort	LACO3	*Lapsana communis* L.
Common plantain	PLMA2	*Plantago major* L.
Common selfheal	PRVU	*Prunella vulgaris* L.
Common St. Johnswort	HYPE	*Hypericum perforatum* L.
Common yarrow	ACMI2	*Achillea millefolium* L.
Cow clover	TRWO	*Trifolium wormskioldii* Lehm.
Creeping buttercup	RARE3	*Ranunculus repens* L.
Creeping sibbaldia	SIPR	*Sibbaldia procumbens* L.
Crevice alumroot	HEMI7	*Heuchera micrantha* Dougl. ex Lindl.
Crossflower	CHTE2	*Chorispora tenella* (Pallas) DC.
Curled starwort	STCR2	*Stellaria crispa* Cham. & Schlecht.
Curly dock	RUCR	*Rumex crispus* L.
Curlytop knotweed	POLA4	*Polygonum lapathifolium* L.
Curvepod yellowcress	ROCU	*Rorippa curvisiliqua* (Hook.) Bess. ex Britt.
Cusick’s milkvetch	ASCU5	*Astragalus cusickii* Gray
Cusick’s Indian paintbrush	CACU7	*Castilleja cusickii* Greenm.
Cusick’s speedwell	VECU	*Veronica cusickii* Gray
Dandelion	TARAX	*Taraxacum* G.H. Weber ex Wiggers
Darkthroat shootingstar	DOPU	*Dodecatheon pulchellum* (Raf.) Merr.
Darkwoods violet	VIOR	*Viola orbiculata* Geyer ex Holz.
Desertparsley	LOMAT	*Lomatium* Raf.
Dock	RUMEX	*Rumex* L.
Drops of gold	DIHO3	*Disporum hookeri* (Torr.) Nichols.
Duncecap larkspur	DEOC	*Delphinium* ×*occidentale* (S. Wats.) S. Wats. (pro sp.) [*barbeyi* × *glaucum*]

Appendix A-2—Total species sorted in alphabetical order by common name (continued)

Common name	Code	Scientific name
Dutchman's breeches	DICU	*Dicentra cucullaria* (L.) Bernh.
Dwarf fireweed	EPLA	*Epilobium latifolium* L.
Dwarf groundsmoke	GAHU2	*Gayophytum humile* Juss.
Eastern showy aster	ASCO3	*Aster conspicuus* Lindl.
Eaton's aster	ASEA	*Aster eatonii* (Gray) T.J. Howell
Elephanthead lousewort	PEGR2	*Pedicularis groenlandica* Retz.
Elkweed	FRSP	*Frasera speciosa* Dougl. ex Griseb.
Enchanter's nightshade	CIAL	*Circaea alpina* L.
Eschscholtz's buttercup	RAES	*Ranunculus eschscholtzii* Schlecht.
Explorer's gentian	GECA	*Gentiana calycosa* Griseb.
Fairybells	DISPO	*Disporum* Salisb. ex D. Don
False bugbane	TRCA	*Trautvetteria caroliniensis* (Walt.) Vail
False hellebore	VERAT	*Veratrum* L.
False Solomon's seal	SMILA	*Smilacina* Desf.
Falsegold groundsel	SEPS2	*Senecio pseudaureus* Rydb.
Feathery false Solomon's seal	SMRA	*Smilacina racemosa* (L.) Desf.
Felwort	SWPE	*Swertia perennis* L.
Fendler's waterleaf	HYFE	*Hydrophyllum fendleri* (Gray) Heller
Fernleaf biscuitroot	LODI	*Lomatium dissectum* (Nutt.) Mathias & Constance
Fewflower pea	LAPA5	*Lathyrus pauciflorus* Fern.
Field bindweed	COAR4	*Convolvulus arvensis* L.
Field chickweed	CEAR4	*Cerastium arvense* L.
Fireweed	EPAN2	*Epilobium angustifolium* L.
Fivestamen miterwort	MIPE	*Mitella pentandra* Hook.
Fleabane	ERIGE2	*Erigeron* L.
Foothill arnica	ARFU3	*Arnica fulgens* Pursh
Forget-me-not	MYOSO	*Myosotis* L.
Fragrant bedstraw	GATR3	*Galium triflorum* Michx.
Fringed grass of Parnassus	PAFI3	*Parnassia fimbriata* Koenig
Fringed willowherb	EPGL4	*Epilobium glandulosum* Lehm.
Garden sorrel	RUAC2	*Rumex acetosa* L.
Gentian	GENTI	*Gentiana* L.
Geranium	GERAN	*Geranium* L.
German knotgrass	SCAN2	*Scleranthus annuus* L.
German-madwort	ASPR	*Asperugo procumbens* L.
Giant goldenrod	SOGI	*Solidago gigantea* Ait.
Giant hyssop	AGAST	*Agastache* Clayton ex Gronov.
Giant mountain aster	ASMO3	*Aster modestus* Lindl.
Giant red Indian paintbrush	CAMI12	*Castilleja miniata* Dougl. ex Hook.
Gilia	GILIA	*Gilia* Ruiz & Pavón
Glandular willowherb	EPHA	*Epilobium halleanum* Hausskn.
Glaucus willowherb	EPGL	*Epilobium glaberrimum* Barbey
Globe penstemon	PEGL5	*Penstemon globosus* (Piper) Pennell & Keck
Goldenrod	SOLID	*Solidago* L.
Grand collomia	COGR4	*Collomia grandiflora* Dougl. ex Lindl.
Grassy tarweed	MAGR3	*Madia gracilis* (Sm.) Keck & J. Clausen ex Applegate
Graygreen thistle	CICA6	*Cirsium canovirens* (Rydb.) Petrak
Gray's licorice-root	LIGR	*Ligusticum grayi* Coult. & Rose
Green false hellebore	VEVI	*Veratrum viride* Ait.
Green gentian	FRASE	*Frasera* Walt.
Gypsyflower	CYOF	*Cynoglossum officinale* L.
Hairy arnica	ARMO4	*Arnica mollis* Hook.
Hare's ear mustard	COOR	*Conringia orientalis* (L.) Dumort.
Hawkweed	HIERA	*Hieracium* L.
Heartleaf arnica	ARCO9	*Arnica cordifolia* Hook.
Heartleaf bittercress	CACO6	*Cardamine cordifolia* Gray
Heartleaf twayblade	LICO6	*Listera cordata* (L.) R. Br. ex Ait. f.
Heartleaf minerslettuce	MOCO4	*Montia cordifolia* (S. Wats.) Pax & K. Hoffmann
Henbit deadnettle	LAAM	*Lamium amplexicaule* L.
High mountain cinquefoil	POFL3	*Potentilla flabellifolia* Hook. ex Torr. & Gray
Hooded ladies'-tresses	SPRO	*Spiranthes romanzoffiana* Cham.
Hookedspur violet	VIAD	*Viola adunca* Sm.
Horehound	MAVU	*Marrubium vulgare* L.
Howell's marshmarigold	CABI2	*Caltha biflora* DC.

Appendix A-2—Total species sorted in alphabetical order by common name (continued)

Common name	Code	Scientific name
Howell's triteleia	BRHO	*Brodiaea howellii* S. Wats.
Idaho licorice-root	LITE2	*Ligusticum tenuifolium* S. Wats.
Idaho trillium	TRPE3	*Trillium petiolatum* Pursh
Indian paintbrush	CASTI2	*Castilleja* Mutis ex L. f.
Indianpipe	MOUN3	*Monotropa uniflora* L.
Jacob's-ladder	POLEM	*Polemonium* L.
Jacob's-ladder	POPU3	*Polemonium pulcherrimum* Hook.
Japanese knotweed	POCU6	*Polygonum cuspidatum* Sieb. & Zucc.
Jessica sticktight	HAMI	*Hackelia micrantha* (Eastw.) J.L. Gentry
Knotweed	POLYG4	*Polygonum* L.
Lambstongue ragwort	SEIN2	*Senecio integerrimus* Nutt.
Lanceleaf figwort	SCLA	*Scrophularia lanceolata* Pursh
Large mountain fleabane	ERCO6	*Erigeron coulteri* Porter
Largeflower fairybells	DISM2	*Disporum smithii* (Hook.) Piper
Largeflower triteleia	BRDO	*Brodiaea douglasii* S. Wats.
Largeleaf avens	GEMA4	*Geum macrophyllum* Willd.
Largeleaf sandwort	ARMA18	*Arenaria macrophylla* Hook.
Larkspur	DELPH	*Delphinium* L.
Leafy white orchis	HADI7	*Habenaria dilatata* (Pursh) Hook.
Lesser burdock	ARMI2	*Arctium minus* Bernh.
Lettuce	LACTU	*Lactuca* L.
Lewiston cornsalad	VALO	*Valerianella locusta* (L.) Lat.
Licorice-root	LIGUS	*Ligusticum* L.
Lily family	LILIAF	Liliaceae
Little western bittercress	CAOL	*Cardamine oligosperma* Nutt.
Littleleaf minerslettuce	MOPA2	*Montia parvifolia* (Moc. ex DC.) Greene
Littleleaf pussytoes	ANMI3	*Antennaria microphylla* Rydb.
Liverleaf wintergreen	PYAS	*Pyrola asarifolia* Michx.
Longleaf starwort	STLO	*Stellaria longifolia* Muhl. ex Willd.
Longstalk clover	TRLO	*Trifolium longipes* Nutt.
Longstalk starwort	STLO2	*Stellaria longipes* Goldie
Lupine	LUPIN	*Lupinus* L.
Lyall's angelica	ANAR3	*Angelica arguta* Nutt.
Maiden blue eyed Mary	COPA3	*Collinsia parviflora* Lindl.
Manyflower tonella	TOFL	*Tonella floribunda* Gray
Mapleleaf goosefoot	CHHY	*Chenopodium hybridum* auct. non L.
Mariposa lily	CALOC	*Calochortus* Pursh
Marsh marigold	CALTH	*Caltha* L.
Marsh violet	VIPA4	*Viola palustris* L.
Meadow-rue	THALI2	*Thalictrum* L.
Menzies' campion	SIME	*Silene menziesii* Hook.
Menzies' fiddleneck	AMRE2	*Amsinckia retrorsa* Suksdorf
Mexican bedstraw	GAAS3	*Galium asperrimum* Gray
Milkvetch	ASTRA	*Astragalus* L.
Minerslettuce	MONTI	*Montia* L.
Mint	MENTH	*Mentha* L.
Mint family	LABIAF	Labiatae
Miterwort	MITEL	*Mitella* L.
Monkeyflower	MIMUL	*Mimulus* L.
Moss campion	SIAC	*Silene acaulis* (L.) Jacq.
Mountain deathcamas	ZIEL2	*Zigadenus elegans* Pursh
Mountain monardella	MOOD	*Monardella odoratissima* Benth.
Mountain sweetcicely	OSCH	*Osmorhiza chilensis* Hook. & Arn.
Mountain tansymustard	DERI2	*Descurainia richardsonii* O.E. Schulz
Mouse-ear chickweed	CERAS	*Cerastium* L.
Mt. Albert goldenrod	SOSP	*Solidago spathulata* DC.
Muskflower	MIMO3	*Mimulus moschatus* Dougl. ex Lindl.
Mustard family	CRUCIF	Cruciferae
Narrowleaf bur-reed	SPAN2	*Sparganium angustifolium* Michx.
Narrowleaf plantain	PLLA	*Plantago lanceolata* L.
Neckweed	VEPE2	*Veronica peregrina* L.
Nettleleaf horsemint	AGUR	*Agastache urticifolia* (Benth.) Kuntze
Nightflowering silene	SINO	*Silene noctiflora* L.
Nodding beggartick	BICE	*Bidens cernua* L.

Appendix A-2—Total species sorted in alphabetical order by common name (continued)

Common name	Code	Scientific name
Nodding chickweed	CENU2	*Cerastium nutans* Raf.
Nodding microceris	MINU	*Microseris nutans* (Hook.) Schultz-Bip.
Northern bedstraw	GABO2	*Galium boreale* L.
Northern bugleweed	LYUN	*Lycopus uniflorus* Michx.
Northern starwort	STCA	*Stellaria calycantha* (Ledeb.) Bong.
Norton's St. Johnswort	HYFON	*Hypericum formosum* Kunth var. *nortoniae* (M.E. Jones) C.L. Hitchc.
Orange agoseris	AGAU2	*Agoseris aurantiaca* (Hook.) Greene
Oregon checkerbloom	SIOR	*Sidalcea oregana* (Nutt. ex Torr. & Gray) Gray
Oregon saxifrage	SAOR2	*Saxifraga oregana* T.J. Howell
Oxeye daisy	CHLE80	*Chrysanthemum leucanthemum* L.
Pacific aster	ASCH2	*Aster chilensis* Nees
Pacific onion	ALVA	*Allium validum* S. Wats.
Pacific trillium	TROV2	*Trillium ovatum* Pursh
Parry's arnica	ARPA13	*Arnica parryi* Gray
Parry's lousewort	PEPA3	*Pedicularis parryi*Gray
Patience dock	RUPA5	*Rumex patientia* L.
Payette beardtongue	PEPA29	*Penstemon payettensis* A. Nels. & J.F. Macbr.
Pea	LATHY	*Lathyrus* L.
Pea family	LEGUMF	Legumaceae
Pennsylvania pellitory	PAPE5	*Parietaria pensylvanica* Muhl. ex Willd.
Peppermint	MEPI	*Mentha ×piperita* L. (pro sp.) [*aquatica* × *spicata*]
Perfoliated minerslettuce	MOPE3	*Montia perfoliata* (Donn ex Willd.) T.J. Howell
Philadelphia fleabane	ERPH	*Erigeron philadelphicus* L.
Pimpernel willowherb	EPAL	*Epilobium alpinum* L. p.p.
Pink family	CARYOF	Caryophyllaceae
Pioneer violet	VIGL	*Viola glabella* Nutt.
Piper's anemone	ANPI	*Anemone piperi* Britt. ex Rydb.
Plantainleaf buttercup	RAAL	*Ranunculus alismifolius* Geyer ex Benth.
Plumeless thistle	CARDU	*Carduus* L.
Poke knotweed	POPH	*Polygonum phytolaccifolium* Meisn. ex Small
Pondweed	POTAM	*Potamogeton* L.
Popular buttercup	RAPO	*Ranunculus populago* Greene
Prickly lettuce	LASE	*Lactuca serriola* L.
Primrose monkeyflower	MIPR	*Mimulus primuloides* Benth.
Purple monkeyflower	MILE2	*Mimulus lewisii* Pursh
Pussytoes	ANTEN	*Antennaria* Gaertn.
Queen's cup beadlily	CLUN2	*Clintonia uniflora* (Menzies ex J.A. & J.H. Schultes) Kunth
Raceme pussytoes	ANRA	*Antennaria racemosa* Hook.
Ragwort	SENEC	*Senecio* L.
Red baneberry	ACRU2	*Actaea rubra* (Ait.) Willd.
Red clover	TRPR2	*Trifolium pratense* L.
Robbins' milkvetch	ASRO	*Astragalus robbinsii* (Oakes) Gray
Rocky Mountain chickweed	STOB	*Stellaria obtusa* Engelm.
Rocky Mountain goldenrod	SOMU	*Solidago multiradiata* Ait.
Rocky Mountain pond-lily	NUPO2	*Nuphar polysepala* Engelm.
Rose campion	LYCO	*Lychnis coronaria* (L.) Desr.
Roughfruit fairybells	DITR2	*Disporum trachycarpum* (S. Wats.) Benth. & Hook. f.
Sanddune wallflower	ERAS2	*Erysimum asperum* (Nutt.) DC.
Saxifrage	SAXIF	*Saxifraga* L.
Scarlet gilia	GIAG	*Gilia aggregata* (Pursh) Spreng.
Scouler's popcornflower	PLSC2	*Plagiobothrys scouleri* (Hook. & Arn.) I.M. Johnston
Scouler's St. Johnswort	HYFOS	*Hypericum formosum* Kunth var. *scouleri* (Hook.) Coult.
Seep monkeyflower	MIGU	*Mimulus guttatus* DC.
Sheep cinquefoil	POOV2	*Potentilla ovina* Macoun ex J.M. Macoun
Shepherd's purse	CABU2	*Capsella bursa-pastoris* (L.) Medik.
Shootingstar	DODEC	*Dodecatheon* L.
Shrubby bedstraw	GAMU2	*Galium multiflorum* Kellogg
Siberian minerslettuce	MOSI2	*Montia sibirica* (L.) T.J. Howell
Sickletop lousewort	PERA	*Pedicularis racemosa* Dougl. ex Benth.
Sidebells wintergreen	PYSE	*Pyrola secunda* L.
Sierra pea	LANE3	*Lathyrus nevadensis* S. Wats.
Sierrra shootingstar	DOJE	*Dodecatheon jeffreyi* Van Houtte
Silverleaf phacelia	PHHA	*Phacelia hastata* Dougl. ex Lehm.
Simplestem bur-reed	SPER	*Sparganium erectum* L.

Appendix A-2—Total species sorted in alphabetical order by common name (continued)

Common name	Code	Scientific name
Sitka valerian	VASI	*Valeriana sitchensis* Bong.
Slender bog orchid	HASA	*Habenaria saccata* Greene
Slender cinquefoil	POGR9	*Potentilla gracilis* Dougl. ex Hook.
Slender hawkweed	HIGR	*Hieracium gracile* Hook.
Slender phlox	MIGR	*Microsteris gracilis* (Hook.) Greene
Slender-spire orchid	HAUN	*Habenaria unalascensis* (Spreng.) S. Wats.
Slim larkspur	DEDE2	*Delphinium depauperatum* Nutt.
Small burnet	SAMI3	*Sanguisorba minor* Scop.
Small bur-reed	SPNA	*Sparganium natans* L.
Small geranium	GEPU2	*Geranium pusillum* L.
Small white violet	VIMA2	*Viola macloskeyi* Lloyd
Smallflower miterwort	MIST3	*Mitella stauropetala* Piper
Smallflower nemophila	NEPA	*Nemophila parviflora* Dougl. ex Benth.
Smallflower woodland-star	LIPA5	*Lithophragma parviflorum* (Hook.) Nutt. ex Torr. & Gray
Snake River phlox	PHCO10	*Phlox colubrina* Wherry & Constance
Snowbed draba	DRCR2	*Draba crassifolia* Graham
Snowline wintergreen	PYMI	*Pyrola minor* L.
Spearleaf arnica	ARLO6	*Arnica longifolia* D.C. Eat.
Speedwell	VERON	*Veronica* L.
Splitleaf Indian paintbrush	CARH4	*Castilleja rhexiifolia* Rydb.
Spreading dogbane	APAN2	*Apocynum androsaemifolium* L.
Spreadingpod rockcress	ARDI2	*Arabis ×divaricarpa* A. Nels. (pro sp.)
St. Johnswort	HYPER	*Hypericum* L.
Starry false Solomon’s seal	SMST	*Smilacina stellata* (L.) Desf.
Starwort	STELL	*Stellaria* L.
Stickseed	HACKE	*Hackelia* Opiz
Sticky chickweed	CEVI3	*Cerastium viscosum* auct. non L.
Sticky cinquefoil	POGL9	*Potentilla glandulosa* Lindl.
Sticky purple geranium	GEVI2	*Geranium viscosissimum* Fisch. & C.A. Mey. ex C.A. Mey.
Stiff clubmoss	LYAN2	*Lycopodium annotinum* L.
Stinging nettle	URDI	*Urtica dioica* L.
Stonecrop	SEDUM	*Sedum* L.
Stream orchid	EPGI	*Epipactis gigantea* Dougl. ex Hook.
Streambank wild hollyhock	ILRI	*Iliamna rivularis* (Dougl. ex Hook.) Greene
Strict forget-me-not	MYMI	*Myosotis micrantha* auct. non Pallas ex Lehm.
Subalpine fleabane	ERPE3	*Erigeron peregrinus* (Banks ex Pursh) Greene
Summer coralroot	COMA4	*Corallorrhiza maculata* (Raf.) Raf.
Sweet coltsfoot	PEFRP	*Petasites frigidus* (L.) Fries var. *palmatus* (Ait.) Cronq.
Sweetcicely	OSMOR	*Osmorhiza* Raf.
Tailed kittentails	SYMI	*Synthyris missurica* (Raf.) Pennell
Tall annual willowherb	EPPA2	*Epilobium paniculatum* Nutt. ex Torr. & Gray
Tall blue lettuce	LABI	*Lactuca biennis* (Moench) Fern.
Tall bluebells	MEPA	*Mertensia paniculata* (Ait.) G. Don
Tall buttercup	RAAC3	*Ranunculus acris* L.
Tall cinquefoil	POAR7	*Potentilla arguta* Pursh
Tall fringed bluebells	MECI3	*Mertensia ciliata* (James ex Torr.) G. Don
Tall groundsel	SEFO	*Senecio foetidus* J.T. Howell
Tall ragwort	SESE2	*Senecio serra* Hook.
Tall tumblemustard	SIAL2	*Sisymbrium altissimum* L.
Tapertip onion	ALAC4	*Allium acuminatum* Hook.
Tarweed fiddleneck	AMLY	*Amsinckia lycopsoides* Lehm.
Tasselflower brickellbush	BRGR	*Brickellia grandiflora* (Hook.) Nutt.
Teasel	DISY	*Dipsacus sylvestris* Huds.
Thistle	CIRSI	*Cirsium* P. Mill.
Threeleaf foamflower	TITR	*Tiarella trifoliata* L.
Threepetal bedstraw	GATR2	*Galium trifidum* L.
Thymeleaf sandwort	ARSE2	*Arenaria serpyllifolia* L.
Thymeleaf speedwell	VESE	*Veronica serpyllifolia* L.
Tinker’s penny	HYAN2	*Hypericum anagalloides* Cham. & Schlecht.
Tiny trumpet	COLI2	*Collomia linearis* Nutt.
Tower rockcress	ARGL	*Arabis glabra* (L.) Bernh.
Tundra aster	ASAL2	*Aster alpigenus* (Torr. & Gray) Gray
Twayblade	LISTE	*Listera* R. Br. ex Ait. f.
Twin clover	TRLA8	*Trifolium latifolium* (Hook.) Greene

Appendix A-2—Total species sorted in alphabetical order by common name (continued)

Common name	Code	Scientific name
Twinleaf bedstraw	GABI	*Galium bifolium* S. Wats.
Twistedstalk	STREP3	*Streptopus* Michx.
Umber pussytoes	ANUM	*Antennaria umbrinella* Rydb.
Varileaf cinquefoil	PODI2	*Potentilla diversifolia* Lehm.
Veiny meadow-rue	THVE	*Thalictrum venulosum* Trel.
Velvet lupine	LULE3	*Lupinus leucophyllus* Dougl. ex Lindl.
Vetch	VICIA	*Vicia* L.
Violet	VIOLA	*Viola* L.
Virginia strawberry	FRVI	*Fragaria virginiana* Duchesne
Water speedwell	VEAN2	*Veronica anagallis-aquatica* L.
Watercress	RONA2	*Rorippa nasturtium-aquaticum* (L.) Hayek
Waterleaf	HYDRO4	*Hydrophyllum* L.
Water-starwort	CALLI6	*Callitriche* L.
Watson's willowherb	EPWA3	*Epilobium watsonii* Barbey
Wavyleaf thistle	CIUN	*Cirsium undulatum* (Nutt.) Spreng.
Western buttercup	RAOC	*Ranunculus occidentalis* Nutt.
Western columbine	AQFO	*Aquilegia formosa* Fisch. ex DC.
Western coneflower	RUOC2	*Rudbeckia occidentalis* Nutt.
Western dock	RUOC3	*Rumex occidentalis* S. Wats.
Western featherbells	STOC	*Stenanthium occidentale* Gray
Western meadow-rue	THOC	*Thalictrum occidentale* Gray
Western mountain aster	ASOC	*Aster occidentalis* (Nutt.) Torr. & Gray
Western pearly everlasting	ANMA	*Anaphalis margaritacea* (L.) Benth.
Western polemonium	POOC2	*Polemonium occidentale* Greene
Western rattlesnake plantain	GOOB2	*Goodyera oblongifolia* Raf.
Western sweetcicely	OSOC	*Osmorhiza occidentalis* (Nutt. ex Torr. & Gray) Torr.
Western water hemlock	CIDO	*Cicuta douglasii* (DC.) Coult. & Rose
Western waterleaf	HYOC	*Hydrophyllum occidentale* (S. Wats.) Gray
White brodiaea	BRHY2	*Brodiaea hyacinthina* (Lindl.) Baker
White clover	TRRE3	*Trifolium repens* L.
White hawkweed	HIAL2	*Hieracium albiflorum* Hook.
White marsh marigold	CALE4	*Caltha leptosepala* DC.
White sagebrush	ARLU	*Artemisia ludoviciana* Nutt.
Wholeleaf saxifrage	SAIN4	*Saxifraga integrifolia* Hook.
Wild mint	MEAR4	*Mentha arvensis* L.
Willow dock	RUSA	*Rumex salicifolius* Weinm.
Willowherb	EPILO	*Epilobium* L.
Wintergreen	PYROL	*Pyrola* L.
Woodland buttercup	RAUN	*Ranunculus uncinatus* D. Don ex G. Don
Woodland pinedrops	PTAN2	*Pterospora andromedea* Nutt.
Woodland strawberry	FRVE	*Fragaria vesca* L.
Woollyhead parsnip	SPCA5	*Sphenosciadium capitellatum* Gray
Wormleaf stonecrop	SEST2	*Sedum stenopetalum* Pursh
Yellow avalanche-lily	ERGR9	*Erythronium grandiflorum* Pursh
Yellow avens	GEAL3	*Geum aleppicum* Jacq.
Yellow columbine	AQFL	*Aquilegia flavescens* S. Wats.
Yellow salsify	TRDU	*Tragopogon dubius* Scop.
Yellow sweetclover	MEAL2	*Melilotus albus* Medik.
Yellow sweetclover	MEOF	*Melilotus officinalis* (L.) Lam.
Yellow Wallowa Indian paintbrush	CACH16	*Castilleja chrysantha* Greenm.
Grasses:		
Alaska oniongrass	MESU	*Melica subulata* (Griseb.) Scribn.
Alpine bentgrass	AGHU	*Agrostis humilis* Vasey
Alpine timothy	PHAL2	*Phleum alpinum* L.
American mannagrass	GLGR	*Glyceria grandis* S. Wats.
Basin wildrye	ELCI2	*Elymus cinereus* Scribn. & Merr.
Bearded fescue	FESU	*Festuca subulata* Trin.
Bearded wheatgrass	AGCA2	*Agropyron caninum* (L.) Beauv.
Beardless wheatgrass	AGIN5	*Agropyron inerme* (Scribn. & J.G. Sm.) Rydb.
Bentgrass	AGROS2	*Agrostis* L.
Blue wildrye	ELGL	*Elymus glaucus* Buckl.
Bluebunch wheatgrass	AGSP	*Agropyron spicatum* (Pursh) Scribn. & J.G. Sm.
Bluegrass	POA	*Poa* L.
Bluejoint reedgrass	CACA4	*Calamagrostis canadensis* (Michx.) Beauv.

Appendix A-2—Total species sorted in alphabetical order by common name (continued)

Common name	Code	Scientific name
Brome	BROMU	*Bromus* L.
Bulbous bluegrass	POBU	*Poa bulbosa* L.
California brome	BRCA5	*Bromus carinatus* Hook. & Arn.
Canada bluegrass	POCO	*Poa compressa* L.
Cheatgrass	BRTE	*Bromus tectorum* L.
Colonial bentgrass	AGTE	*Agrostis tenuis* Sibthorp
Columbia brome	BRVU	*Bromus vulgaris* (Hook.) Shear
Creeping bentgrass	AGST2	*Agrostis stolonifera* L.
Cusick's bluegrass	POCU3	*Poa cusickii* Vasey
Drooping woodreed	CILA2	*Cinna latifolia* (Trev. ex Goepp.) Griseb.
Fescue	FESTU	*Festuca* L.
Fowl bluegrass	POPA2	*Poa palustris* L.
Fowl mannagrass	GLST	*Glyceria striata* (Lam.) A.S. Hitchc.
Foxtail muhly	MUAN	*Muhlenbergia andina* (Nutt.) A.S. Hitchc.
Fringed brome	BRCI2	*Bromus ciliatus* L.
Grass family	POACF	Poaceae
Greenleaf fescue	FEVI	*Festuca viridula* Vasey
Idaho fescue	FEID	*Festuca idahoensis* Elmer
Japanese brome	BRJA	*Bromus japonicus* Thunb. ex Murr.
Kentucky bluegrass	POPR	*Poa pratensis* L.
Mannagrass	GLYCE	*Glyceria* R. Br.
Marsh bluegrass	POLE2	*Poa leptocoma* Trin.
Meadow foxtail	ALPR3	*Alopecurus pratensis* L.
Meadow ryegrass	FEPR	*Festuca pratensis* Huds.
Mountain bentgrass	AGVA	*Agrostis variabilis* Rydb.
Needlegrass	STIPA	*Stipa* L.
Nodding brome	BRAN	*Bromus anomalus* Rupr. ex Fourn.
Orchardgrass	DAGL	*Dactylis glomerata* L.
Orcutt's brome	BROR2	*Bromus orcuttianus* Vasey
Pacific brome	BRPA3	*Bromus pacificus* Shear
Pine bluegrass	POSC	*Poa scabrella* (Thurb.) Benth. ex Vasey
Pinegrass	CARU	*Calamagrostis rubescens* Buckl.
Poverty brome	BRST2	*Bromus sterilis* L.
Prairie Junegrass	KOCR	*Koeleria cristata* auct. p.p. non Pers.
Purple oniongrass	MESP	*Melica spectabilis* Scribn.
Purple reedgrass	CAPU	*Calamagrostis purpurascens* R. Br.
Quackgrass	AGRE2	*Agropyron repens* (L.) Beauv.
Rattlesnake brome	BRBR5	*Bromus briziformis* Fisch. & C.A. Mey.
Redtop	AGAL3	*Agrostis alba* auct. non L.
Reed canarygrass	PHAR3	*Phalaris arundinacea* L.
Reedgrass	CALAM	*Calamagrostis* Adans.
Ripgut brome	BRRI8	*Bromus rigidus* Roth
Rough bentgrass	AGSC5	*Agrostis scabra* Willd.
Rough bluegrass	POTR2	*Poa trivialis* L.
Rye brome	BRSE	*Bromus secalinus* L.
Saltgrass	DISP	*Distichlis spicata* (L.) Greene
Sandberg's bluegrass	POSA12	*Poa sandbergii*
Shortawn foxtail	ALAE	*Alopecurus aequalis* Sobol.
Slender hairgrass	DEEL	*Deschampsia elongata* (Hook.) Munro
Slender muhly	MUFI2	*Muhlenbergia filiformis* (Thurb. ex S. Wats.) Rydb.
Smith's melicgrass	MESM	*Melica smithii* (Porter ex Gray) Vasey
Spike bentgrass	AGEX	*Agrostis exarata* Trin.
Spike trisetum	TRSP2	*Trisetum spicatum* (L.) Richter
Suksdorf's brome	BRSU2	*Bromus suksdorfii* Vasey
Sweet vernalgrass	ANOD	*Anthoxanthum odoratum* L.
Tall fescue	FEAR3	*Festuca arundinacea* Schreb.
Tall mannagrass	GLEL	*Glyceria elata* (Nash ex Rydb.) M.E. Jones
Tall oatgrass	AREL3	*Arrhenatherum elatius* (L.) Beauv. ex J.& K. Presl
Tall trisetum	TRCA21	*Trisetum canescens* Buckl.
Tall trisetum	TRCE2	*Trisetum cernuum* Trin.
Thin bentgrass	AGDI	*Agrostis diegoensis* Vasey
Thurber's bentgrass	AGTH2	*Agrostis thurberiana* A.S. Hitchc.
Timber oatgrass	DAIN	*Danthonia intermedia* Vasey
Timothy	PHPR3	*Phleum pratense* L.

Appendix A-2—Total species sorted in alphabetical order by common name (continued)

Common name	Code	Scientific name
Tufted hairgrass	DECE	*Deschampsia cespitosa* (L.) Beauv. [orthographic variant]
Water whorlgrass	CAAQ3	*Catabrosa aquatica* (L.) Beauv.
Weak alkaligrass	PUPA3	*Puccinellia pauciflora* (J. Presl) Munz
Western fescue	FEOC	*Festuca occidentalis* Hook.
Western needlegrass	STOC2	*Stipa occidentalis* Thurb. ex S. Wats.
Wheatgrass	AGROP2	*Agropyron* Gaertn.
Wheeler bluegrass	PONE2	*Poa nervosa* (Hook.) Vasey
Wolf's trisetum	TRWO3	*Trisetum wolfii* Vasey
Grasslikes:		
Abruptbeak sedge	CAAB2	*Carex abrupta* Mackenzie
Aquatic sedge	CAAQ	*Carex aquatilis* Wahlenb.
Back's sedge	CABA3	*Carex backii* Boott
Baltic rush	JUBA	*Juncus balticus* Willd.
Beaked sedge	CARO6	*Carex rostrata* Stokes
Big-leaved sedge	CAAM10	*Carex amplifolia* Boott
Black alpine sedge	CANI2	*Carex nigricans* C.A. Mey.
Bladder sedge	CAUT	*Carex utriculata* Boott
Brown sedge	CASU6	*Carex subfusca* W. Boott
Bulrush	SCIRP	*Scirpus* L.
Chamisso sedge	CAPA14	*Carex pachystachya* Cham. ex Steud.
Clustered field sedge	CAPR5	*Carex praegracilis* W. Boott
Colorado rush	JUCO2	*Juncus confusus* Coville
Common rush	JUEF	*Juncus effusus* L.
Creeping spikerush	ELPA3	*Eleocharis palustris* (L.) Roemer & J.A. Schultes
Cusick's sedge	CACU5	*Carex cusickii* Mackenzie ex Piper & Beattie
Delicate spikerush	ELBE	*Eleocharis bella* (Piper) Svens.
Densely-tufted sedge	CALEL	*Carex lenticularis* Michx. var. *lenticularis*
Dewey sedge	CADE9	*Carex deweyana* Schwein.
Drummond's rush	JUDR	*Juncus drummondii* E. Mey.
Early sedge	CAPR4	*Carex praeceptorium* Mackenzie
Elk sedge	CAGE2	*Carex geyeri* Boott
Few-flowered spikerush	ELPA6	*Eleocharis pauciflora* (Lightf.) Link
Field woodrush	LUCA2	*Luzula campestris* (L.) DC.
Golden sedge	CAAU3	*Carex aurea* Nutt.
Hairlike sedge	CACA12	*Carex capillaris* L.
Henderson's sedge	CAHE7	*Carex hendersonii* Bailey
Hitchcock's smooth woodrush	LUHI4	*Luzula hitchcockii* Hämet-Ahti
Holm's Rocky Mountain sedge	CASC12	*Carex scopulorum* Holm
Hood's sedge	CAHO5	*Carex hoodii* Boott
Inflated sedge	CAVE6	*Carex vesicaria* L.
Jones' sedge	CAJO	*Carex jonesii* Bailey
Lakeshore sedge	CALE8	*Carex lenticularis* Michx.
Meadow sedge	CAPR7	*Carex praticola* Rydb.
Mertens' rush	JUME3	*Juncus mertensianus* Bong.
Mud sedge	CALI7	*Carex limosa* L.
Nearlyblack sedge	CASU7	*Carex subnigricans* Stacey
Nebraska sedge	CANE2	*Carex nebrascensis* Dewey
Northern cluster sedge	CAAR2	*Carex arcta* Boott
Northern singlespike sedge	CASC10	*Carex scirpoidea* Michx.
Northwestern sedge	CACO11	*Carex concinnoides* Mackenzie
Parry's rush	JUPA	*Juncus parryi* Engelm.
Parry's sedge	CAPA18	*Carex parryana* Dewey
Raynolds' sedge	CARA6	*Carex raynoldsii* Dewey
Rock sedge	CASA10	*Carex saxatilis* L.
Ross' sedge	CARO5	*Carex rossii* Boott
Rush	JUNCU	*Juncus* L.
Saw-beak sedge	CAST5	*Carex stipata* Muhl. ex Willd.
Saw-leaved sedge	CASCP	*Carex scopulorum* Holm var. *prionophylla* (Holm) L.A. Standley
Sedge	CAREX	*Carex* L.
Sheep sedge	CAIL	*Carex illota* Bailey
Sheldon's sedge	CASH	*Carex sheldonii* Mackenzie
Short-beaked sedge	CASI2	*Carex simulata* Mackenzie
Showy sedge	CASP5	*Carex spectabilis* Dewey
Sierra hare sedge	CALE9	*Carex leporinella* Mackenzie

Appendix A-2—Total species sorted in alphabetical order by common name (continued)

Common name	Code	Scientific name
Silvery sedge	CACA11	*Carex canescens* L.
Simple bog sedge	KOSI2	*Kobresia simpliciuscula* (Wahlenb.) Mackenzie
Slender sedge	CALA11	*Carex lasiocarpa* Ehrh.
Slenderbeak sedge	CAAT3	*Carex athrostachya* Olney
Smallflowered woodrush	LUPA4	*Luzula parviflora* (Ehrh.) Desv.
Small-fruit bulrush	SCMI2	*Scirpus microcarpus* J.& K. Presl
Smallwing sedge	CAMI7	*Carex microptera* Mackenzie
Smooth-stemmed sedge	CALA13	*Carex laeviculmis* Meinsh.
Soft-leaved sedge	CADI6	*Carex disperma* Dewey
Spikerush	ELEOC	*Eleocharis* R. Br.
Star sedge	CAMU7	*Carex muricata* L.
Swordleaf rush	JUEN	*Juncus ensifolius* Wikstr.
Thread rush	JUFI	*Juncus filiformis* L.
Torrent sedge	CANU5	*Carex nudata* W. Boott
Tuftedstem rush	JUBR3	*Juncus brachyphyllus* Wieg.
Twotipped sedge	CABI10	*Carex bipartita* All.
Widefruit sedge	CAEU2	*Carex eurycarpa* Holm
Woodrush	LUZUL	*Luzula* DC.
Woodrush sedge	CALU7	*Carex luzulina* Olney
Woolgrass	SCCY	*Scirpus cyperinus* (L.) Kunth
Woolly sedge	CALA30	*Carex lanuginosa* auct. non Michx.
Ferns and horsetails**:**		
Brittle bladderfern	CYFR2	*Cystopteris fragilis* (L.) Bernh.
Common horsetail	EQAR	*Equisetum arvense* L.
Horsetail	EQUIS	*Equisetum* L.
Ladyfern	ATFI	*Athyrium filix-femina* (L.) Roth
Maidenhair	ADPE	*Adiantum pedatum* L.
Male fern	DRFI2	*Dryopteris filix-mas* (L.) Schott
Marsh horsetail	EQPA	*Equisetum palustre* L.
Mountain woodfern	DRAU8	*Dryopteris austriaca* (Jacq.) Woynar ex Schinz & Thellung
Oakfern	GYDR	*Gymnocarpium dryopteris* (L.) Newman
Oregon cliff fern	WOOR	*Woodsia oregana* D.C. Eat.
Rattlesnake fern	BOVI	*Botrychium virginianum* (L.) Sw.
Scouringrush horsetail	EQHY	*Equisetum hyemale* L.
Smooth horsetail	EQLA	*Equisetum laevigatum* A. Braun
Variegated scouringrush	EQVA	*Equisetum variegatum* Schleich. ex F. Weber & D.M.H. Mohr
Western brackenfern	PTAQ	*Pteridium aquilinum* (L.) Kuhn
Western swordfern	POMU	*Polystichum munitum* (Kaulfuss) K. Presl
Mosses:		
Spagnum moss	SPHAG2	*Sphagnum* L.

Appendix B: Complete Constancy and Average Cover of All Species Present (style adopted from Hansen et al. 1995)

Constancy (CON) refers to the percentage of sample stands in which each species occurs.

Average cover (COV) refers to the the average percentage canopy cover of a species for the sample stands where it was recorded. For example, a vegetation type may be composed of 12 sample stands, but a particular species may be present in only 5 of those stands. The average cover for that species is calculated as the average canopy cover in those five stands.

Life form (LF) codes: PO = primary overstory tree, SO = subordinate overstory tree, U = understory tree, S = shrub, F = forb, G = grass, GL = grasslike, FH = ferns and horsetails.

Appendix B-1—Constancy and average cover of all species present in the following types:

- Subalpine Fir-Engelmann Spruce/Labrador Tea-Floodplain Plant Association (ABLA/LE)
- Subalpine Fir-Engelmann Spruce/Rusty Menziesia-Floodplain Plant Association (ABLA/ME)
- Subalpine Fir/Big Huckleberry-Floodplain Plant Association (ABLA/VA)
- Engelmann Spruce-Subalpine Fir/Holm's Rocky Mountain Sedge Plant Association (PIEN/CA)
- Engelmann Spruce-Subalpine Fir/Arrowleaf Groundsel Plant Association (PIEN/SE)
- Grand Fir/Pacific Yew/Twinflower-Floodplain Plant Association (ABGR/TA)
- Grand Fir/Black Hawthorn/Dewey Sedge Plant Association (ABGR/CR)
- Grand Fir/Rocky Mountain Maple-Floodplain Plant Association (ABGR/AC)
- Douglas-Fir/Rocky Mountain Maple–Mallow Ninebark–Floodplain Plant Association (PSME/AC)
- Douglas-Fir/Common Snowberry-Floodplain Plant Association (PSME/SY)
- Ponderosa Pine/Common Snowberry-Floodplain Plant Association (PIPO/SY).

Type		ABLA/LE		ABLA/ME		ABLA/VA		PIEN/CA		PIEN/SE		ABGR/TA		ABGR/CR		ABGR/AC		PSME/AC		PSME/SY		PIPO/SY	
N		7		3		3		6		9		5		5		12		23		4		6	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
ABGR	PO	—	—	—	—	—	—	—	—	—	—	100	54	20	75	75	35	4	7	—	—	—	—
ABLA	PO	85	14	100	20	100	24	16	10	77	24	—	—	—	—	—	—	—	—	—	—	—	—
ALRH2	PO	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	10	—	—	—	—
ALRU2	PO	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	7	—	—	—	—	—	—
LAOC	PO	—	—	—	—	33	20	—	—	—	—	—	—	—	—	—	—	4	5	—	—	—	—
PIAL	PO	14	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PICO	PO	—	—	66	12	—	—	33	3	22	6	—	—	—	—	—	—	—	—	—	—	—	—
PIEN	PO	100	10	100	27	100	42	83	29	55	18	—	—	—	—	—	—	—	—	—	—	—	—
PIPO	PO	—	—	—	—	—	—	—	—	—	—	—	—	20	5	16	6	22	18	—	—	100	60
POTR15	PO	—	—	—	—	—	—	—	—	—	—	—	—	40	60	33	12	4	5	—	—	—	—
PSME	PO	—	—	—	—	—	—	—	—	—	—	20	15	20	40	50	21	83	42	100	56	—	—
ABGR	SO	—	—	—	—	—	—	—	—	—	—	40	13	60	23	33	10	—	—	—	—	—	—
ABLA	SO	71	10	33	5	33	5	16	3	55	5	—	—	—	—	—	—	—	—	—	—	—	—
ALRH2	SO	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	2	—	—	—	—	—	—
ALRU2	SO	—	—	—	—	—	—	—	—	—	—	20	5	—	—	8	5	—	—	—	—	—	—
BEPAS	SO	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	10	—	—	—	—	—	—
PIAL	SO	14	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PICO	SO	—	—	—	—	—	—	50	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PIEN	SO	28	4	—	—	33	20	50	10	55	4	—	—	—	—	—	—	—	—	—	—	—	—
PIPO	SO	—	—	—	—	—	—	—	—	—	—	—	—	20	4	16	2	22	7	—	—	16	15
POTR15	SO	—	—	—	—	—	—	—	—	—	—	—	—	20	5	8	1	—	—	—	—	—	—
PSME	SO	—	—	—	—	—	—	—	—	—	—	20	5	20	1	16	7	43	8	50	45	—	—
TABR2	SO	—	—	—	—	—	—	—	—	—	—	100	24	—	—	—	—	—	—	—	—	—	—
ABGR	U	—	—	—	—	—	—	—	—	—	—	100	13	80	5	91	10	9	2	—	—	16	1
ABLA	U	100	18	100	5	100	30	83	6	77	9	—	—	—	—	—	—	—	—	—	—	—	—
ALRU2	U	—	—	—	—	—	—	—	—	—	—	20	4	—	—	—	—	—	—	—	—	—	—
BEPAS	U	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	10	—	—	—	—	—	—

Appendix B-1—Constancy and average cover of all species present in the following types (continued)

Type		ABLA/LE		ABLA/ME		ABLA/VA		PIEN/CA		PIEN/SE		ABGR/TA		ABGR/CR		ABGR/AC		PSME/AC		PSME/SY		PIPO/SY	
N		7		3		3		6		9		5		5		12		23		4		6	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
BEPAS	U	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	10	—	—	—	—	—	—
JUOC	U	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	1	—	—	—	—
PIAL	U	28	2	—	—	—	—	16	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PICO	U	—	—	—	—	—	—	50	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PIEN	U	42	3	100	33	100	48	66	4	77	7	40	10	—	—	8	2	—	—	—	—	—	—
PIPO	U	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	2	13	2	—	—	—	—
POTR15	U	—	—	—	—	—	—	—	—	—	—	—	—	20	1	8	1	4	5	—	—	—	—
PSME	U	—	—	—	—	—	—	—	—	—	—	—	—	20	1	16	1	35	3	75	15	16	1
TSME	U	—	—	—	—	33	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ACGL	S	—	—	—	—	—	—	—	—	—	—	100	6	20	5	91	22	91	10	—	—	16	3
ALIN2	S	—	—	—	—	—	—	—	—	—	—	—	—	20	15	—	—	9	3	—	—	16	2
ALSI3	S	14	1	—	—	—	—	—	—	—	—	20	4	—	—	—	—	—	—	—	—	—	—
AMAL2	S	—	—	—	—	—	—	—	—	—	—	80	3	80	6	91	5	83	11	50	2	66	25
ARUV	S	—	—	—	—	—	—	16	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
BEAQ	S	—	—	—	—	—	—	—	—	—	—	40	38	—	—	8	5	—	—	—	—	—	—
BEOC2	S	—	—	—	—	—	—	—	—	—	—	20	3	—	—	16	9	43	24	—	—	—	—
BERE	S	—	—	—	—	—	—	—	—	—	—	20	1	20	2	25	1	22	2	75	2	33	43
BETUL	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	1	—	—	—	—	—	—
CHME	S	—	—	—	—	—	—	—	—	11	1	—	—	—	—	—	—	—	—	—	—	—	—
CHUM	S	—	—	—	—	33	3	—	—	—	—	20	2	—	—	—	—	—	—	—	—	—	—
CLCO2	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	5	4	3	—	—	—	—
CLLI2	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	1	—	—	—	—
COST4	S	—	—	—	—	—	—	—	—	—	—	20	3	40	7	41	7	26	8	—	—	16	95
CRDO2	S	—	—	—	—	—	—	—	—	—	—	20	2	100	41	50	4	52	10	—	—	66	29
GAHU	S	42	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
HODI	S	—	—	—	—	—	—	—	—	—	—	60	5	20	1	75	12	83	15	75	18	50	45
KAMI	S	14	1	—	—	—	—	16	1	11	5	—	—	—	—	—	—	—	—	—	—	—	—
KAOC	S	—	—	—	—	—	—	16	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—
LEGL	S	100	55	33	10	33	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
LIBO3	S	—	—	—	—	—	—	—	—	11	1	100	14	—	—	—	—	—	—	—	—	—	—
LOCI3	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	8	4	1	—	—	—	—
LOIN5	S	28	1	—	—	100	5	—	—	55	5	20	1	—	—	—	—	—	—	—	—	—	—
LOUT2	S	14	3	66	4	66	5	—	—	22	1	40	3	—	—	8	2	—	—	—	—	—	—
MEFE	S	14	4	100	73	—	—	—	—	11	1	—	—	—	—	—	—	—	—	—	—	—	—
PAMY	S	—	—	—	—	—	—	—	—	11	1	40	3	—	—	8	3	—	—	—	—	—	—
PHCA11	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	30	—	—	—	—	—	—
PHEM	S	85	7	33	10	—	—	33	6	11	1	—	—	—	—	—	—	—	—	—	—	—	—
PHLE4	S	—	—	—	—	—	—	—	—	—	—	40	4	60	26	83	12	83	13	25	5	50	7
PHMA5	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	6	57	20	—	—	33	11
PRVI	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	1	22	2	—	—	16	5
RHPU	S	—	—	—	—	—	—	—	—	—	—	80	12	20	1	58	10	61	4	—	—	16	15
RHRA6	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16	6	4	1	—	—	—	—
RIBES	S	—	—	—	—	—	—	—	—	—	—	40	2	20	2	—	—	17	2	—	—	—	—
RICE	S	—	—	—	—	—	—	—	—	11	15	—	—	—	—	—	—	4	10	—	—	16	5

Appendix B-1—Constancy and average cover of all species present in the following types (continued)

Type		ABLA/LE		ABLA/ME		ABLA/VA		PIEN/CA		PIEN/SE		ABGR/TA		ABGR/CR		ABGR/AC		PSME/AC		PSME/SY		PIPO/SY	
N		7		3		3		6		9		5		5		12		23		4		6	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
RICO	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	10	4	3	—	—	—	—
RIHU	S	14	5	—	—	33	3	—	—	11	20	—	—	—	—	8	1	—	—	—	—	—	—
RIIR	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16	2	17	4	—	—	—	—
RILA	S	—	—	—	—	100	9	16	1	55	10	80	4	40	2	33	5	17	4	—	—	—	—
RIMO2	S	—	—	—	—	—	—	—	—	11	3	—	—	—	—	8	10	17	7	—	—	—	—
RINI2	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	1	—	—	—	—
ROGY	S	14	1	—	—	—	—	—	—	—	—	60	4	40	6	33	4	17	7	25	1	16	10
RONU	S	—	—	—	—	—	—	—	—	—	—	—	—	20	3	16	3	17	3	25	5	—	—
ROSA5	S	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	13	6	25	10	33	2
ROWO	S	—	—	—	—	—	—	—	—	—	—	40	20	—	—	16	13	26	7	—	—	16	10
RUID	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	1	4	1	—	—	—	—
RULE	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9	6	—	—	16	3
RUPA	S	—	—	—	—	33	10	—	—	—	—	40	23	60	13	58	4	48	15	—	—	16	2
SACE3	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16	5	13	7	—	—	16	10
SACO2	S	28	6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SAEX	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16	1
SAFA	S	—	—	—	—	—	—	—	—	11	1	—	—	—	—	—	—	—	—	—	—	—	—
SALA5	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16	5
SALIX	S	—	—	—	—	—	—	33	1	11	1	—	—	—	—	—	—	—	—	—	—	—	—
SAMBU	S	—	—	—	—	—	—	—	—	22	6	—	—	—	—	—	—	—	—	—	—	—	—
SHCA	S	—	—	—	—	—	—	—	—	11	1	—	—	—	—	—	—	—	—	—	—	—	—
SOAU	S	—	—	—	—	—	—	—	—	—	—	20	5	—	—	8	3	—	—	—	—	—	—
SOSC2	S	—	—	—	—	33	5	—	—	—	—	20	2	20	25	—	—	—	—	—	—	—	—
SPBE2	S	—	—	—	—	33	10	—	—	—	—	—	—	—	—	25	1	57	21	75	17	66	15
SPIRA	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	5	—	—
SYAL	S	—	—	—	—	—	—	—	—	—	—	60	38	100	33	100	41	87	33	100	63	100	28
SYOR2	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16	25
VACA13	S	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VACCI	S	—	—	—	—	—	—	—	—	11	3	—	—	—	—	—	—	—	—	—	—	—	—
VAME	S	14	2	—	—	100	33	16	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VASC	S	85	13	100	30	33	1	50	3	66	10	—	—	—	—	—	—	—	—	—	—	—	—
VAUL	S	—	—	66	15	66	13	33	30	11	1	—	—	—	—	—	—	—	—	—	—	—	—
ACCO4	F	28	1	—	—	33	5	16	15	77	9	—	—	—	—	8	1	—	—	—	—	—	—
ACMI2	F	14	1	—	—	33	3	33	3	33	2	—	—	20	1	16	3	22	2	75	1	33	4
ACRU2	F	—	—	—	—	—	—	—	—	22	1	20	1	20	1	8	3	9	2	—	—	—	—
ADBI	F	—	—	—	—	—	—	—	—	—	—	80	6	60	1	66	2	26	2	25	5	—	—
AGUR	F	—	—	—	—	—	—	—	—	—	—	—	—	20	1	8	1	9	2	—	—	—	—
ALVA	F	28	3	—	—	—	—	50	2	33	38	—	—	—	—	—	—	—	—	—	—	—	—
AMLY	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	3	—	—	—	—
ANAL4	F	14	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ANAR3	F	—	—	—	—	—	—	—	—	11	1	—	—	—	—	16	1	4	1	—	—	—	—
ANEMO	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	1	—	—	—	—	—	—
ANMA	F	—	—	—	—	—	—	16	1	22	3	—	—	—	—	—	—	—	—	—	—	—	—
ANPI	F	—	—	—	—	—	—	—	—	—	—	100	3	20	3	16	1	9	1	—	—	—	—

Appendix B-1—Constancy and average cover of all species present in the following types (continued)

Type		ABLA/LE		ABLA/ME		ABLA/VA		PIEN/CA		PIEN/SE		ABGR/TA		ABGR/CR		ABGR/AC		PSME/AC		PSME/SY		PIPO/SY	
N		7		3		3		6		9		5		5		12		23		4		6	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
ANRA	F	—	—	—	—	—	—	—	—	11	5	—	—	—	—	—	—	—	—	—	—	—	—
ANSC8	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	22	3	—	—	—	—
ANTEN	F	—	—	—	—	33	10	—	—	11	1	—	—	—	—	—	—	—	—	—	—	—	—
ANUM	F	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
APAN2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	1	—	—	—	—
AQFL	F	—	—	—	—	33	10	—	—	11	10	—	—	—	—	—	—	—	—	—	—	—	—
AQFO	F	—	—	—	—	—	—	—	—	22	1	20	5	—	—	—	—	—	—	25	3	—	—
ARAM2	F	—	—	—	—	—	—	—	—	11	1	—	—	—	—	—	—	—	—	—	—	—	—
ARCH3	F	14	1	—	—	—	—	33	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ARCO9	F	14	1	66	3	66	13	—	—	55	3	40	3	20	3	41	5	61	15	100	10	33	8
ARGL	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	1	—	—
ARLA8	F	—	—	—	—	—	—	—	—	11	1	—	—	—	—	—	—	—	—	—	—	—	—
ARLO6	F	—	—	—	—	—	—	—	—	11	1	—	—	—	—	—	—	—	—	—	—	—	—
ARLU	F	—	—	—	—	—	—	—	—	11	10	—	—	—	—	—	—	—	—	—	—	—	—
ARMA18	F	—	—	—	—	33	1	—	—	22	1	40	3	20	3	41	2	4	1	25	1	16	1
ARMI2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	22	1	—	—	—	—
ARMO4	F	14	1	—	—	—	—	16	10	22	2	—	—	—	—	—	—	—	—	—	—	—	—
ARNIC	F	—	—	—	—	—	—	—	—	11	1	—	—	—	—	—	—	—	—	—	—	—	—
ARSE2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16	3
ASAL2	F	—	—	—	—	—	—	—	—	11	15	—	—	—	—	—	—	—	—	—	—	—	—
ASCA11	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16	2
ASCA2	F	—	—	—	—	—	—	—	—	—	—	60	8	20	2	25	6	—	—	—	—	—	—
ASCO3	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16	2	26	4	—	—	—	—
ASEA	F	—	—	—	—	—	—	—	—	—	—	—	—	20	3	8	1	—	—	—	—	—	—
ASFO	F	—	—	—	—	33	3	—	—	44	2	—	—	—	—	—	—	—	—	—	—	—	—
ASMO3	F	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—
ASOC	F	14	3	—	—	33	2	16	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ASTER	F	—	—	—	—	—	—	—	—	22	3	—	—	—	—	—	—	—	—	25	1	—	—
BASA3	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16	1
BRDO	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16	3
BRODI	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16	1
CABI2	F	—	—	—	—	—	—	33	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CABU2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	1	—	—	—	—	—	—
CACH16	F	28	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CACO11	F	—	—	—	—	—	—	—	—	—	—	—	—	20	5	—	—	—	—	—	—	—	—
CARDU	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	3	—	—
CEAR4	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	1	16	3
CEVU	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	3	—	—	—	—
CHLE80	F	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	25	1	—	—
CIAL	F	—	—	—	—	33	1	—	—	—	—	40	21	40	10	58	3	61	15	25	1	—	—
CIAR4	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	3	—	—	—	—	16	1
CIRSI	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	1	4	1	—	—	—	—
CIVU	F	—	—	—	—	—	—	—	—	—	—	—	—	40	1	—	—	—	—	—	—	—	—
CLEMA	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	5	—	—	—	—

Appendix B-1—Constancy and average cover of all species present in the following types (continued)

Type		ABLA/LE		ABLA/ME		ABLA/VA		PIEN/CA		PIEN/SE		ABGR/TA		ABGR/CR		ABGR/AC		PSME/AC		PSME/SY		PIPO/SY	
N		7		3		3		6		9		5		5		12		23		4		6	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
CLME	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	1	—	—	—	—
CLUN2	F	14	5	—	—	66	3	—	—	—	—	80	9	—	—	33	2	4	3	—	—	—	—
COCA13	F	—	—	—	—	—	—	—	—	—	—	20	35	—	—	—	—	—	—	—	—	—	—
COMA4	F	—	—	—	—	—	—	—	—	—	—	40	1	—	—	—	—	—	—	—	—	—	—
COPA3	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	1	4	1	—	—	—	—
CRFR2	F	—	—	—	—	—	—	—	—	—	—	20	3	20	1	—	—	—	—	—	—	—	—
CRUCIF	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	1	4	1	—	—	—	—
CYOF	F	—	—	—	—	—	—	—	—	—	—	—	—	20	1	8	1	22	2	—	—	—	—
DELPH	F	—	—	—	—	—	—	—	—	11	5	—	—	—	—	—	—	—	—	—	—	—	—
DICU	F	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	4	10	—	—	—	—
DIHO3	F	—	—	—	—	—	—	—	—	—	—	60	8	—	—	66	7	4	3	—	—	—	—
DISM2	F	—	—	—	—	—	—	—	—	—	—	20	3	—	—	—	—	—	—	—	—	—	—
DISPO	F	—	—	—	—	—	—	16	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
DISY	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	1	4	1	—	—	—	—
DITR2	F	—	—	—	—	—	—	—	—	—	—	20	1	40	4	—	—	22	2	—	—	16	1
DOAL	F	14	2	—	—	—	—	83	1	11	1	—	—	—	—	—	—	—	—	—	—	—	—
DOJE	F	28	18	—	—	—	—	50	1	22	10	—	—	—	—	—	—	—	—	—	—	—	—
EPAL	F	—	—	—	—	—	—	50	9	33	1	—	—	—	—	—	—	—	—	—	—	—	—
EPAN2	F	28	1	66	1	100	2	16	1	44	3	—	—	—	—	—	—	13	4	25	10	33	8
EPGI	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	1	—	—	—	—	—	—
EPGL	F	—	—	—	—	—	—	—	—	11	1	—	—	—	—	—	—	—	—	—	—	—	—
EPGL4	F	—	—	—	—	33	1	—	—	11	3	—	—	20	1	—	—	—	—	—	—	—	—
EPILO	F	—	—	—	—	—	—	16	1	22	3	—	—	—	—	—	—	—	—	—	—	—	—
ERCO6	F	—	—	—	—	33	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ERGR9	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	17	7	25	5	16	10
ERPE3	F	57	2	33	1	—	—	33	8	66	6	—	—	—	—	—	—	—	—	—	—	—	—
ERSP4	F	—	—	—	—	—	—	16	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
FRVE	F	—	—	—	—	66	6	—	—	—	—	60	3	20	1	25	2	35	3	50	18	33	3
FRVI	F	14	1	—	—	—	—	—	—	33	5	—	—	—	—	—	—	4	10	—	—	—	—
GAAP2	F	—	—	—	—	—	—	—	—	11	3	20	3	—	—	41	6	74	9	100	5	50	11
GABI	F	—	—	—	—	33	1	16	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
GABO2	F	—	—	—	—	—	—	16	1	11	1	—	—	—	—	—	—	—	—	—	—	—	—
GALIU	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9	6	—	—	33	2
GATR2	F	—	—	—	—	—	—	—	—	—	—	60	4	100	3	33	2	26	7	25	1	—	—
GATR3	F	—	—	—	—	33	10	—	—	22	1	—	—	—	—	—	—	—	—	25	3	—	—
GECA	F	85	4	33	1	—	—	33	2	22	2	—	—	—	—	—	—	—	—	—	—	—	—
GEMA4	F	14	1	—	—	33	1	16	1	11	1	20	1	—	—	16	4	9	1	—	—	—	—
GEPU2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16	5
GEVI2	F	—	—	—	—	—	—	—	—	11	1	—	—	—	—	—	—	—	—	—	—	—	—
GOOB2	F	—	—	—	—	33	5	—	—	—	—	40	2	20	1	16	3	13	2	—	—	—	—
HABEN	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	1	—	—	—	—	—	—
HACKE	F	—	—	—	—	33	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
HADI7	F	14	1	—	—	—	—	—	—	22	2	—	—	20	1	—	—	—	—	—	—	—	—
HASA	F	28	1	—	—	33	1	—	—	—	—	—	—	—	—	8	1	—	—	—	—	—	—

Appendix B-1—Constancy and average cover of all species present in the following types (continued)

Type		ABLA/LE		ABLA/ME		ABLA/VA		PIEN/CA		PIEN/SE		ABGR/TA		ABGR/CR		ABGR/AC		PSME/AC		PSME/SY		PIPO/SY	
N		7		3		3		6		9		5		5		12		23		4		6	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
HAUN	F	—	—	—	—	—	—	16	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—
HELA4	F	—	—	—	—	—	—	—	—	44	8	—	—	20	1	33	3	13	4	—	—	—	—
HEUCH	F	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	4	1	—	—	—	—
HIAL2	F	—	—	—	—	33	10	—	—	—	—	—	—	—	—	8	1	9	1	—	—	—	—
HIERA	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16	2	17	3	25	1	33	3
HYAN2	F	—	—	—	—	33	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
HYCA4	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	1	—	—	—	—
HYFE	F	—	—	—	—	—	—	—	—	22	1	—	—	—	—	—	—	9	2	—	—	—	—
HYFON	F	14	1	—	—	—	—	16	1	11	1	—	—	—	—	—	—	—	—	—	—	—	—
HYPE	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13	1	—	—	—	—
HYPER	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	1	4	5	—	—	—	—
ILRI	F	—	—	—	—	—	—	—	—	—	—	—	—	20	3	—	—	—	—	25	3	—	—
LABI	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	3	—	—	—	—	—	—
LACTU	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	3	—	—	—	—
LANE3	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	1	—	—	—	—	—	—
LASE	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	3	—	—	—	—
LATHY	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	5	17	5	25	1	33	8
LEGUMF	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	3	—	—
LICA2	F	14	1	—	—	33	1	50	3	33	5	—	—	—	—	—	—	—	—	—	—	—	—
LICO6	F	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
LIGR	F	14	1	—	—	—	—	16	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
LIGUS	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	1	—	—	—	—	—	—
LILIAF	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	1	—	—	—	—	—	—
LIPA5	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	5	—	—
LISTE	F	—	—	—	—	—	—	—	—	22	4	—	—	20	1	—	—	—	—	—	—	—	—
LITE2	F	42	2	—	—	33	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
LODI	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16	1
LUPIN	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	1	—	—	—	—
LUPO2	F	14	1	—	—	100	6	16	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
LYAL	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9	1	—	—	16	3
LYAN2	F	14	1	33	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
LYCO	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	1	—	—	—	—
MEAR4	F	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—
MECI3	F	—	—	—	—	66	8	33	1	55	12	—	—	—	—	—	—	—	—	—	—	—	—
MENTH	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	1	—	—	—	—	—	—
MEOF	F	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—	—	—
MEPA	F	—	—	—	—	—	—	—	—	11	5	—	—	—	—	8	1	—	—	—	—	—	—
MIGR	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9	3	—	—	—	—
MIGU	F	—	—	—	—	—	—	16	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MILE2	F	—	—	—	—	—	—	16	1	33	2	—	—	—	—	—	—	—	—	—	—	—	—
MIMO3	F	—	—	—	—	—	—	16	1	—	—	—	—	20	2	—	—	4	1	—	—	—	—
MINU	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	1	—	—
MIPE	F	14	2	33	1	—	—	83	3	22	20	20	1	—	—	—	—	4	1	—	—	—	—
MIPR	F	—	—	—	—	33	1	16	8	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Appendix B-1—Constancy and average cover of all species present in the following types (continued)

Type		ABLA/LE		ABLA/ME		ABLA/VA		PIEN/CA		PIEN/SE		ABGR/TA		ABGR/CR		ABGR/AC		PSME/AC		PSME/SY		PIPO/SY	
N		7		3		3		6		9		5		5		12		23		4		6	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
MIST3	F	14	1	—	—	33	3	—	—	33	6	—	—	—	—	8	3	4	10	—	—	—	—
MITEL	F	—	—	—	—	—	—	—	—	11	1	—	—	—	—	—	—	—	—	—	—	—	—
MOCO4	F	14	1	33	1	—	—	—	—	33	10	60	6	20	1	33	4	26	3	—	—	—	—
MOPE3	F	—	—	—	—	—	—	—	—	—	—	20	10	20	3	16	2	74	7	100	4	33	12
MOSI2	F	—	—	—	—	—	—	—	—	11	1	—	—	20	1	—	—	4	5	—	—	—	—
MOUN3	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	1	—	—	—	—	—	—
OSCH	F	—	—	—	—	33	5	—	—	22	1	100	7	80	1	66	4	65	5	100	5	33	14
OSMOR	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	4	—	—
OSOC	F	—	—	—	—	—	—	—	—	22	3	—	—	40	3	8	1	9	1	—	—	—	—
PAFI3	F	14	2	—	—	33	10	—	—	66	4	—	—	—	—	—	—	—	—	—	—	—	—
PEGL5	F	28	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PEGR2	F	14	1	—	—	—	—	50	2	11	1	—	—	—	—	—	—	—	—	—	—	—	—
PERA	F	—	—	—	—	66	2	—	—	22	2	—	—	—	—	—	—	—	—	—	—	—	—
POBI6	F	—	—	—	—	—	—	33	1	11	3	—	—	—	—	—	—	—	—	—	—	—	—
POFL3	F	71	17	—	—	33	1	100	6	11	1	—	—	—	—	—	—	—	—	—	—	—	—
POGL9	F	—	—	—	—	—	—	—	—	11	1	—	—	—	—	8	1	4	1	—	—	—	—
POPU3	F	—	—	—	—	33	3	16	1	44	2	—	—	—	—	—	—	—	—	—	—	—	—
PRVU	F	—	—	—	—	—	—	—	—	—	—	—	—	20	1	8	1	—	—	—	—	—	—
PTAN2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	1	—	—	—	—	—	—
PYAS	F	14	15	—	—	33	3	—	—	—	—	20	1	—	—	—	—	—	—	—	—	—	—
PYSE	F	14	10	66	7	100	9	33	1	66	1	20	1	—	—	—	—	—	—	—	—	—	—
RAUN	F	—	—	—	—	33	3	16	1	—	—	20	1	—	—	—	—	13	1	—	—	—	—
RUAC2	F	—	—	—	—	33	1	—	—	—	—	—	—	—	—	—	—	—	—	25	3	—	—
RUCR	F	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—
RUOC2	F	—	—	—	—	—	—	—	—	33	4	—	—	40	2	16	1	—	—	—	—	—	—
SAAM3	F	—	—	—	—	33	10	—	—	11	1	—	—	20	1	—	—	—	—	—	—	—	—
SAAR13	F	14	1	—	—	—	—	16	3	77	7	—	—	—	—	—	—	—	—	—	—	—	—
SASI10	F	—	—	—	—	—	—	66	8	22	4	—	—	—	—	—	—	—	—	—	—	—	—
SECY	F	42	2	—	—	—	—	33	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SEIN2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	1	—	—	—	—
SENEC	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	1	—	—	—	—
SEPS2	F	—	—	—	—	—	—	—	—	22	4	—	—	—	—	—	—	—	—	—	—	—	—
SEST2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	5	—	—
SETR	F	28	3	—	—	—	—	33	13	100	26	—	—	—	—	—	—	—	—	—	—	—	—
SIAL2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	1	—	—	—	—
SIME	F	—	—	—	—	—	—	—	—	11	3	—	—	—	—	—	—	—	—	50	3	—	—
SINO	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13	1	—	—	—	—
SIOR	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	1	—	—	—	—
SMRA	F	—	—	—	—	—	—	—	—	—	—	40	11	40	3	16	3	91	3	50	2	16	3
SMST	F	14	1	—	—	33	1	—	—	—	—	100	19	40	20	91	16	17	4	50	4	16	3
SODU	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	1	—	—	—	—
SOLID	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	5	—	—	16	1
SOSP	F	—	—	—	—	—	—	—	—	11	1	—	—	—	—	—	—	—	—	—	—	—	—
STAM2	F	14	5	—	—	66	3	16	1	44	2	20	1	—	—	16	1	4	3	25	1	—	—

Appendix B-1—Constancy and average cover of all species present in the following types (continued)

Type		ABLA/LE		ABLA/ME		ABLA/VA		PIEN/CA		PIEN/SE		ABGR/TA		ABGR/CR		ABGR/AC		PSME/AC		PSME/SY		PIPO/SY	
N		7		3		3		6		9		5		5		12		23		4		6	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
STCA	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9	3	—	—	—	—
STCR2	F	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—
STELL	F	—	—	—	—	—	—	16	1	11	1	—	—	—	—	—	—	—	—	—	—	—	—
STLO	F	—	—	—	—	—	—	—	—	—	—	20	3	—	—	8	10	—	—	—	—	—	—
STME2	F	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	26	4	—	—	16	10
STOC	F	—	—	—	—	—	—	—	—	22	2	—	—	—	—	—	—	—	—	—	—	—	—
SWPE	F	—	—	—	—	—	—	—	—	22	4	—	—	—	—	—	—	—	—	—	—	—	—
TAOF	F	—	—	—	—	—	—	—	—	22	2	—	—	—	—	8	1	22	2	50	3	33	2
TARAX	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	1	—	—	—	—
THALI2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9	2	25	1	—	—
THOC	F	—	—	—	—	33	1	—	—	55	18	20	1	60	25	33	1	30	4	—	—	—	—
THVE	F	—	—	—	—	66	18	—	—	11	35	—	—	—	—	—	—	—	—	—	—	—	—
TITR	F	14	15	—	—	66	13	—	—	—	—	80	6	—	—	8	5	—	—	—	—	—	—
TOFL	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	3	26	11	25	5	—	—
TRCA	F	—	—	—	—	33	1	16	1	11	3	20	1	40	1	8	1	—	—	—	—	—	—
TRDU	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13	2	—	—	50	3
TRIFO	F	—	—	—	—	—	—	16	2	—	—	20	1	—	—	—	—	4	1	—	—	—	—
TRLA6	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16	2	—	—	—	—	—	—
TRLA8	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	7	—	—	—	—
TRLO	F	—	—	—	—	—	—	—	—	11	2	—	—	—	—	—	—	—	—	—	—	—	—
TROV2	F	—	—	—	—	—	—	—	—	—	—	20	1	—	—	8	1	13	5	—	—	—	—
TRPE3	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	1	—	—	75	2	—	—
TRPR2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	15	16	3
TRRE3	F	—	—	—	—	33	1	—	—	—	—	—	—	—	—	8	1	—	—	—	—	—	—
TRWO	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16	1
UMBELF	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	1	—	—	—	—	—	—
URDI	F	—	—	—	—	—	—	—	—	11	1	—	—	—	—	33	2	13	2	—	—	—	—
VASI	F	—	—	—	—	33	25	—	—	44	4	—	—	—	—	—	—	4	1	—	—	—	—
VEAM2	F	—	—	—	—	33	1	16	1	—	—	—	—	—	—	—	—	4	1	—	—	—	—
VECU	F	—	—	—	—	—	—	16	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VERAT	F	14	2	—	—	—	—	16	1	11	1	—	—	—	—	—	—	—	—	—	—	—	—
VERON	F	—	—	—	—	—	—	16	1	—	—	—	—	—	—	—	—	—	—	25	3	—	—
VESE	F	14	1	—	—	—	—	16	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VETH	F	—	—	—	—	—	—	—	—	—	—	—	—	20	1	8	1	9	1	—	—	—	—
VEVI	F	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VEWO2	F	28	1	—	—	—	—	16	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VIAD	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	1	—	—	—	—	—	—
VIAM	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	35	4	25	1	33	13
VICA4	F	—	—	—	—	—	—	—	—	—	—	60	5	20	15	25	5	39	6	—	—	—	—
VIGL	F	—	—	—	—	—	—	—	—	—	—	40	6	40	1	33	2	4	1	—	—	—	—
VIOLA	F	42	2	33	3	66	10	50	4	44	1	20	1	40	3	41	6	26	2	25	1	—	—
VIOR	F	—	—	—	—	—	—	—	—	11	3	—	—	—	—	—	—	—	—	—	—	—	—
VIPA4	F	14	3	—	—	—	—	16	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
XETE	F	14	15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Appendix B-1—Constancy and average cover of all species present in the following types (continued)

Type		ABLA/LE		ABLA/ME		ABLA/VA		PIEN/CA		PIEN/SE		ABGR/TA		ABGR/CR		ABGR/AC		PSME/AC		PSME/SY		PIPO/SY	
N		7		3		3		6		9		5		5		12		23		4		6	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
OV																							
ZIEL2	F	—	—	—	—	—	—	—	—	11	1	—	—	—	—	—	—	—	—	—	—	—	—
AGEX	G	—	—	—	—	—	—	—	—	—	—	—	—	20	1	8	1	—	—	—	—	—	—
AGHU	G	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
AGROS2	G	—	—	—	—	—	—	33	2	11	1	—	—	—	—	—	—	—	—	—	—	—	—
AGSC5	G	—	—	—	—	—	—	16	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
AGSP	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16	3
ANOD	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16	10
AREL3	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	1	4	1	50	2	—	—
BRAN	G	—	—	—	—	—	—	—	—	11	3	—	—	—	—	—	—	—	—	—	—	—	—
BRBR5	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16	1
BRCA5	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	3	—	—	—	—
BRCI2	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	3	—	—	—	—	—	—
BROMU	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	3	—	—	—	—
BROR2	G	—	—	—	—	—	—	—	—	—	—	40	9	20	3	—	—	4	10	—	—	16	3
BRPA3	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	2	—	—	—	—	—	—
BRRI8	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	5	—	—	—	—
BRTE	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13	2	—	—	—	—
BRVU	G	14	1	—	—	33	25	—	—	22	4	60	9	20	5	41	3	30	4	25	5	16	5
CAAQ3	G	—	—	—	—	—	—	16	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CACA4	G	28	30	—	—	66	7	16	1	11	1	—	—	—	—	—	—	—	—	—	—	—	—
CAPU	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16	3
CARU	G	—	—	—	—	33	5	—	—	—	—	—	—	—	—	—	—	9	9	50	14	—	—
CILA2	G	—	—	—	—	—	—	—	—	22	3	—	—	—	—	—	—	4	1	—	—	16	5
DAGL	G	—	—	—	—	—	—	16	1	—	—	20	1	20	15	16	1	13	3	50	3	33	3
DAIN	G	28	2	—	—	33	1	16	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
DECE	G	28	1	—	—	—	—	66	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
DEEL	G	—	—	—	—	—	—	16	1	—	—	—	—	—	—	—	—	—	—	25	1	—	—
ELGL	G	14	1	—	—	33	1	33	10	22	3	20	1	60	9	66	4	65	6	50	16	50	4
FEID	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	5	—	—	16	3
FEOC	G	—	—	—	—	—	—	—	—	11	1	40	3	20	1	16	3	48	8	75	2	16	10
FESTU	G	—	—	—	—	33	3	—	—	—	—	—	—	—	—	—	—	4	1	—	—	—	—
FESU	G	—	—	—	—	—	—	—	—	—	—	20	1	60	18	25	9	13	14	—	—	—	—
FEVI	G	—	—	—	—	—	—	16	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
GLEL	G	14	5	—	—	33	20	16	1	11	4	—	—	20	1	—	—	9	2	—	—	—	—
GLST	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	5	—	—	—	—	—	—
MESM	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	5	—	—	—	—	—	—
MESU	G	—	—	—	—	—	—	—	—	—	—	20	20	40	3	50	11	22	6	25	15	—	—
MUFI2	G	—	—	—	—	—	—	16	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PHAL2	G	14	1	—	—	33	1	33	3	—	—	—	—	—	—	—	—	4	5	—	—	—	—
PHPR3	G	—	—	—	—	—	—	16	1	—	—	20	1	—	—	—	—	4	1	—	—	16	1
POA	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	1	22	8	—	—	—	—
PONE2	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	25	25	5	33	1
POPA2	G	—	—	—	—	—	—	—	—	—	—	—	—	20	1	8	2	—	—	25	3	—	—

Appendix B-1—Constancy and average cover of all species present in the following types (continued)

Type		ABLA/LE		ABLA/ME		ABLA/VA		PIEN/CA		PIEN/SE		ABGR/TA		ABGR/CR		ABGR/AC		PSME/AC		PSME/SY		PIPO/SY	
N		7		3		3		6		9		5		5		12		23		4		6	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
POPR	G	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	39	15	50	13	33	3
PUPA3	G	—	—	—	—	—	—	16	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
TRCA21	G	—	—	—	—	—	—	—	—	—	—	—	—	20	40	16	10	26	8	—	—	16	5
TRCE2	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13	4	25	3	—	—
CAAM10	GL	—	—	—	—	—	—	—	—	—	—	—	—	20	4	—	—	—	—	—	—	—	—
CAAQ	GL	—	—	—	—	—	—	33	22	—	—	—	—	—	—	—	—	—	—	—	—	16	1
CABA3	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	22	4	—	—	16	3
CABI10	GL	—	—	—	—	—	—	—	—	11	1	—	—	—	—	—	—	—	—	—	—	—	—
CADE9	GL	—	—	—	—	—	—	—	—	—	—	40	4	100	12	50	3	39	12	—	—	16	5
CADI6	GL	—	—	—	—	—	—	16	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAGE2	GL	—	—	—	—	—	—	—	—	—	—	—	—	20	1	50	10	35	11	75	30	66	14
CAHE7	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	4	—	—	—	—	—	—
CAIL	GL	—	—	—	—	—	—	16	15	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAJO	GL	14	1	—	—	—	—	33	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CALA13	GL	14	40	—	—	33	30	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CALE9	GL	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CALU7	GL	42	2	—	—	—	—	16	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAMI7	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	1	—	—	—	—	—	—
CAMU7	GL	—	—	—	—	—	—	16	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CANI2	GL	28	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAPA14	GL	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAREX	GL	—	—	—	—	33	5	—	—	11	1	—	—	—	—	8	10	9	4	—	—	—	—
CARO5	GL	—	—	33	1	—	—	—	—	22	8	20	3	—	—	—	—	17	7	25	3	33	23
CASC12	GL	71	27	—	—	33	6	100	62	11	4	—	—	—	—	—	—	—	—	—	—	—	—
CAUT	GL	28	1	—	—	33	6	16	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ELPA6	GL	28	4	—	—	—	—	33	28	—	—	—	—	—	—	—	—	—	—	—	—	—	—
JUDR	GL	28	1	—	—	—	—	66	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
JUEN	GL	14	2	—	—	33	1	16	1	11	1	—	—	—	—	—	—	—	—	—	—	—	—
JUFI	GL	—	—	—	—	33	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
JUME3	GL	—	—	33	1	—	—	33	1	11	3	—	—	—	—	—	—	—	—	—	—	—	—
LUCA2	GL	—	—	—	—	—	—	33	2	—	—	—	—	—	—	—	—	9	2	50	8	16	3
LUHI4	GL	14	10	33	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
LUPA4	GL	28	4	—	—	33	1	16	1	—	—	20	3	—	—	—	—	—	—	—	—	—	—
ADPE	FH	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—	—	—
ATFI	FH	—	—	—	—	—	—	—	—	—	—	40	2	20	5	25	1	17	5	—	—	—	—
CYFR2	FH	—	—	—	—	—	—	—	—	—	—	20	5	20	1	25	1	52	4	50	1	—	—
DRAU8	FH	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	4	1	—	—	—	—
DRFI2	FH	—	—	—	—	—	—	—	—	—	—	—	—	20	5	—	—	—	—	—	—	—	—
EQAR	FH	14	60	—	—	33	60	33	2	22	4	—	—	—	—	8	1	—	—	—	—	16	1
EQHY	FH	—	—	—	—	—	—	—	—	—	—	—	—	—	—	41	3	30	1	—	—	16	1
GYDR	FH	—	—	—	—	—	—	—	—	—	—	40	1	—	—	—	—	—	—	—	—	—	—
POMU	FH	—	—	—	—	—	—	—	—	22	1	40	3	—	—	25	4	—	—	—	—	—	—
PTAQ	FH	—	—	—	—	—	—	—	—	—	—	20	5	20	2	16	4	13	2	—	—	16	3

Appendix B-2—Constancy and average cover of all species present in the following types:

- Engelmann Spruce/Common Horsetail Plant Association (PIEN/EQ)
- Lodgepole Pine/Holm's Rocky Mountain Sedge Plant Community (PICO/CA)
- Ponderosa Pine/Black Hawthorn Plant Community (PIPO/CR)
- Black Cottonwood/Mountain Alder-Red-Osier Dogwood Plant Association (POTR15/AL)
- Black Cottonwood/Common Snowberry Plant Community Type (POTR15/SY)
- Black Cottonwood/Rocky Mountain Maple Plant Community Type (POTR15/AC)
- Red Alder/Common Snowberry/Dewey Sedge Plant Community Type (ALRU/SY)
- White Alder/Blackberry Plant Community Type (ALRH2/RU)
- White Alder/Mesic Shrub Plant Community Type (ALRH2/SH)
- Arctic Willow Plant Association (SAAR27)
- Booth's Willow/Inflated Sedge Plant Community (SABO2/CAV).

Type		PIEN/EQ		PICO/CA		PIPO/CR		POTR15/AL		POTR15/SY		POTR15/AC		ALRU2/SY		ALRH2/RU		ALRH2/SH		SAAR27		SABO2/CAV	
N		1		1		1		7		5		2		5		26		3		3		1	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
ABGR	PO	—	—	—	—	—	—	—	—	—	—	—	—	20	5	—	—	—	—	—	—	—	—
ABLA	PO	—	—	100	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ALRH2	PO	—	—	—	—	—	—	14	5	—	—	—	—	—	—	100	68	92	64	—	—	—	—
ALRU2	PO	—	—	—	—	—	—	—	—	—	—	50	25	—	—	—	—	—	—	—	—	—	—
BEPAS	PO	—	—	—	—	—	—	—	—	—	—	—	—	40	18	—	—	—	—	—	—	—	—
PICO	PO	—	—	100	15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PIEN	PO	100	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PIPO	PO	—	—	—	—	100	20	14	2	—	—	50	15	—	—	—	—	—	—	—	—	—	—
POTR15	PO	—	—	—	—	—	—	85	27	100	49	100	43	—	—	33	20	23	23	—	—	—	—
PSME	PO	—	—	—	—	—	—	—	—	—	—	—	—	40	4	—	—	7	6	—	—	—	—
ABGR	SO	—	—	—	—	—	—	14	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ALRH2	SO	—	—	—	—	—	—	—	—	20	50	—	—	—	—	—	—	61	26	—	—	—	—
ALRU2	SO	—	—	—	—	—	—	—	—	—	—	50	5	20	35	—	—	—	—	—	—	—	—
JUNI	SO	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	10	—	—	—	—
PICO	SO	—	—	100	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PIEN	SO	—	—	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PIPO	SO	—	—	—	—	100	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
POTR15	SO	—	—	—	—	—	—	42	8	60	14	100	8	—	—	—	—	3	8	—	—	—	—
PRAV	SO	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	20	—	—	—	—
ABGR	U	—	—	—	—	—	—	28	12	—	—	50	1	60	5	—	—	3	1	—	—	—	—
ABLA	U	100	10	100	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ALRH2	U	—	—	—	—	—	—	14	1	—	—	—	—	—	—	33	15	30	9	—	—	—	—
ALRU2	U	—	—	—	—	—	—	—	—	—	—	—	—	40	6	—	—	—	—	—	—	—	—
BEPAS	U	—	—	—	—	—	—	—	—	—	—	—	—	20	5	—	—	—	—	—	—	—	—
PIAL	U	—	—	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PICO	U	—	—	100	6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PIEN	U	—	—	100	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PIPO	U	—	—	—	—	—	—	14	5	20	4	50	1	40	2	—	—	3	5	—	—	—	—
POBA2	U	—	—	—	—	—	—	—	—	20	3	—	—	—	—	—	—	—	—	—	—	—	—
POTR15	U	—	—	—	—	—	—	71	10	60	1	100	2	—	—	—	—	19	3	—	—	—	—
PRAV	U	—	—	—	—	—	—	14	1	—	—	—	—	—	—	—	—	3	15	—	—	—	—
ROPS	U	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	1	—	—	—	—
ACER	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	5	—	—	—	—
ACGL	S	—	—	—	—	100	1	71	11	—	—	100	1	80	3	33	20	30	6	—	—	—	—
ALIN2	S	—	—	—	—	—	—	57	17	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ALSI3	S	—	—	—	—	—	—	14	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Appendix B-2—Constancy and average cover of all species present in the following types: (continued)

Type		PIEN/EQ		PICO/CA		PIPO/CR		POTR15/AL		POTR15/SY		POTR15/AC		ALRU2/SY		ALRH2/RU		ALRH2/SH		SAAR27		SABO2/CAV	
N		1		1		1		7		5		2		5		26		3		3		1	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
AMAL2	S	—	—	—	—	100	3	85	6	60	3	50	4	40	2	66	6	23	5	—	—	—	—
BEOC2	S	—	—	—	—	100	15	28	38	—	—	—	—	40	12	—	—	15	20	—	—	—	—
BERE	S	—	—	—	—	100	1	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—
CERE2	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	5	30	6	—	—	—	—
CESA	S	—	—	—	—	—	—	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CHUM	S	—	—	—	—	—	—	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CLCO2	S	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	3	1	—	—	—	—
CLLI2	S	—	—	—	—	—	—	14	8	20	2	—	—	—	—	—	—	—	—	—	—	—	—
ST4	S	—	—	—	—	100	5	85	20	20	1	—	—	60	10	—	—	53	20	—	—	—	—
CRDO2	S	—	—	—	—	100	30	71	13	80	35	100	63	60	18	33	20	50	9	—	—	—	—
GAHU	S	—	—	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
HODI	S	—	—	—	—	100	3	42	5	80	7	50	50	60	5	33	15	30	14	—	—	—	—
KAMI	S	—	—	100	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
LOCI3	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	1	—	—	—	—
MEFE	S	—	—	100	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PHEM	S	—	—	100	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PHLE4	S	—	—	—	—	100	6	71	27	80	38	100	22	100	39	100	4	96	29	—	—	—	—
PHMA5	S	—	—	—	—	—	—	14	4	60	4	50	2	—	—	—	—	3	1	—	—	—	—
POBA2	S	—	—	—	—	—	—	—	—	20	3	—	—	—	—	—	—	3	20	—	—	—	—
PRAR3	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	30	—	—	—	—
PRCE	S	—	—	—	—	—	—	14	2	—	—	—	—	—	—	—	—	3	20	—	—	—	—
PRDO	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	8	—	—	—	—
PRUNU	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	1	—	—	—	—
PRVI	S	—	—	—	—	100	10	14	22	40	20	50	3	20	1	33	5	26	7	—	—	—	—
RHAL2	S	—	—	—	—	—	—	14	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RHGL	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	1	—	—	—	—
RHPU	S	—	—	—	—	100	10	28	4	40	2	50	1	80	13	66	3	50	7	—	—	—	—
RHRA6	S	—	—	—	—	100	40	42	27	20	15	—	—	—	—	66	8	34	6	—	—	—	—
RIBES	S	—	—	—	—	—	—	14	1	20	1	50	4	20	1	—	—	3	5	—	—	—	—
RICE	S	100	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RICO	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	4	—	—	—	—
RIHU	S	—	—	—	—	—	—	14	2	—	—	—	—	20	5	—	—	—	—	—	—	—	—
RIIR	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	1	—	—	—	—
RILA	S	100	3	—	—	—	—	28	1	—	—	—	—	40	8	33	5	15	4	—	—	—	—
RIMO2	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	5	—	—	—	—
RINI2	S	—	—	—	—	100	2	28	13	20	8	—	—	—	—	—	—	15	2	—	—	—	—
ROGY	S	—	—	—	—	—	—	—	—	—	—	50	7	20	5	—	—	3	2	—	—	—	—
RONU	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	1	—	—	—	—
ROSA5	S	—	—	—	—	—	—	—	—	20	10	—	—	—	—	—	—	3	5	—	—	—	—
ROWO	S	—	—	—	—	—	—	—	—	60	7	50	1	—	—	—	—	23	2	—	—	—	—
RUBA	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	10	—	—	—	—
RUBUS	S	—	—	—	—	—	—	14	10	—	—	—	—	—	—	—	—	11	2	—	—	—	—
RUDI2	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	66	72	3	1	—	—	—	—
RUID	S	—	—	—	—	—	—	28	3	—	—	—	—	—	—	66	1	3	15	—	—	—	—

Appendix B-2—Constancy and average cover of all species present in the following types: (continued)

Type		PIEN/EQ		PICO/CA		PIPO/CR		POTR15/AL		POTR15/SY		POTR15/AC		ALRU2/SY		ALRH2/RU		ALRH2/SH		SAAR27		SABO2/CAV	
N		1		1		1		7		5		2		5		26		3		3		1	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
RULA	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	70	7	1	—	—	—	—
RULE	S	—	—	—	—	—	—	14	1	—	—	50	1	—	—	—	—	11	6	—	—	—	—
RUPA	S	—	—	—	—	100	3	57	19	—	—	50	4	80	19	—	—	30	12	—	—	—	—
SAAR27	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	67	—	—
SABO2	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	14	100	90
SACE3	S	—	—	—	—	—	—	28	2	—	—	—	—	—	—	33	10	19	3	—	—	—	—
SACO2	S	100	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SAFA	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	3	—	—
SALIX	S	—	—	—	—	—	—	14	3	—	—	—	—	—	—	33	3	—	—	—	—	—	—
SAMBU	S	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—
SARI2	S	—	—	—	—	—	—	14	1	—	—	—	—	20	1	—	—	—	—	—	—	—	—
SASC	S	—	—	—	—	—	—	28	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SASI2	S	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—
SPBE2	S	—	—	—	—	—	—	14	3	20	5	50	1	20	3	—	—	3	5	—	—	—	—
SPDE	S	—	—	100	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SYAL	S	—	—	—	—	—	—	57	14	100	18	100	50	100	20	—	—	23	10	—	—	—	—
VASC	S	—	—	100	15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ACCO4	F	100	3	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—
ACMI2	F	—	—	—	—	—	—	14	1	40	1	—	—	—	—	—	—	23	11	—	—	—	—
ACRU2	F	100	3	—	—	—	—	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ADBI	F	—	—	—	—	—	—	14	1	—	—	—	—	—	—	—	—	7	1	—	—	—	—
AGAST	F	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—
AGUR	F	—	—	—	—	—	—	14	2	20	1	—	—	—	—	—	—	19	1	—	—	—	—
ALVA	F	100	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
AMRE2	F	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—	—	—	—	—
ANAR3	F	—	—	—	—	—	—	14	2	—	—	—	—	—	—	—	—	3	4	—	—	—	—
ANEMO	F	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	33	5	—	—
ANMA	F	100	3	—	—	—	—	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ANPI	F	—	—	—	—	—	—	—	—	20	3	—	—	—	—	—	—	—	—	—	—	—	—
ANSC8	F	—	—	—	—	100	5	14	10	40	53	—	—	—	—	66	18	57	17	—	—	—	—
APAN2	F	—	—	—	—	—	—	14	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—
AQFO	F	—	—	—	—	—	—	—	—	20	3	—	—	—	—	—	—	—	—	—	—	—	—
ARCH3	F	—	—	—	—	—	—	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ARCO9	F	—	—	—	—	—	—	14	2	—	—	50	10	20	1	—	—	11	1	—	—	—	—
ARLU	F	—	—	—	—	—	—	14	1	—	—	—	—	—	—	—	—	3	1	—	—	—	—
ARMA18	F	—	—	—	—	—	—	—	—	—	—	—	—	20	5	—	—	—	—	—	—	—	—
ARMI2	F	—	—	—	—	100	5	28	16	40	1	—	—	—	—	66	18	34	4	—	—	—	—
ASAL2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	1	—	—
ASAL7	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	1	—	—
ASCA2	F	—	—	—	—	—	—	14	3	—	—	50	2	—	—	—	—	3	1	—	—	—	—
ASCH2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	1	—	—	—	—
ASCO3	F	—	—	—	—	—	—	—	—	20	3	—	—	—	—	—	—	—	—	—	—	—	—
ASFO	F	100	3	—	—	—	—	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ASMO3	F	—	—	—	—	—	—	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Appendix B-2—Constancy and average cover of all species present in the following types: (continued)

Type		PIEN/EQ		PICO/CA		PIPO/CR		POTR15/AL		POTR15/SY		POTR15/AC		ALRU2/SY		ALRH2/RU		ALRH2/SH		SAAR27		SABO2/CAV	
N		1		1		1		7		5		2		5		26		3		3		1	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
ASPR	F	—	—	—	—	—	—	—	—	40	1	—	—	—	—	—	—	—	—	—	—	—	—
ASTER	F	—	—	—	—	—	—	28	2	20	1	—	—	20	1	—	—	3	5	—	—	—	—
BRODI	F	—	—	—	—	—	—	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CACH16	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	3	—	—
CACO11	F	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—
CAOL	F	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—	—	—	—	—
CASTI2	F	—	—	—	—	—	—	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CIAL	F	—	—	—	—	100	3	28	8	20	1	50	1	100	6	33	3	30	12	—	—	—	—
CIAR4	F	—	—	—	—	—	—	14	1	—	—	—	—	—	—	—	—	3	5	—	—	—	—
CIRSI	F	—	—	—	—	—	—	28	1	20	1	—	—	—	—	—	—	15	1	—	—	—	—
CIVU	F	—	—	—	—	—	—	—	—	—	—	50	1	—	—	—	—	—	—	—	—	—	—
CLEMA	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	3	—	—	—	—
CLUN2	F	—	—	—	—	—	—	14	1	—	—	—	—	20	1	—	—	—	—	—	—	—	—
COAR4	F	—	—	—	—	—	—	—	—	20	5	—	—	—	—	—	—	—	—	—	—	—	—
COGR4	F	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—	—	—	—	—
COOR	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	3	—	—	—	—	—	—
CRUCIF	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	1	—	—	—	—
CYOF	F	—	—	—	—	100	1	28	1	40	2	50	1	—	—	—	—	30	2	—	—	—	—
DEOC	F	—	—	—	—	—	—	14	8	—	—	—	—	—	—	—	—	—	—	—	—	—	—
DIHO3	F	—	—	—	—	—	—	14	1	—	—	—	—	20	1	—	—	—	—	—	—	—	—
DISY	F	—	—	—	—	—	—	14	1	—	—	—	—	—	—	33	1	30	3	—	—	—	—
DITR2	F	—	—	—	—	—	—	—	—	—	—	50	1	—	—	—	—	3	1	—	—	—	—
DOAL	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	1	—	—
EPAN2	F	—	—	100	1	—	—	—	—	—	—	—	—	—	—	33	3	3	1	—	—	—	—
EPGI	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	1	—	—	—	—
EPGL	F	100	15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
EPGL4	F	—	—	—	—	—	—	14	1	—	—	—	—	—	—	—	—	3	1	—	—	—	—
EPILO	F	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	3	1	—	—	—	—
ERIGE2	F	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—	—	—	—	—
ERPE3	F	—	—	100	4	—	—	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
FRVE	F	—	—	—	—	—	—	14	3	—	—	50	1	20	1	—	—	—	—	—	—	—	—
GAAP2	F	—	—	—	—	100	5	57	5	100	15	50	1	—	—	66	18	76	16	—	—	—	—
GAAS3	F	—	—	—	—	—	—	—	—	—	—	50	1	—	—	—	—	—	—	—	—	—	—
GALIU	F	—	—	—	—	—	—	—	—	—	—	—	—	60	2	—	—	—	—	—	—	—	—
GATR2	F	—	—	—	—	—	—	28	1	20	1	50	1	20	3	—	—	3	1	—	—	—	—
GATR3	F	—	—	—	—	—	—	14	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—
GEAL3	F	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—	—	—	—	—
GECA	F	—	—	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
GEMA4	F	—	—	—	—	—	—	14	5	—	—	—	—	40	2	—	—	7	1	—	—	—	—
GERAN	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	1	—	—	—	—
GEUM	F	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	10	—	—	—	—
HADI7	F	—	—	—	—	—	—	28	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
HAMI	F	—	—	—	—	—	—	14	1	—	—	—	—	20	1	—	—	—	—	—	—	—	—
HELA4	F	100	3	—	—	—	—	28	2	40	4	50	1	80	4	—	—	26	5	—	—	—	—

Appendix B-2—Constancy and average cover of all species present in the following types: (continued)

Type		PIEN/EQ		PICO/CA		PIPO/CR		POTR15/AL		POTR15/SY		POTR15/AC		ALRU2/SY		ALRH2/RU		ALRH2/SH		SAAR27		SABO2/CAV	
N		1		1		1		7		5		2		5		26		3		3		1	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
HEUCH	F	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—
HIAL2	F	—	—	—	—	—	—	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
HYCA4	F	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—
HYFE	F	—	—	—	—	—	—	14	1	—	—	50	1	—	—	33	5	34	2	—	—	—	—
HYPE	F	—	—	—	—	—	—	28	1	—	—	—	—	—	—	—	—	15	1	—	—	—	—
HYPER	F	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	3	1	—	—	—	—
LAAM	F	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—	—	—	—	—
LABI	F	—	—	—	—	—	—	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
LABIAF	F	—	—	—	—	—	—	14	1	—	—	—	—	—	—	—	—	7	2	—	—	—	—
LACO3	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	3	—	—	—	—
LASE	F	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	11	1	—	—	—	—
LATHY	F	—	—	—	—	—	—	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
LEGUMF	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	1	—	—	—	—
LICA2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	5	—	—
LIPA5	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—	—	—
LITE2	F	—	—	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
LOCO6	F	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—	—	—	—	—
LOMAT	F	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—
LYAL	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	3	—	—	—	—
LYUN	F	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—
MAGR3	F	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—	—	—	—	—
MEAR4	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—	—	—
MECI3	F	—	—	—	—	—	—	28	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MEOF	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	1	—	—	—	—
MEPI	F	—	—	—	—	—	—	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MERTE	F	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—
MIGU	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	1	—	—	—	—
MIMO3	F	100	5	—	—	—	—	—	—	20	1	—	—	—	—	—	—	7	1	—	—	—	—
MIPE	F	—	—	—	—	—	—	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MIST3	F	—	—	—	—	—	—	—	—	—	—	—	—	40	1	—	—	—	—	—	—	—	—
MITEL	F	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	2	—	—	—	—
MOCO4	F	—	—	—	—	—	—	14	2	20	1	50	3	80	7	—	—	15	10	—	—	—	—
MOPE3	F	—	—	—	—	100	1	—	—	40	11	—	—	—	—	66	9	76	9	—	—	—	—
MOSI2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	20	—	—	—	—
MYOSO	F	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—
OSCH	F	100	1	—	—	100	1	14	1	40	8	50	1	60	1	66	5	34	8	—	—	—	—
OSOC	F	—	—	—	—	—	—	14	20	—	—	50	1	60	2	—	—	—	—	—	—	—	—
PAFI3	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	1	—	—
PAPE5	F	—	—	—	—	—	—	14	1	—	—	—	—	—	—	—	—	11	5	—	—	—	—
PEGR2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	6	—	—
PENST	F	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—	—	—	—	—
POBI7	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	1	—	—	—	—
POCU6	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	20	—	—	—	—
POFL3	F	—	—	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Appendix B-2—Constancy and average cover of all species present in the following types: (continued)

Type		PIEN/EQ		PICO/CA		PIPO/CR		POTR15/AL		POTR15/SY		POTR15/AC		ALRU2/SY		ALRH2/RU		ALRH2/SH		SAAR27		SABO2/CAV	
N		1		1		1		7		5		2		5		26		3		3		1	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
POGL9	F	—	—	—	—	—	—	14	1	20	1	—	—	—	—	—	—	—	—	—	—	—	—
POGR9	F	—	—	—	—	—	—	14	1	—	—	—	—	—	—	—	—	3	1	—	—	—	—
POLA4	F	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—	—	—	—	—
POLYG4	F	—	—	—	—	—	—	14	1	—	—	—	—	—	—	—	—	11	1	—	—	—	—
POTEN	F	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	3	1	—	—	—	—
PRVU	F	—	—	—	—	—	—	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PYSE	F	—	—	—	—	—	—	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RANUN	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	1	—	—	—	—
RAUN	F	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	3	1	—	—	—	—
RUCR	F	—	—	—	—	—	—	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RUMEX	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	1	—	—	—	—
RUOB	F	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—
RUOC2	F	—	—	—	—	—	—	28	4	—	—	50	1	40	1	33	10	—	—	—	—	—	—
RUPA5	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	3	3	3	—	—	—	—
RUSA	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	5	—	—	—	—
SAAR13	F	100	20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SCAN2	F	—	—	—	—	—	—	—	—	20	3	—	—	—	—	—	—	—	—	—	—	—	—
SCLA	F	—	—	—	—	—	—	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SECY	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	1	—	—
SEDUM	F	—	—	—	—	—	—	—	—	—	—	—	—	20	3	—	—	—	—	—	—	—	—
SESE2	F	—	—	—	—	—	—	28	2	40	2	50	2	—	—	—	—	—	—	—	—	—	—
SETR	F	100	20	—	—	—	—	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SIAL2	F	—	—	—	—	100	1	—	—	20	1	—	—	—	—	—	—	7	1	—	—	—	—
SIME	F	—	—	—	—	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SINO	F	—	—	—	—	100	1	14	2	20	2	—	—	—	—	—	—	15	1	—	—	—	—
SMRA	F	—	—	—	—	—	—	28	1	40	11	100	3	40	1	—	—	7	2	—	—	—	—
SMST	F	—	—	—	—	—	—	28	6	40	6	50	1	80	4	—	—	7	2	—	—	—	—
SODU	F	—	—	—	—	100	1	14	1	—	—	—	—	—	—	66	10	46	2	—	—	—	—
SOLID	F	—	—	—	—	—	—	14	6	—	—	—	—	—	—	—	—	—	—	—	—	—	—
STCR2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	3
STELL	F	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—
STME2	F	—	—	—	—	100	1	—	—	40	2	—	—	—	—	—	—	—	—	—	—	—	—
TAOF	F	—	—	—	—	100	1	14	1	20	1	—	—	20	1	—	—	19	1	—	—	—	—
THOC	F	—	—	—	—	—	—	28	3	20	1	—	—	20	1	—	—	7	1	—	—	—	—
THVE	F	100	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
TOFL	F	—	—	—	—	100	1	—	—	—	—	—	—	—	—	—	—	7	2	—	—	—	—
TRCA	F	—	—	—	—	—	—	28	6	—	—	—	—	—	—	—	—	—	—	—	—	—	—
TRDU	F	—	—	—	—	—	—	14	1	20	1	—	—	—	—	—	—	7	1	—	—	—	—
TRIFO	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	2	—	—	—	—
TROV2	F	—	—	—	—	—	—	—	—	—	—	50	1	20	1	—	—	—	—	—	—	—	—
TRRE3	F	—	—	—	—	—	—	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
URDI	F	—	—	—	—	—	—	42	1	—	—	—	—	60	2	33	15	69	5	—	—	—	—
VEAM2	F	100	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VERON	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	1	—	—	—	—

Appendix B-2—Constancy and average cover of all species present in the following types: (continued)

Type		PIEN/EQ		PICO/CA		PIPO/CR		POTR15/AL		POTR15/SY		POTR15/AC		ALRU2/SY		ALRH2/RU		ALRH2/SH		SAAR27		SABO2/CAV	
N		1		1		1		7		5		2		5		26		3		3		1	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
VETH	F	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—	—	—	—	—
VIAM	F	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—	—	—	—	—
VICA4	F	—	—	—	—	100	60	14	60	20	15	100	7	20	5	—	—	34	7	—	—	—	—
VICIA	F	—	—	—	—	—	—	—	—	20	3	—	—	—	—	—	—	—	—	—	—	—	—
VIGL	F	—	—	—	—	—	—	14	1	—	—	—	—	60	3	—	—	—	—	—	—	—	—
VIOLA	F	—	—	100	2	—	—	—	—	20	2	—	—	20	1	33	5	7	7	—	—	—	—
ZIEL2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	1	—	—
AGSC5	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	3	—	—	—	—
AGTH2	G	100	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
AREL3	G	—	—	—	—	—	—	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
BRCA5	G	100	3	—	—	—	—	14	10	—	—	—	—	—	—	—	—	7	2	—	—	—	—
BRJA	G	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—	—	—	—	—
BROMU	G	—	—	—	—	—	—	—	—	—	—	—	—	20	3	—	—	—	—	—	—	—	—
BROR2	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—	—	—
BRRI8	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	66	10	3	15	—	—	—	—
BRTE	G	—	—	—	—	100	50	14	2	20	2	—	—	—	—	—	—	30	9	—	—	—	—
BRVU	G	100	3	—	—	—	—	14	1	—	—	—	—	—	—	—	—	7	4	—	—	—	—
CACA4	G	—	—	—	—	—	—	14	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CILA2	G	100	1	—	—	—	—	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
DAGL	G	—	—	—	—	—	—	—	—	20	5	—	—	40	2	33	1	11	4	—	—	—	—
DECE	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	1	—	—
ELCI2	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	3	—	—	—	—
ELGL	G	—	—	—	—	100	1	71	5	100	4	100	3	80	8	100	6	57	5	—	—	—	—
FEOC	G	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—
FESU	G	—	—	—	—	—	—	14	3	—	—	50	1	40	6	—	—	3	3	—	—	—	—
GLEL	G	100	15	—	—	—	—	14	3	—	—	—	—	—	—	33	3	—	—	—	—	—	—
GLYCE	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	1	—	—	—	—
MESU	G	—	—	—	—	—	—	—	—	—	—	—	—	20	15	—	—	—	—	—	—	—	—
PHAL2	G	—	—	—	—	—	—	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PHAR3	G	—	—	—	—	—	—	—	—	20	5	—	—	20	10	—	—	—	—	—	—	—	—
PHPR3	G	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—	—	—	—	—
POA	G	—	—	—	—	—	—	14	3	20	10	—	—	—	—	—	—	7	1	—	—	—	—
POPR	G	—	—	—	—	100	3	57	4	60	30	—	—	60	2	—	—	26	7	—	—	—	—
STOC2	G	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—	—	—	—	—
TRCA21	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	1	—	—	—	—
CAAM10	GL	—	—	—	—	—	—	14	1	—	—	—	—	—	—	—	—	3	2	—	—	—	—
CAAR2	GL	—	—	—	—	—	—	14	1	20	1	—	—	—	—	—	—	—	—	—	—	—	—
CABA3	GL	—	—	—	—	—	—	—	—	20	3	—	—	—	—	—	—	—	—	—	—	—	—
CADE9	GL	—	—	—	—	100	1	71	4	40	1	50	1	100	10	—	—	61	6	—	—	—	—
CAGE2	GL	—	—	—	—	—	—	—	—	20	5	—	—	40	2	—	—	—	—	—	—	—	—
CAHO5	GL	—	—	—	—	—	—	14	1	20	3	—	—	—	—	33	5	—	—	—	—	—	—
CAIL	GL	—	—	100	8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAMI7	GL	—	—	—	—	—	—	28	1	20	1	—	—	—	—	—	—	—	—	—	—	—	—
CANI2	GL	—	—	100	8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Appendix B-2—Constancy and average cover of all species present in the following types: (continued)

Type		PIEN/EQ		PICO/CA		PIPO/CR		POTR15/AL		POTR15/SY		POTR15/AC		ALRU2/SY		ALRH2/RU		ALRH2/SH		SAAR27		SABO2/CAV	
N		1		1		1		7		5		2		5		26		3		3		1	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
CAPR4	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	1	100	10
CAREX	GL	100	3	—	—	—	—	—	—	—	—	—	—	—	—	33	1	—	—	33	5	—	—
CARO5	GL	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—	—	—	—	—
CASC12	GL	—	—	100	70	—	—	14	1	—	—	—	—	—	—	—	—	—	—	66	18	—	—
CASU7	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	66	26	—	—
CAUT	GL	100	15	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAVE6	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	30
ELPA6	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	66	46	—	—
JUDR	GL	—	—	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
LUCA2	GL	—	—	—	—	—	—	—	—	20	1	—	—	20	1	—	—	—	—	—	—	—	—
ATFI	FH	—	—	—	—	—	—	14	2	—	—	—	—	60	4	—	—	15	4	—	—	—	—
CYFR2	FH	—	—	—	—	—	—	14	1	—	—	—	—	20	1	—	—	15	2	—	—	—	—
DRFI2	FH	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	5	7	1	—	—	—	—
EQAR	FH	100	85	—	—	—	—	28	50	20	1	—	—	20	3	33	5	26	2	—	—	—	—
EQHY	FH	—	—	—	—	—	—	42	2	—	—	—	—	60	2	33	1	46	8	—	—	—	—
EQLA	FH	—	—	—	—	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
EQPA	FH	—	—	—	—	—	—	—	—	—	—	—	—	20	3	—	—	—	—	—	—	—	—
EQVA	FH	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	50	—	—
GYDR	FH	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—
POMU	FH	—	—	—	—	—	—	—	—	—	—	—	—	20	3	—	—	—	—	—	—	—	—
PTAQ	FH	—	—	—	—	—	—	14	1	—	—	—	—	—	—	—	—	3	1	—	—	—	—

Appendix B-3—Constancy and average cover of all species present in the following types:

- Willow/Aquatic Sedge Plant Association (SAL/CAA)
- Booth's Willow/Holm's Rocky Mountain Sedge Plant Association (SABO2/CAS)
- Willow/Bluejoint Reedgrass Plant Association (SAL/CAC)
- Willow/Mesic Forb Plant Community Type (SAL/FO)
- Farr's Willow/Pacific Onion Plant Community (SAFA/AL)
- Undergreen/Willow/Bladder Sedge Plant Community Type (SACO/CAU)
- Undergreen Willow/Holm's Rocky Mountain Sedge Plant Association (SACO/CAS)
- Drummond's Willow/Arrowleaf Groundsel Plant Community (SADR/SE)
- Lemmon's Willow/Mesic Forb Plant Community (SALE/MF)
- Coyote Willow Plant Association (SAEX)
- Sitka Willow/Common Horsetail Plant Community (SASI2/EQ)

Type		SAL/CAA		SABO/CAS		SAL/CAC		SAL/FO		SAFA/AL		SACO/CAU		SACO/CAS		SADR/SE		SALE/MF		SAEX		SASI2/EQ	
N		2		10		4		10		1		1		5		1		1		13		1	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
ABGR	U	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	1	—	—
ABLA	U	—	—	10	3	—	—	30	5	—	—	—	—	40	2	—	—	100	5	15	1	—	—
JUOC	U	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	1	—	—
PIEN	U	—	—	—	—	25	3	20	4	—	—	—	—	—	—	—	—	100	5	46	7	—	—
POTR15	U	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	23	5	100	10
PSME	U	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	1	—	—
ROPS	U	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	1	—	—
ALIN2	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	5	100	35
ALSI3	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	5	15	1	—	—
BEGL	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	3	—	—
CLLI2	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15	2	—	—
COST4	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	30	5	100	15
CRDO2	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15	2	—	—
KAMI	S	—	—	—	—	25	1	10	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—
LEGL	S	—	—	—	—	—	—	—	—	—	—	—	—	20	2	—	—	—	—	—	—	—	—
LOIN5	S	—	—	—	—	—	—	10	2	—	—	—	—	—	—	—	—	100	20	30	4	—	—
PHEM	S	—	—	—	—	—	—	10	20	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PHLE4	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15	21	—	—
POFR4	S	50	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	30	3	—	—
RHPU	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	4	—	—
RIHU	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	15	7	2	—	—
RIIR	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15	2	—	—
RILA	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	5	—	—	—	—
RIMO2	S	—	—	—	—	—	—	10	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ROWO	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15	10	—	—
RUBUS	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1
SABA3	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	10	—	—
SABO2	S	100	49	100	70	50	72	50	65	100	18	—	—	—	—	—	—	—	—	7	2	—	—
SACO2	S	—	—	10	10	50	75	40	44	—	—	100	50	100	61	—	—	100	20	7	40	—	—
SADR	S	—	—	—	—	—	—	20	75	—	—	—	—	—	—	100	80	—	—	15	8	—	—
SAEX	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	10	100	63	—	—
SAFA	S	50	60	—	—	—	—	—	—	100	60	—	—	—	—	—	—	—	—	—	—	—	—
SALA5	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	23	2	—	—
SALA6	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	5	—	—
SALE	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	70	—	—	—	—
SALIX	S	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—
SAMY	S	—	—	—	—	—	—	10	85	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Appendix B-3—Constancy and average cover of all species present in the following types (continued)

Type		SAL/CAA		SABO/CAS		SAL/CAC		SAL/FO		SAFA/AL		SACO/CAU		SACO/CAS		SADR/SE		SALE/MF		SAEX		SASI2/EQ	
N		2		10		4		10		1		1		5		1		1		13		1	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
SARI2	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	46	28	—	—
SASI2	S	—	—	—	—	—	—	—	—	—	—	—	—	20	20	—	—	—	—	7	6	100	70
SAWO	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	20	—	—
SHCA	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
SYAL	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
VACA13	S	—	—	10	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VACCI	S	—	—	—	—	25	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VASC	S	—	—	—	—	—	—	20	12	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ACCO4	F	—	—	10	1	—	—	30	12	—	—	—	—	40	2	—	—	100	3	—	—	—	—
ACMI2	F	100	1	—	—	—	—	20	6	—	—	—	—	20	1	—	—	—	—	38	3	—	—
AGAU2	F	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—
AGUR	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
ALVA	F	—	—	—	—	—	—	40	12	100	80	—	—	—	—	—	—	—	—	—	—	—	—
ANAL4	F	—	—	—	—	—	—	10	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ANAR3	F	—	—	—	—	—	—	20	8	—	—	—	—	40	4	—	—	100	10	38	3	—	—
ANMA	F	—	—	—	—	—	—	20	2	—	—	—	—	20	10	—	—	—	—	30	3	100	3
ANMI3	F	—	—	—	—	25	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ANTEN	F	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—
ANUM	F	—	—	—	—	—	—	10	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
APIACF	F	—	—	—	—	—	—	10	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—
AQUIL	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15	1	—	—
ARCH3	F	—	—	10	1	50	1	20	1	100	1	—	—	40	1	—	—	—	—	7	2	—	—
ARDI2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
ARLA8	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
ARLO6	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15	1	—	—
ARLU	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	46	4	—	—
ARMA18	F	—	—	—	—	—	—	10	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ARMO4	F	—	—	10	1	—	—	10	1	—	—	—	—	40	6	—	—	—	—	—	—	—	—
ARNIC	F	—	—	—	—	—	—	20	3	—	—	100	5	—	—	—	—	—	—	—	—	—	—
ARPA13	F	—	—	—	—	—	—	10	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ASAL7	F	—	—	—	—	—	—	10	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ASCH2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	2	—	—
ASEA	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	23	3	—	—
ASFO	F	—	—	20	14	—	—	30	14	—	—	—	—	20	10	—	—	100	15	7	1	—	—
ASMO3	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	3	38	5	—	—
ASOC	F	50	1	—	—	25	5	40	9	—	—	—	—	—	—	—	—	—	—	7	15	—	—
ASRO	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	10	—	—
ASTER	F	—	—	—	—	—	—	20	3	—	—	—	—	—	—	—	—	—	—	—	—	100	10
ASTRA	F	—	—	—	—	—	—	10	1	—	—	—	—	—	—	—	—	—	—	15	3	—	—
CABI2	F	—	—	—	—	—	—	—	—	100	1	—	—	—	—	—	—	—	—	—	—	—	—
CACH16	F	—	—	20	1	25	1	20	1	—	—	—	—	20	1	—	—	—	—	7	1	—	—
CACO6	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1	—	—	—	—
CACU7	F	—	—	—	—	—	—	10	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAMI12	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	23	2	—	—

Appendix B-3—Constancy and average cover of all species present in the following types (continued)

Type		SAL/CAA		SABO/CAS		SAL/CAC		SAL/FO		SAFA/AL		SACO/CAU		SACO/CAS		SADR/SE		SALE/MF		SAEX		SASI2/EQ	
N		2		10		4		10		1		1		5		1		1		13		1	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
CARH4	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
CARO2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15	1	—	—
CASTI2	F	—	—	10	5	—	—	20	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CERAS	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
CHHY	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
CHLE80	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
CIAL	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
CIAR4	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
CICA6	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
CIDO	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	5	—	—
CIRSI	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	3	—	—
CIVU	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	5	—	—
COCA5	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
COGR4	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
CRUCIF	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15	1	—	—
CYOF	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
DISY	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	23	1	—	—
DOAL	F	50	1	20	6	—	—	70	5	—	—	—	—	20	1	—	—	—	—	—	—	—	—
DOJE	F	—	—	10	30	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
DOPU	F	—	—	—	—	—	—	—	—	—	—	100	15	—	—	—	—	—	—	—	—	—	—
EPAL	F	—	—	—	—	—	—	10	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
EPAN2	F	—	—	—	—	—	—	10	5	—	—	—	—	—	—	—	—	100	10	7	15	—	—
EPGL	F	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	15	3	—	—
EPGL4	F	—	—	—	—	25	1	10	3	—	—	—	—	—	—	100	3	—	—	15	1	—	—
EPILO	F	—	—	10	3	25	1	10	3	—	—	—	—	—	—	—	—	—	—	15	1	—	—
EPLA	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15	9	—	—
EPPA2	F	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ERAS2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
ERIGE2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	23	1	—	—
ERPE3	F	—	—	30	2	75	10	20	6	—	—	—	—	40	2	—	—	—	—	7	1	—	—
ERSP4	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	3	—	—
FRASE	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
FRVE	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
FRVI	F	—	—	—	—	—	—	20	6	—	—	—	—	—	—	—	—	—	—	15	2	—	—
GAAP2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	100	5
GAAS3	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15	10	—	—
GABI	F	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	7	1	—	—
GABO2	F	—	—	10	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
GATR2	F	—	—	—	—	25	1	—	—	—	—	—	—	—	—	—	—	—	—	15	2	—	—
GATR3	F	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	7	3	—	—
GECA	F	—	—	40	5	50	1	40	18	—	—	—	—	20	3	—	—	—	—	—	—	—	—
GEMA4	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1	30	2	100	1
GEUM	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
GIAG	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	10	—	—

Appendix B-3—Constancy and average cover of all species present in the following types (continued)

Type		SAL/CAA		SABO/CAS		SAL/CAC		SAL/FO		SAFA/AL		SACO/CAU		SACO/CAS		SADR/SE		SALE/MF		SAEX		SASI2/EQ	
N		2		10		4		10		1		1		5		1		1		13		1	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
GICO2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15	2	—	—
GILIA	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
HABEN	F	—	—	—	—	—	—	10	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
HAMI	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	5	—	—
HASA	F	—	—	—	—	—	—	10	1	—	—	—	—	40	1	100	3	—	—	—	—	—	—
HELA4	F	—	—	—	—	—	—	10	3	—	—	—	—	—	—	—	—	100	3	30	5	—	—
HIERA	F	—	—	—	—	—	—	10	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
HYAN2	F	—	—	—	—	—	—	—	—	—	—	—	—	40	8	—	—	—	—	—	—	—	—
HYFON	F	—	—	—	—	25	8	50	6	—	—	—	—	40	1	—	—	—	—	15	1	—	—
HYFOS	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
HYOC	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
HYPE	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
ILRI	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	3
LASE	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15	1	—	—
LATHY	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	3
LICA2	F	—	—	20	6	—	—	40	9	—	—	100	3	—	—	—	—	100	1	7	5	—	—
LILIAF	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
LITE2	F	50	1	40	2	100	5	40	3	—	—	—	—	20	1	—	—	—	—	—	—	—	—
LOCO6	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
LOPU3	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	2	—	—
LUPO2	F	—	—	—	—	25	1	20	3	—	—	—	—	40	2	—	—	100	3	—	—	—	—
MEAL2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	2	—	—
MEAR4	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	30	1	—	—
MECI3	F	—	—	—	—	—	—	30	3	—	—	—	—	—	—	—	—	100	5	23	22	—	—
MEPI	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	5
MIGU	F	—	—	—	—	—	—	10	3	—	—	—	—	—	—	—	—	—	—	7	1	—	—
MILE2	F	—	—	—	—	—	—	10	3	—	—	—	—	40	1	—	—	—	—	—	—	—	—
MIMO3	F	—	—	—	—	—	—	—	—	—	—	—	—	40	1	100	10	—	—	7	1	100	1
MIPE	F	—	—	—	—	—	—	10	1	—	—	—	—	40	2	—	—	—	—	—	—	—	—
MIPR	F	—	—	10	2	—	—	10	1	—	—	—	—	20	1	—	—	—	—	—	—	—	—
MITEL	F	—	—	—	—	—	—	20	6	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MOCO4	F	—	—	—	—	25	3	30	14	—	—	—	—	20	2	—	—	—	—	7	1	100	1
MONTI	F	—	—	—	—	—	—	10	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MYOSO	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15	1	—	—
PAFI3	F	—	—	—	—	—	—	30	7	100	1	100	10	40	1	—	—	100	1	23	3	—	—
PEGL5	F	—	—	—	—	—	—	30	2	—	—	—	—	20	1	—	—	—	—	—	—	—	—
PEGR2	F	—	—	20	1	50	1	80	2	—	—	100	5	40	1	—	—	—	—	7	1	—	—
PENST	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
PEPA29	F	—	—	—	—	25	60	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PHHA	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	5	—	—
PLLA	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	3	—	—
PLMA2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15	1	—	—
POFL3	F	—	—	60	11	100	12	90	23	100	1	—	—	100	3	—	—	100	3	—	—	—	—
POLYG4	F	—	—	—	—	—	—	10	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Appendix B-3—Constancy and average cover of all species present in the following types (continued)

Type		SAL/CAA		SABO/CAS		SAL/CAC		SAL/FO		SAFA/AL		SACO/CAU		SACO/CAS		SADR/SE		SALE/MF		SAEX		SASI2/EQ	
N		2		10		4		10		1		1		5		1		1		13		1	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
POVI3	F	50	1	—	—	—	—	—	—	100	1	—	—	—	—	—	—	—	—	—	—	—	—
PRVU	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
PYAS	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	3	—	—	—	—
RAAL	F	—	—	—	—	25	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RANUN	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
RAOC	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
RAPO	F	—	—	—	—	—	—	10	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RARE3	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
RAUN	F	—	—	—	—	—	—	10	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RUCR	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	23	2	—	—
RUOC2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	46	3	100	5
RUPA5	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
SAAM3	F	—	—	—	—	—	—	10	5	—	—	—	—	—	—	—	—	100	5	—	—	—	—
SAAR13	F	—	—	—	—	—	—	40	2	—	—	—	—	—	—	—	—	100	3	15	15	—	—
SCLA	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
SECY	F	100	2	40	16	25	5	70	16	100	20	100	20	80	4	—	—	—	—	—	—	—	—
SEPS2	F	—	—	—	—	—	—	10	20	—	—	—	—	—	—	—	—	—	—	38	18	—	—
SESE2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	38	6	—	—
SETR	F	—	—	10	1	25	1	40	7	—	—	—	—	20	20	100	20	100	10	38	10	—	—
SIAC	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
SINO	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
SIPR	F	—	—	—	—	—	—	20	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SOCA6	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15	6	100	15
SODU	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
SOLID	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
SOMU	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15	2	—	—
SPCA5	F	—	—	—	—	—	—	—	—	—	—	100	3	—	—	—	—	100	3	7	1	—	—
SPRO	F	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—
STCA	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	3	100	1
STCR2	F	—	—	10	5	—	—	10	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
STLO2	F	—	—	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—
TAOF	F	—	—	—	—	—	—	10	1	—	—	—	—	—	—	—	—	—	—	38	1	—	—
THALI2	F	—	—	—	—	—	—	—	—	—	—	—	—	20	2	—	—	—	—	—	—	—	—
THOC	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15	3	—	—
THVE	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	20	—	—	—	—
TRCA	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	5	—	—	—	—
TRDU	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
TRIFO	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	23	1	—	—
TRPR2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
TRRE3	F	—	—	—	—	—	—	10	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
URDI	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	3	100	10
VERAT	F	—	—	10	1	—	—	10	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VERON	F	—	—	—	—	—	—	10	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VESE	F	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Appendix B-3—Constancy and average cover of all species present in the following types (continued)

Type		SAL/CAA		SABO/CAS		SAL/CAC		SAL/FO		SAFA/AL		SACO/CAU	
N		2		10		4		10		1		1	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
VETH	F	—	—	—	—	—	—	—	—	—	—	—	—
VEWO2	F	—	—	10	1	25	1	20	1	—	—	—	—
VIMA2	F	—	—	—	—	—	—	10	3	—	—	—	—
VIOLA	F	—	—	30	12	50	2	40	8	—	—	—	—
VIOR	F	—	—	—	—	—	—	—	—	—	—	—	—
VIPA4	F	—	—	10	1	—	—	—	—	—	—	—	—
ZIEL2	F	—	—	—	—	—	—	10	3	—	—	100	3
AGAL3	G	—	—	—	—	—	—	—	—	—	—	—	—
AGCA2	G	—	—	—	—	—	—	—	—	—	—	—	—
AGHU	G	—	—	10	10	50	2	20	4	—	—	—	—
AGIN5	G	—	—	—	—	—	—	—	—	—	—	—	—
AGROS2	G	—	—	—	—	—	—	10	1	—	—	100	5
AGSC5	G	—	—	—	—	—	—	—	—	—	—	—	—
AGST2	G	—	—	—	—	—	—	—	—	—	—	—	—
AGTE	G	—	—	—	—	—	—	10	15	—	—	—	—
AGTH2	G	—	—	10	1	25	3	10	5	—	—	—	—
AGVA	G	—	—	10	20	—	—	—	—	—	—	—	—
BRBR5	G	—	—	—	—	—	—	—	—	—	—	—	—
BRCA5	G	—	—	—	—	—	—	10	5	—	—	—	—
BRCI2	G	—	—	—	—	—	—	—	—	—	—	—	—
BRJA	G	—	—	—	—	—	—	—	—	—	—	—	—
BROR2	G	—	—	—	—	—	—	—	—	—	—	—	—
BRTE	G	—	—	—	—	—	—	—	—	—	—	—	—
CACA4	G	—	—	10	5	100	66	30	6	—	—	—	—
CILA2	G	—	—	—	—	—	—	—	—	—	—	—	—
DAIN	G	—	—	20	12	25	1	30	6	—	—	—	—
DECE	G	50	1	30	4	75	5	60	13	100	15	100	3
ELCI2	G	—	—	—	—	—	—	—	—	—	—	—	—
ELGL	G	—	—	—	—	—	—	—	—	—	—	—	—
FEID	G	—	—	—	—	—	—	—	—	—	—	—	—
FEPR	G	—	—	—	—	—	—	—	—	—	—	—	—
FEVI	G	—	—	—	—	—	—	10	1	—	—	—	—
GLEL	G	—	—	—	—	—	—	—	—	—	—	—	—
KOCR	G	—	—	—	—	—	—	20	3	—	—	—	—
MUAN	G	—	—	—	—	—	—	—	—	—	—	—	—
MUFI2	G	—	—	10	5	—	—	30	11	—	—	—	—
PHAL2	G	—	—	10	1	75	1	50	1	—	—	—	—
PHAR3	G	—	—	—	—	—	—	—	—	—	—	—	—
PHPR3	G	—	—	—	—	—	—	—	—	—	—	—	—
POA	G	—	—	—	—	—	—	10	1	—	—	—	—
POCO	G	—	—	—	—	—	—	—	—	—	—	—	—
POLE2	G	—	—	—	—	—	—	10	1	—	—	—	—
POPA2	G	—	—	—	—	—	—	—	—	—	—	—	—

Type		SACO/CAS		SADR/SE		SALE/MF		SAEX		SASI2/EQ	
N		5		1		1		13		1	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
VETH	F	—	—	—	—	—	—	15	1	—	—
VEWO2	F	20	1	—	—	—	—	—	—	—	—
VIMA2	F	—	—	—	—	—	—	—	—	—	—
VIOLA	F	60	3	100	10	100	15	—	—	—	—
VIOR	F	—	—	—	—	—	—	7	1	—	—
VIPA4	F	—	—	—	—	—	—	—	—	—	—
ZIEL2	F	—	—	—	—	—	—	—	—	—	—
AGAL3	G	—	—	—	—	—	—	7	1	—	—
AGCA2	G	—	—	—	—	—	—	15	2	—	—
AGHU	G	—	—	—	—	—	—	—	—	—	—
AGIN5	G	—	—	—	—	—	—	7	5	—	—
AGROS2	G	—	—	—	—	—	—	—	—	—	—
AGSC5	G	—	—	—	—	—	—	15	2	—	—
AGST2	G	—	—	—	—	—	—	15	21	—	—
AGTE	G	—	—	—	—	100	3	—	—	—	—
AGTH2	G	20	3	—	—	—	—	—	—	—	—
AGVA	G	—	—	—	—	—	—	—	—	—	—
BRBR5	G	—	—	—	—	—	—	7	1	—	—
BRCA5	G	20	1	—	—	—	—	15	3	—	—
BRCI2	G	—	—	—	—	100	10	—	—	—	—
BRJA	G	—	—	—	—	—	—	7	1	—	—
BROR2	G	—	—	—	—	—	—	7	1	—	—
BRTE	G	—	—	—	—	—	—	7	2	—	—
CACA4	G	40	16	—	—	100	30	15	7	—	—
CILA2	G	20	8	100	3	—	—	—	—	—	—
DAIN	G	—	—	—	—	—	—	7	1	—	—
DECE	G	20	45	—	—	—	—	15	1	—	—
ELCI2	G	—	—	—	—	—	—	7	1	—	—
ELGL	G	20	36	—	—	100	5	30	4	100	10
FEID	G	—	—	—	—	—	—	7	1	—	—
FEPR	G	—	—	—	—	—	—	7	1	—	—
FEVI	G	—	—	—	—	—	—	—	—	—	—
GLEL	G	—	—	100	5	—	—	15	2	—	—
KOCR	G	—	—	—	—	—	—	—	—	—	—
MUAN	G	—	—	—	—	—	—	7	3	—	—
MUFI2	G	—	—	—	—	—	—	—	—	—	—
PHAL2	G	20	1	—	—	—	—	7	1	—	—
PHAR3	G	—	—	—	—	—	—	23	30	—	—
PHPR3	G	—	—	—	—	—	—	15	1	—	—
POA	G	—	—	—	—	—	—	7	5	—	—
POCO	G	—	—	—	—	—	—	7	3	—	—
POLE2	G	—	—	—	—	—	—	—	—	—	—
POPA2	G	—	—	—	—	—	—	7	2	100	25

Appendix B-3—Constancy and average cover of all species present in the following types (continued)

Type		SAL/CAA		SABO/CAS		SAL/CAC		SAL/FO		SAFA/AL		SACO/CAU		SACO/CAS		SADR/SE		SALE/MF		SAEX		SASI2/EQ	
N		2		10		4		10		1		1		5		1		1		13		1	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
POPR	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	46	9	—	—
TRSP2	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
TRWO3	G	—	—	10	5	50	1	40	4	—	—	—	—	20	1	—	—	—	—	—	—	—	—
CAAB2	GL	—	—	—	—	—	—	10	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAAQ	GL	100	70	10	5	—	—	10	25	—	—	—	—	20	3	—	—	—	—	—	—	100	1
CAAR2	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
CAAU3	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
CACA12	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
CAHO5	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
CAIL	GL	—	—	10	10	25	5	10	5	—	—	—	—	20	1	—	—	—	—	—	—	—	—
CAJO	GL	—	—	—	—	—	—	20	6	—	—	—	—	20	1	—	—	—	—	—	—	—	—
CALA30	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	5	—	—
CALE9	GL	—	—	10	15	—	—	10	1	—	—	—	—	20	5	—	—	—	—	—	—	—	—
CALU7	GL	—	—	20	3	—	—	20	1	—	—	100	10	—	—	—	—	—	—	7	1	—	—
CAMI7	GL	—	—	—	—	—	—	10	12	—	—	—	—	40	1	—	—	—	—	23	3	100	3
CANE2	GL	—	—	10	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CANI2	GL	—	—	10	1	—	—	10	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAPA18	GL	—	—	10	15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAPR4	GL	—	—	20	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAPR7	GL	—	—	—	—	25	1	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
CAREX	GL	—	—	—	—	—	—	10	1	—	—	—	—	—	—	—	—	100	3	23	1	—	—
CASA10	GL	—	—	—	—	—	—	—	—	100	1	—	—	—	—	—	—	—	—	—	—	—	—
CASC10	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
CASC12	GL	50	1	100	62	100	12	80	11	100	15	100	15	100	56	100	3	—	—	—	—	—	—
CAST5	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15	1	—	—
CAUT	GL	—	—	20	6	50	6	10	1	—	—	100	80	—	—	—	—	—	—	7	1	—	—
ELPA3	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	2	—	—
ELPA6	GL	50	3	40	26	25	10	10	1	—	—	—	—	20	30	—	—	—	—	—	—	—	—
JUBA	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
JUCO2	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
JUDR	GL	—	—	20	4	—	—	10	5	—	—	—	—	40	1	—	—	—	—	—	—	—	—
JUEF	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
JUEN	GL	—	—	—	—	—	—	—	—	—	—	—	—	40	1	—	—	—	—	7	1	100	1
JUME3	GL	—	—	10	10	—	—	20	2	—	—	100	10	—	—	—	—	100	1	—	—	—	—
JUNCU	GL	—	—	—	—	—	—	10	10	—	—	—	—	—	—	—	—	—	—	7	3	—	—
JUPA	GL	—	—	—	—	—	—	10	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—
LUCA2	GL	—	—	10	1	—	—	20	1	—	—	—	—	20	1	—	—	—	—	—	—	—	—
LUPA4	GL	—	—	—	—	—	—	10	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
LUZUL	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1	—	—	—	—
SCIRP	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
SCMI2	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	2	—	—
ATFI	FH	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
CYFR2	FH	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—

Appendix B-3—Constancy and average cover of all species present in the following types (continued)

Type		SAL/CAA		SABO/CAS		SAL/CAC		SAL/FO		SAFA/AL		SACO/CAU		SACO/CAS		SADR/SE		SALE/MF		SAEX		SASI2/EQ	
N		2		10		4		10		1		1		5		1		1		13		1	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
EQAR	FH	—	—	—	—	—	—	20	30	—	—	100	10	60	2	—	—	100	3	61	17	100	30
EQLA	FH	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15	2	—	—
EQVA	FH	100	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15	26	—	—

Appendix B-4—Constancy and average cover of all species present in the following types:

- Sitka Alder/Ladyfern Plant Association (ALSI3/AT)
- Sitka Alder/Drooping Woodreed Plant Association (ALSI3/CI)
- Sitka Alder/Mesic Forb Plant Community Type (ALSI3/FO)
- Mountain Alder/Ladyfern Plant Association (ALIN2/AT)
- Mountain Alder/Tall Mannagrass Plant Association (ALIN2/GL)
- Mountain Alder–Red-Osier Dogwood/Mesic Forb Plant Association (ALIN2-CO)
- Mountain Alder/Common Horsetail Plant Association (ALIN2/EQ)
- Mountain Alder–Common Snowberry Plant Association (ALIN2-SY)
- Mountain Alder/Dewey Sedge Plant Community Type (ALIN2/CA)
- Red-Osier Dogwood/Ladyfern Plant Association (COST4/AT)
- Red-Osier Dogwood Plant Association (COST4)

Type		ALSI3/AT		ALSI3/CI		ALSI3/FO		ALIN2/AT		ALIN2/GL		ALIN2-CO		ALIN2/EQ		ALIN2-SY		ALIN2/CA		COST4/AT		COST4	
N		2		2		8		3		2		3		1		1		2		2		9	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
ABGR	PO	—	—	—	—	—	—	33	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ABLA	PO	50	5	—	—	13	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PIEN	PO	—	—	—	—	13	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ABGR	SO	—	—	—	—	13	14	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ALRH2	SO	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	4
PSME	SO	—	—	—	—	—	—	—	—	—	—	—	—	100	10	—	—	—	—	—	—	—	—
TABR2	SO	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	22	4
ABGR	U	—	—	50	1	25	5	33	1	—	—	67	6	—	—	100	2	50	1	—	—	—	—
ABLA	U	100	6	50	1	50	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PIEN	U	50	1	50	1	25	1	33	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PIPO	U	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	1
PSME	U	—	—	—	—	—	—	—	—	—	—	33	6	—	—	100	1	—	—	—	—	11	1
TSME	U	—	—	—	—	13	15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ACGL	S	—	—	—	—	—	—	—	—	—	—	33	2	—	—	100	1	—	—	50	3	66	10
ALIN2	S	—	—	—	—	—	—	100	82	100	90	100	75	100	90	100	30	100	88	50	10	—	—
ALSI3	S	100	68	100	85	100	86	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
AMAL2	S	—	—	—	—	—	—	33	3	—	—	—	—	100	1	100	1	—	—	—	—	33	2
BEOC2	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	35	—	—	50	5	33	12
BERE	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1	—	—	—	—	—	—
CERE2	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	11
CHUM	S	—	—	—	—	13	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CLLI2	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	22	2
COST4	S	—	—	—	—	—	—	100	10	—	—	100	45	—	—	100	4	100	9	100	60	100	52
CRDO2	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	3	—	—	50	10	33	14
HODI	S	—	—	—	—	—	—	33	10	—	—	33	4	100	3	100	20	50	3	—	—	33	27
LIBO3	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	2
LOIN5	S	50	15	—	—	13	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	1
LOUT2	S	50	1	—	—	25	4	—	—	—	—	33	1	—	—	—	—	—	—	—	—	—	—
OPHO	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
PAMY	S	—	—	—	—	13	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PHCA11	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	5	—	—	—	—
PHLE4	S	—	—	—	—	—	—	33	5	—	—	67	23	100	3	100	4	50	55	50	10	66	10
PHMA5	S	—	—	—	—	—	—	—	—	—	—	33	1	—	—	100	1	—	—	—	—	22	2
PRVI	S	—	—	—	—	—	—	33	5	—	—	33	2	—	—	—	—	—	—	—	—	11	5
RHPU	S	—	—	—	—	—	—	—	—	—	—	33	7	—	—	—	—	—	—	—	—	33	6
RHRA6	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	22	8
RIBES	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	2

Appendix B-4—Constancy and average cover of all species present in the following types: (continued)

Type		ALSI3/AT		ALSI3/CI		ALSI3/FO		ALIN2/AT		ALIN2/GL		ALIN2-CO		ALIN2/EQ		ALIN2-SY		ALIN2/CA		COST4/AT		COST4	
N		2		2		8		3		2		3		1		1		2		2		9	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
RIHU	S	100	7	—	—	13	4	67	23	50	35	—	—	—	—	—	—	50	3	—	—	—	—
RIIR	S	—	—	—	—	—	—	—	—	—	—	33	1	—	—	—	—	—	—	—	—	11	5
RILA	S	100	14	—	—	63	8	67	4	—	—	33	2	—	—	100	2	—	—	50	20	22	39
RIMO2	S	—	—	—	—	—	—	—	—	50	10	—	—	—	—	—	—	—	—	—	—	—	—
RINI2	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	4
RIWO	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—	—	—
ROGY	S	—	—	—	—	—	—	—	—	—	—	33	1	100	1	—	—	—	—	—	—	33	1
ROSA5	S	—	—	—	—	—	—	—	—	—	—	33	5	—	—	—	—	—	—	—	—	—	—
ROWO	S	—	—	—	—	—	—	33	1	—	—	33	25	—	—	—	—	50	3	50	5	33	19
RUBUS	S	—	—	—	—	—	—	—	—	—	—	33	1	—	—	—	—	—	—	—	—	—	—
RUDI2	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	20
RUID	S	—	—	—	—	—	—	—	—	—	—	33	1	—	—	100	1	—	—	—	—	—	—
RULE	S	—	—	—	—	—	—	—	—	—	—	33	1	—	—	—	—	50	3	—	—	11	5
RUPA	S	100	3	—	—	13	1	33	60	—	—	67	35	—	—	—	—	100	12	100	12	44	30
SABO2	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	1
SACE3	S	—	—	—	—	13	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SAEX	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—	11	15
SARI2	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	1
SASC	S	50	3	—	—	13	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SASI2	S	—	—	50	3	13	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SOAU	S	—	—	—	—	25	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SOSC2	S	—	—	—	—	13	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SPBE2	S	—	—	—	—	13	5	—	—	—	—	33	2	100	1	100	4	—	—	—	—	11	1
SYAL	S	—	—	—	—	—	—	33	20	—	—	67	18	100	1	100	55	50	3	50	3	44	21
VAME	S	50	3	—	—	50	12	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VASC	S	—	—	—	—	13	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VAUL	S	50	15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ACCO4	F	100	3	50	1	38	12	—	—	50	1	—	—	—	—	—	—	—	—	—	—	11	1
ACMI2	F	—	—	—	—	—	—	33	1	—	—	33	1	100	3	—	—	50	1	—	—	—	—
ACRU2	F	—	—	—	—	13	20	33	2	—	—	67	1	—	—	—	—	—	—	—	—	—	—
ADBI	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	3	22	3
AGUR	F	—	—	—	—	13	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ANAR3	F	—	—	100	7	63	3	33	3	50	20	67	3	100	1	—	—	50	3	50	1	22	2
ANMA	F	—	—	50	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ANPI	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1	—	—	—	—	—	—
ANSC8	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	3
AQFL	F	—	—	—	—	—	—	—	—	—	—	33	1	—	—	—	—	—	—	—	—	—	—
AQFO	F	—	—	—	—	—	—	—	—	—	—	—	—	100	1	—	—	—	—	—	—	—	—
ARCO9	F	—	—	—	—	25	4	33	1	—	—	—	—	—	—	100	3	—	—	—	—	22	1
ARLU	F	—	—	50	1	13	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ARMA18	F	—	—	—	—	38	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ARMI2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	22	2
ARNIC	F	—	—	—	—	—	—	—	—	50	15	—	—	—	—	—	—	—	—	—	—	—	—

Appendix B-4—Constancy and average cover of all species present in the following types: (continued)

Type		ALSI3/AT		ALSI3/CI		ALSI3/FO		ALIN2/AT		ALIN2/GL		ALIN2-CO		ALIN2/EQ		ALIN2-SY		ALIN2/CA		COST4/AT		COST4	
N		2		2		8		3		2		3		1		1		2		2		9	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
ASCA2	F	—	—	—	—	—	—	33	8	—	—	—	—	—	—	—	—	50	1	50	3	—	—
ASEA	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	1
ASFO	F	50	3	50	1	13	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ASMO3	F	—	—	—	—	—	—	33	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ASOC	F	—	—	—	—	—	—	—	—	—	—	—	—	100	10	—	—	—	—	—	—	—	—
ASTER	F	—	—	—	—	—	—	—	—	—	—	33	1	—	—	—	—	50	5	—	—	—	—
BRHO	F	—	—	—	—	—	—	—	—	—	—	—	—	100	1	—	—	—	—	—	—	—	—
CACO6	F	50	10	50	1	—	—	33	1	—	—	—	—	—	—	—	—	—	—	50	5	—	—
CALOC	F	—	—	—	—	—	—	—	—	—	—	—	—	100	1	—	—	—	—	—	—	—	—
CARDA	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—	—	—
CEAR4	F	—	—	—	—	—	—	—	—	—	—	—	—	100	1	—	—	—	—	—	—	11	3
CHLE80	F	—	—	—	—	—	—	—	—	—	—	—	—	100	15	—	—	—	—	—	—	—	—
CIAL	F	—	—	50	5	38	27	67	10	50	3	67	6	—	—	100	5	50	3	100	10	33	2
CIAR4	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	1
CIDO	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	1
CIRSI	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	1
CLUN2	F	—	—	—	—	13	5	—	—	—	—	—	—	—	—	—	—	—	—	50	3	—	—
COLI2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—	—	—
COMA4	F	—	—	—	—	13	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
DICU	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—	—	—
DIHO3	F	—	—	—	—	—	—	33	2	—	—	—	—	—	—	—	—	50	1	—	—	—	—
DISPO	F	—	—	—	—	—	—	—	—	—	—	33	1	—	—	—	—	—	—	—	—	—	—
DISY	F	—	—	—	—	—	—	—	—	—	—	33	1	—	—	—	—	50	1	—	—	11	5
DITR2	F	—	—	—	—	—	—	33	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
DOJE	F	—	—	—	—	—	—	—	—	50	1	—	—	—	—	—	—	—	—	—	—	—	—
EPAL	F	50	1	50	3	13	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
EPAN2	F	—	—	—	—	25	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
EPGL	F	—	—	50	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
EPGL4	F	—	—	50	1	—	—	33	15	100	3	—	—	—	—	—	—	—	—	50	1	—	—
EPILO	F	—	—	—	—	—	—	—	—	—	—	—	—	100	3	—	—	—	—	—	—	—	—
ERPE3	F	—	—	—	—	13	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ERPH	F	—	—	—	—	—	—	—	—	—	—	—	—	100	10	—	—	—	—	—	—	—	—
FRVE	F	—	—	—	—	—	—	—	—	—	—	33	1	—	—	100	1	50	1	—	—	—	—
FRVI	F	—	—	—	—	—	—	33	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
GAAP2	F	50	3	—	—	—	—	33	10	50	10	33	5	100	5	—	—	—	—	50	10	55	7
GAMU2	F	—	—	—	—	—	—	—	—	—	—	—	—	100	3	—	—	—	—	—	—	—	—
GATR2	F	—	—	—	—	—	—	67	3	—	—	33	1	—	—	100	6	50	5	50	1	22	1
GATR3	F	50	10	100	3	100	3	—	—	50	10	—	—	—	—	—	—	—	—	—	—	—	—
GEMA4	F	50	3	50	1	38	2	100	6	50	1	67	2	100	1	100	1	100	1	50	20	—	—
HABEN	F	—	—	—	—	—	—	33	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
HACKE	F	—	—	—	—	13	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
HADI7	F	—	—	50	1	—	—	33	10	—	—	—	—	—	—	—	—	—	—	50	1	—	—
HAMI	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	1

Appendix B-4—Constancy and average cover of all species present in the following types: (continued)

Type		ALSI3/AT		ALSI3/CI		ALSI3/FO		ALIN2/AT		ALIN2/GL		ALIN2-CO		ALIN2/EQ		ALIN2-SY		ALIN2/CA		COST4/AT		COST4	
N		2		2		8		3		2		3		1		1		2		2		9	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
HASA	F	—	—	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
HELA4	F	50	1	50	30	75	21	100	9	100	14	67	2	—	—	—	—	100	2	—	—	33	3
HEMI7	F	—	—	—	—	—	—	—	—	—	—	33	1	—	—	—	—	—	—	—	—	—	—
HEUCH	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	2
HIAL2	F	—	—	—	—	25	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
HIGR	F	—	—	—	—	13	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
HYDRO4	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1	—	—	—	—	—	—
HYFE	F	—	—	—	—	25	8	—	—	—	—	33	1	—	—	—	—	50	3	50	15	22	40
HYPE	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	22	1
HYPER	F	—	—	—	—	—	—	33	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ILRI	F	—	—	—	—	—	—	33	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
LABI	F	—	—	—	—	—	—	33	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
LABIAF	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	1
LASE	F	—	—	—	—	—	—	33	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
LATHY	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	3	—	—	—	—
LEGUMF	F	—	—	—	—	—	—	—	—	—	—	—	—	100	5	—	—	—	—	—	—	—	—
LEMI3	F	—	—	—	—	—	—	33	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—
LICA2	F	—	—	—	—	25	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
LIGR	F	—	—	—	—	—	—	—	—	—	—	33	4	—	—	—	—	—	—	—	—	11	1
LIPA5	F	—	—	—	—	—	—	—	—	—	—	—	—	100	5	—	—	—	—	—	—	—	—
LISTE	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	1
LULE3	F	—	—	—	—	—	—	—	—	—	—	—	—	100	3	—	—	—	—	—	—	—	—
MEAL2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	2
MEAR4	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	1
MECI3	F	—	—	—	—	63	12	—	—	—	—	67	8	—	—	—	—	50	3	—	—	—	—
MELU	F	—	—	—	—	—	—	—	—	—	—	—	—	100	3	—	—	—	—	—	—	—	—
MEPA	F	—	—	50	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MEPI	F	—	—	—	—	—	—	33	3	—	—	—	—	—	—	—	—	—	—	—	—	11	1
MIGU	F	—	—	50	1	—	—	67	1	50	1	—	—	100	15	—	—	—	—	50	10	11	1
MILE2	F	50	3	100	3	—	—	—	—	50	1	—	—	—	—	—	—	—	—	—	—	—	—
MIMO3	F	—	—	50	3	—	—	33	3	100	5	—	—	—	—	—	—	—	—	—	—	—	—
MIPE	F	—	—	100	2	25	2	33	3	50	1	—	—	—	—	—	—	50	1	50	1	—	—
MIPR	F	—	—	—	—	—	—	—	—	50	2	—	—	—	—	—	—	—	—	—	—	—	—
MIST3	F	50	10	—	—	—	—	33	25	50	1	—	—	—	—	100	1	50	1	—	—	11	1
MOCO4	F	100	1	100	18	38	9	100	19	—	—	67	8	—	—	100	11	100	3	50	20	33	1
MOPA2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	3	—	—	—	—
MOPE3	F	—	—	—	—	—	—	—	—	—	—	—	—	100	1	—	—	—	—	—	—	33	5
OSCH	F	100	4	50	3	100	2	33	2	—	—	67	2	100	3	100	1	100	2	—	—	33	3
OSOC	F	—	—	—	—	13	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PAFI3	F	—	—	50	1	13	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
POPU3	F	—	—	—	—	25	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
POTEN	F	—	—	—	—	13	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PRVU	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	1

Appendix B-4—Constancy and average cover of all species present in the following types: (continued)

Type		ALSI3/AT		ALSI3/CI		ALSI3/FO		ALIN2/AT		ALIN2/GL		ALIN2-CO		ALIN2/EQ		ALIN2-SY		ALIN2/CA		COST4/AT		COST4	
N		2		2		8		3		2		3		1		1		2		2		9	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
PYAS	F	—	—	—	—	13	20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PYMI	F	—	—	—	—	13	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PYROL	F	—	—	—	—	13	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PYSE	F	—	—	—	—	13	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RAOC	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	1
RAUN	F	—	—	—	—	—	—	67	5	—	—	—	—	100	10	100	1	50	1	50	5	—	—
RONA2	F	—	—	50	1	—	—	33	1	—	—	—	—	—	—	—	—	—	—	50	1	11	20
RUCR	F	—	—	—	—	—	—	33	1	—	—	—	—	100	3	—	—	—	—	—	—	—	—
RUOC2	F	—	—	50	2	13	5	67	3	—	—	—	—	—	—	—	—	50	5	—	—	11	1
SAAR13	F	100	16	50	1	25	2	—	—	50	15	—	—	—	—	—	—	—	—	50	15	—	—
SCLA	F	—	—	—	—	13	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SEIN2	F	—	—	—	—	13	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SESE2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	1
SEST2	F	—	—	—	—	—	—	—	—	—	—	—	—	100	3	—	—	—	—	—	—	—	—
SETR	F	100	8	100	6	38	3	67	1	100	9	—	—	100	3	—	—	50	1	—	—	22	1
SINO	F	—	—	—	—	—	—	—	—	—	—	33	1	—	—	—	—	—	—	—	—	—	—
SIOR	F	50	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SMRA	F	—	—	—	—	—	—	33	2	—	—	33	15	—	—	—	—	—	—	—	—	33	1
SMST	F	—	—	—	—	13	1	67	10	50	3	33	3	100	5	100	1	—	—	100	4	11	3
SOCA6	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	1
SODU	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	5
STAM2	F	100	5	50	1	50	6	67	4	—	—	—	—	—	—	—	—	—	—	50	30	11	5
STCR2	F	—	—	50	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
STLO	F	—	—	—	—	—	—	33	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
TAOF	F	—	—	—	—	13	1	—	—	—	—	33	1	100	10	—	—	50	1	—	—	11	3
THOC	F	—	—	—	—	25	4	33	3	—	—	—	—	—	—	—	—	—	—	—	—	22	1
THVE	F	—	—	—	—	38	8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
TITR	F	50	5	—	—	13	1	67	6	—	—	—	—	—	—	—	—	—	—	50	5	—	—
TOFL	F	—	—	—	—	—	—	—	—	—	—	33	1	—	—	—	—	—	—	—	—	11	1
TRCA	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	3	50	15	—	—
TROV2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	1
TRPE3	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	1
TRRE3	F	—	—	—	—	—	—	—	—	—	—	—	—	100	1	—	—	50	1	—	—	—	—
URDI	F	—	—	—	—	38	3	67	3	50	20	—	—	—	—	100	2	100	2	50	15	11	3
VASI	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1	—	—	—	—	—	—
VEAM2	F	—	—	—	—	—	—	33	1	—	—	—	—	100	15	—	—	—	—	50	1	—	—
VERAT	F	—	—	—	—	13	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VERON	F	—	—	—	—	—	—	—	—	—	—	—	—	100	3	—	—	—	—	—	—	—	—
VESE	F	50	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—	—	—
VETH	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	1
VEWO2	F	—	—	50	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VICA4	F	—	—	—	—	13	5	33	15	—	—	33	5	—	—	—	—	50	3	50	5	33	1
VIGL	F	—	—	50	1	25	4	33	2	—	—	—	—	100	20	100	3	—	—	—	—	22	8

Appendix B-4—Constancy and average cover of all species present in the following types: (continued)

Type		ALSI3/AT		ALSI3/CI		ALSI3/FO		ALIN2/AT		ALIN2/GL		ALIN2-CO		ALIN2/EQ		ALIN2-SY		ALIN2/CA		COST4/AT		COST4	
N		2		2		8		3		2		3		1		1		2		2		9	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
VIOLA	F	100	2	50	5	63	15	—	—	—	—	—	—	—	—	—	—	—	—	50	5	—	—
VIOR	F	—	—	—	—	13	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
AGRE2	G	—	—	—	—	—	—	—	—	—	—	33	2	—	—	—	—	—	—	—	—	—	—
AGROS2	G	—	—	—	—	—	—	—	—	—	—	33	1	—	—	—	—	—	—	—	—	—	—
AGST2	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	70
AGTH2	G	—	—	50	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
AREL3	G	—	—	—	—	—	—	—	—	—	—	—	—	100	3	—	—	—	—	—	—	—	—
BRCA5	G	—	—	50	1	13	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
BROMU	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1	—	—	—	—	22	1
BRRI8	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	1
BRSU2	G	—	—	—	—	13	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
BRTE	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	10
BRVU	G	50	1	—	—	50	4	—	—	—	—	—	—	—	—	—	—	50	1	—	—	11	1
CAAQ3	G	—	—	50	5	—	—	33	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CACA4	G	—	—	50	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CILA2	G	50	5	100	15	25	1	—	—	100	9	—	—	—	—	100	8	—	—	—	—	11	2
DAGL	G	—	—	—	—	—	—	—	—	—	—	—	—	100	5	—	—	—	—	—	—	—	—
DEEL	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	1
ELGL	G	—	—	50	4	63	2	33	2	—	—	67	3	—	—	—	—	50	5	—	—	33	1
FEAR3	G	—	—	—	—	—	—	—	—	—	—	—	—	100	15	—	—	—	—	—	—	—	—
FEOC	G	—	—	—	—	—	—	—	—	—	—	—	—	100	1	—	—	—	—	—	—	—	—
FESU	G	—	—	—	—	—	—	67	20	—	—	—	—	—	—	—	—	—	—	50	20	—	—
GLEL	G	100	6	100	3	—	—	67	16	100	19	33	5	100	5	—	—	—	—	50	10	22	1
MESU	G	—	—	—	—	—	—	33	3	—	—	—	—	—	—	—	—	50	1	—	—	—	—
PHAR3	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	40
PHPR3	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	1
POA	G	—	—	—	—	—	—	—	—	—	—	33	5	—	—	—	—	—	—	—	—	—	—
POPA2	G	—	—	—	—	—	—	33	20	—	—	—	—	100	3	—	—	—	—	—	—	—	—
POPR	G	—	—	—	—	—	—	—	—	—	—	—	—	100	10	100	1	—	—	—	—	11	1
PUPA3	G	—	—	—	—	—	—	—	—	—	—	—	—	100	3	—	—	—	—	—	—	—	—
TRWO3	G	50	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAAM10	GL	—	—	—	—	—	—	33	5	50	1	—	—	—	—	—	—	—	—	50	5	—	—
CAAQ	GL	—	—	50	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAAR2	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	1
CADE9	GL	—	—	50	3	13	1	100	30	50	1	67	12	—	—	100	75	100	8	100	14	33	2
CAGE2	GL	—	—	—	—	13	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	2
CAHO5	GL	—	—	50	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAJO	GL	—	—	—	—	—	—	—	—	50	1	—	—	—	—	—	—	—	—	—	—	—	—
CALA13	GL	50	15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CALU7	GL	—	—	50	1	—	—	—	—	50	1	—	—	—	—	—	—	—	—	—	—	—	—
CAMI7	GL	—	—	100	1	—	—	—	—	—	—	—	—	—	—	100	1	—	—	—	—	—	—
CANU5	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	3
CAPR7	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—	—	—

Appendix B-4—Constancy and average cover of all species present in the following types: (continued)

Type		ALSI3/AT		ALSI3/CI		ALSI3/FO		ALIN2/AT		ALIN2/GL		ALIN2-CO		ALIN2/EQ		ALIN2-SY		ALIN2/CA		COST4/AT		COST4	
N		2		2		8		3		2		3		1		1		2		2		9	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
CAREX	GL	50	5	—	—	13	3	—	—	—	—	—	—	100	3	—	—	—	—	—	—	11	1
CARO5	GL	—	—	—	—	13	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CARU	GL	—	—	—	—	13	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CASH	GL	—	—	—	—	—	—	—	—	—	—	33	8	—	—	—	—	—	—	—	—	—	—
CASU6	GL	—	—	—	—	—	—	33	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAUT	GL	—	—	50	5	—	—	—	—	50	1	—	—	—	—	—	—	—	—	—	—	—	—
CAVE6	GL	—	—	—	—	—	—	—	—	—	—	33	1	—	—	—	—	—	—	—	—	—	—
ELPA3	GL	—	—	—	—	—	—	—	—	—	—	—	—	100	10	—	—	—	—	—	—	—	—
JUBA	GL	—	—	—	—	—	—	—	—	—	—	—	—	100	10	—	—	—	—	—	—	—	—
JUEN	GL	—	—	50	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
JUNCU	GL	—	—	—	—	13	1	—	—	—	—	—	—	—	—	100	1	—	—	—	—	—	—
LUCA2	GL	—	—	—	—	—	—	—	—	—	—	—	—	100	3	—	—	—	—	—	—	—	—
LUPA4	GL	—	—	—	—	25	1	—	—	—	—	—	—	—	—	—	—	50	3	50	3	—	—
SCMI2	GL	—	—	—	—	—	—	—	—	50	5	33	1	100	5	100	1	—	—	—	—	—	—
ADPE	FH	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	10	—	—
ATFI	FH	100	8	50	1	13	4	100	17	—	—	33	1	—	—	—	—	100	3	100	40	22	12
CYFR2	FH	—	—	—	—	13	1	33	3	—	—	33	1	—	—	100	1	50	1	50	10	33	1
DRFI2	FH	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	3	11	1
EQAR	FH	—	—	50	10	—	—	100	5	100	6	100	6	100	25	100	1	—	—	—	—	22	30
EQHY	FH	—	—	—	—	—	—	33	3	—	—	33	1	—	—	—	—	50	3	—	—	66	3
EQLA	FH	—	—	—	—	—	—	—	—	—	—	—	—	100	1	—	—	—	—	—	—	—	—
EQPA	FH	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	10	—	—	—	—
GYDR	FH	50	5	—	—	—	—	33	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—
POMU	FH	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	3	11	3
PTAQ	FH	—	—	—	—	—	—	33	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Appendix B-5—Constancy and average cover of all species present in the following types:

- Water Birch/Wet Sedge Plant Community Type (BEOC/WS)
- Water Birch/Reed Canarygrass Plant Community (BEOC/PH)
- Water Birch/Mesic Forb Plant Community Type (BEOC/FO)
- Black Hawthorn/Mesic Forb Plant Community Type (CRDO/FO)
- Common Snowberry Plant Community Type (SYAL)
- Rocky Mountain Maple Plant Community Type (ACGL)
- Pacific Ninebark Plant Community (PHCA11)
- Mallow Ninebark-Common Snowberry Plant Community Type (PHMA5)
- Netleaf Hackberry/Brome Plant Community Type (CERE/BR)
- Lewis' Mock Orange/Mesic Forb Plant Community Type (PHLE/FO)

Type		**BEOC/WS**		**BEOC/PH**		**BEOC/FO**		**CRDO/FO**		**SYAL**		**ACGL**		**PHCA11**		**PHMA5**		**CERE/BR**		**PHLE/FO**	
N		**2**		**1**		**13**		**17**		**6**		**8**		**1**		**2**		**14**		**9**	
Species	**LF**	**CON**	**COV**	**CON**	**COV**	**CON**	**COV**	**CON**	**COV**	**CON**	**COV**	**CON**	**COV**	**CON**	**COV**	**CON**	**COV**	**CON**	**COV**	**CON**	**COV**
ALRH2	PO	—	—	—	—	—	—	6	2	—	—	—	—	—	—	—	—	7	40	11	2
ALRU2	PO	—	—	100	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PSME	PO	—	—	—	—	—	—	6	5	17	10	—	—	—	—	—	—	—	—	—	—
ALRH2	SO	—	—	—	—	8	15	—	—	—	—	13	20	—	—	—	—	—	—	—	—
JUNI	SO	—	—	—	—	8	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PIPO	SO	—	—	—	—	—	—	6	2	—	—	—	—	—	—	—	—	—	—	—	—
POTR15	SO	—	—	—	—	8	6	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PRAM	SO	—	—	—	—	8	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PSME	SO	—	—	—	—	—	—	—	—	17	1	—	—	—	—	—	—	—	—	—	—
TABR2	SO	—	—	—	—	—	—	6	2	—	—	13	1	—	—	—	—	—	—	—	—
ABGR	U	—	—	—	—	—	—	6	1	17	1	13	5	100	3	—	—	—	—	—	—
ALRH2	U	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	22	2
LAOC	U	—	—	—	—	8	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PIEN	U	—	—	—	—	8	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
POTR15	U	—	—	—	—	8	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PSME	U	—	—	—	—	8	3	12	3	—	—	—	—	—	—	—	—	—	—	—	—
ROPS	U	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	1
ACGL	S	50	3	—	—	46	14	23	6	33	9	100	74	100	20	50	5	14	21	22	3
ALIN2	S	100	9	—	—	7	13	—	—	16	10	—	—	—	—	—	—	—	—	—	—
AMAL2	S	50	5	—	—	38	6	35	7	33	8	25	6	100	10	100	9	28	6	33	6
BEOC2	S	100	38	100	80	100	72	—	—	16	10	—	—	—	—	—	—	7	20	—	—
BERE	S	—	—	—	—	7	3	17	4	—	—	—	—	—	—	—	—	—	—	—	—
CERE2	S	—	—	—	—	46	11	17	9	33	8	12	3	—	—	—	—	100	72	66	16
CLCO2	S	—	—	—	—	7	1	—	—	—	—	—	—	—	—	—	—	14	4	—	—
CLLI2	S	—	—	—	—	23	2	—	—	—	—	—	—	—	—	—	—	7	1	—	—
COST4	S	—	—	100	3	38	5	5	4	16	20	25	6	100	10	—	—	7	50	11	30
CRDO2	S	50	10	—	—	46	13	100	86	50	9	25	20	—	—	50	10	21	17	33	11
HODI	S	50	5	100	1	23	37	35	14	50	22	37	18	—	—	50	10	28	22	11	15
LIBO3	S	—	—	—	—	—	—	—	—	—	—	12	3	—	—	—	—	—	—	—	—
PAMY	S	—	—	—	—	—	—	—	—	—	—	12	5	100	3	—	—	—	—	—	—
PHCA11	S	—	—	—	—	—	—	—	—	—	—	—	—	100	95	—	—	—	—	—	—
PHLE4	S	—	—	100	10	92	16	70	11	50	28	87	23	100	15	—	—	78	23	100	55
PHMA5	S	50	3	—	—	7	2	23	6	33	14	12	6	—	—	100	42	—	—	11	25
POFR4	S	—	—	—	—	7	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PREM	S	—	—	—	—	7	2	5	10	—	—	—	—	—	—	—	—	—	—	—	—
PRVI	S	—	—	—	—	53	9	23	10	—	—	12	1	—	—	—	—	28	22	33	3
RHGL	S	—	—	—	—	7	1	—	—	16	1	—	—	—	—	—	—	7	1	11	2
RHPU	S	—	—	—	—	38	11	5	3	16	2	25	5	100	20	—	—	7	20	22	1

Appendix B-5—Constancy and average cover of all species present in the following types: (continued)

Type		BEOC/WS		BEOC/PH		BEOC/FO		CRDO/FO		SYAL		ACGL		PHCA11		PHMA5		CERE/BR		PHLE/FO	
N		2		1		13		17		6		8		1		2		14		9	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
RHRA6	S	—	—	—	—	76	13	35	8	16	10	37	4	—	—	—	—	64	13	44	7
RIBES	S	50	3	—	—	7	1	29	4	—	—	—	—	—	—	—	—	7	1	11	3
RICE	S	—	—	—	—	—	—	—	—	—	—	12	1	—	—	—	—	—	—	—	—
RIHU	S	—	—	100	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RIIN2	S	—	—	—	—	—	—	5	3	—	—	—	—	—	—	—	—	—	—	11	10
RIIR	S	—	—	—	—	7	1	5	3	16	1	—	—	—	—	—	—	—	—	11	1
RILA	S	—	—	—	—	15	2	5	3	16	15	12	20	—	—	—	—	—	—	11	5
RIMO2	S	—	—	—	—	7	3	—	—	—	—	12	3	—	—	—	—	7	5	—	—
RINI2	S	—	—	—	—	15	1	—	—	—	—	—	—	—	—	—	—	21	6	—	—
ROGY	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	35
RONU	S	—	—	—	—	—	—	11	10	16	5	—	—	—	—	—	—	14	2	11	4
ROSA5	S	—	—	—	—	—	—	11	6	—	—	12	1	—	—	—	—	7	1	—	—
ROWO	S	50	15	—	—	23	15	17	2	50	27	12	3	—	—	—	—	7	1	11	1
RUDI2	S	—	—	—	—	7	1	5	5	—	—	—	—	—	—	—	—	7	50	—	—
RUID	S	—	—	—	—	7	3	5	10	16	3	—	—	—	—	50	5	—	—	11	3
RULA	S	50	10	—	—	—	—	—	—	—	—	12	10	—	—	—	—	—	—	—	—
RULE	S	50	3	—	—	7	1	—	—	—	—	—	—	—	—	—	—	7	5	—	—
RUPA	S	—	—	—	—	23	21	11	10	16	5	37	15	100	3	50	25	14	6	—	—
SACE3	S	—	—	—	—	38	5	35	8	33	11	25	10	—	—	—	—	42	10	33	15
SALE	S	—	—	—	—	—	—	5	3	—	—	—	—	—	—	—	—	—	—	—	—
SARA2	S	—	—	—	—	—	—	5	5	—	—	—	—	—	—	—	—	—	—	—	—
SARI2	S	—	—	—	—	7	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SHCA	S	—	—	—	—	7	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SPBE2	S	—	—	—	—	15	2	5	5	—	—	25	7	—	—	100	20	—	—	—	—
SYAL	S	50	5	—	—	46	9	94	20	100	64	50	10	100	40	50	15	28	36	11	3
ACCO4	F	—	—	—	—	—	—	—	—	—	—	12	1	—	—	—	—	—	—	—	—
ACMI2	F	—	—	—	—	38	8	11	2	16	3	12	1	—	—	50	3	7	1	22	1
ACRU2	F	—	—	—	—	—	—	5	1	16	3	12	3	—	—	—	—	—	—	—	—
ADBI	F	—	—	—	—	—	—	5	1	16	5	12	3	—	—	—	—	—	—	11	5
AGUR	F	—	—	—	—	—	—	5	3	16	5	12	1	—	—	50	1	14	2	33	4
ALAC4	F	—	—	—	—	—	—	5	1	—	—	—	—	—	—	—	—	7	3	—	—
AMRE2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	22	1
ANAR3	F	50	5	—	—	—	—	5	1	—	—	—	—	—	—	—	—	—	—	—	—
ANPI	F	50	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ANSC8	F	—	—	—	—	69	18	64	44	33	65	50	30	—	—	—	—	92	47	77	27
APAN2	F	—	—	—	—	—	—	—	—	—	—	12	1	—	—	50	3	—	—	—	—
AQFO	F	—	—	—	—	—	—	—	—	16	3	—	—	—	—	—	—	—	—	—	—
ARCO9	F	—	—	—	—	—	—	17	16	16	1	25	16	—	—	100	28	—	—	—	—
ARGL	F	—	—	—	—	—	—	—	—	16	5	—	—	—	—	—	—	—	—	—	—
ARLU	F	—	—	—	—	7	1	—	—	—	—	12	2	—	—	—	—	14	2	22	2
ARMA18	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	3	—	—	—	—
ARMI2	F	—	—	—	—	23	2	29	1	16	5	12	5	—	—	—	—	28	4	22	6
ARSE2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	11	25
ASCA2	F	50	3	—	—	—	—	—	—	—	—	12	10	100	10	—	—	—	—	—	—

Appendix B-5—Constancy and average cover of all species present in the following types: (continued)

Type		BEOC/WS		BEOC/PH		BEOC/FO		CRDO/FO		SYAL		ACGL		PHCA11		PHMA5		CERE/BR		PHLE/FO	
N		2		1		13		17		6		8		1		2		14		9	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
ASCO3	F	—	—	—	—	7	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ASFO	F	50	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ASTER	F	—	—	—	—	7	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ASTERF	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
BASA3	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	5
BRDO	F	—	—	—	—	—	—	5	1	—	—	—	—	—	—	—	—	7	1	—	—
BRGR	F	—	—	—	—	7	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
BRHY2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	1
CABU2	F	—	—	—	—	—	—	—	—	—	—	12	1	—	—	—	—	—	—	—	—
CAOL	F	—	—	—	—	7	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CARDA	F	—	—	—	—	7	6	—	—	—	—	—	—	—	—	—	—	—	—	11	1
CEAR4	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	3	14	1	33	10
CERAS	F	—	—	100	1	—	—	5	1	—	—	—	—	—	—	—	—	—	—	11	1
CEVI3	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	5
CHLE80	F	—	—	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CHTE2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	1
CIAL	F	—	—	100	5	30	12	64	9	66	12	50	2	—	—	50	5	7	3	11	10
CIAR4	F	50	1	—	—	7	3	—	—	50	2	—	—	—	—	—	—	7	1	—	—
CIRSI	F	—	—	—	—	15	1	—	—	16	1	—	—	—	—	—	—	—	—	22	1
CIUN	F	—	—	—	—	7	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CIVU	F	—	—	—	—	7	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CLUN2	F	—	—	—	—	—	—	—	—	—	—	12	10	—	—	—	—	—	—	—	—
COPA3	F	—	—	—	—	—	—	—	—	16	1	—	—	—	—	—	—	—	—	—	—
CYOF	F	—	—	—	—	30	2	11	1	16	1	12	1	—	—	—	—	28	2	33	1
DICU	F	—	—	—	—	—	—	5	3	16	1	—	—	100	15	—	—	—	—	—	—
DIHO3	F	—	—	—	—	—	—	—	—	—	—	12	35	100	10	—	—	—	—	—	—
DISY	F	—	—	—	—	23	2	5	1	—	—	12	1	—	—	—	—	—	—	33	2
DITR2	F	—	—	100	1	7	1	5	1	—	—	12	1	—	—	—	—	—	—	—	—
EPAN2	F	—	—	—	—	7	1	—	—	16	1	—	—	—	—	—	—	—	—	—	—
EPGL	F	50	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
EPGL4	F	50	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
EPILO	F	—	—	—	—	—	—	—	—	16	3	—	—	—	—	—	—	—	—	—	—
ERAS2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
ERGR9	F	—	—	—	—	7	5	—	—	16	3	—	—	—	—	100	6	—	—	—	—
ERIGE2	F	—	—	100	3	7	1	—	—	—	—	—	—	—	—	—	—	—	—	11	1
FRVE	F	—	—	—	—	7	3	5	10	16	3	—	—	—	—	—	—	—	—	—	—
GAAP2	F	—	—	100	3	69	16	82	21	100	9	75	16	—	—	50	10	85	25	77	6
GALIU	F	—	—	—	—	—	—	5	1	—	—	—	—	—	—	—	—	—	—	—	—
GATR2	F	—	—	100	10	—	—	17	9	16	3	12	3	—	—	50	5	—	—	—	—
GATR3	F	—	—	—	—	7	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
GEAL3	F	—	—	100	1	—	—	5	1	—	—	—	—	—	—	—	—	—	—	—	—
GEBI2	F	—	—	—	—	—	—	11	1	—	—	—	—	—	—	—	—	7	1	—	—
GEMA4	F	100	12	—	—	—	—	—	—	16	1	—	—	—	—	—	—	—	—	—	—
GEPU2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	11	3

Appendix B-5—Constancy and average cover of all species present in the following types: (continued)

Type		BEOC/WS		BEOC/PH		BEOC/FO		CRDO/FO		SYAL		ACGL		PHCA11		PHMA5		CERE/BR		PHLE/FO	
N		2		1		13		17		6		8		1		2		14		9	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
GOOB2	F	—	—	—	—	—	—	5	1	—	—	—	—	—	—	—	—	—	—	—	—
HADI7	F	50	15	100	5	—	—	5	5	—	—	—	—	—	—	—	—	—	—	—	—
HAMI	F	—	—	—	—	7	1	—	—	—	—	—	—	—	—	—	—	7	1	11	1
HEBO	F	—	—	—	—	7	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
HELA4	F	—	—	100	10	7	2	5	3	33	6	—	—	—	—	—	—	—	—	11	30
HIERA	F	—	—	—	—	—	—	5	1	16	1	—	—	—	—	50	5	—	—	—	—
HYCA4	F	—	—	—	—	15	1	5	5	—	—	—	—	—	—	50	3	—	—	—	—
HYFE	F	—	—	—	—	7	3	29	9	—	—	25	10	100	40	—	—	14	1	—	—
HYPE	F	—	—	—	—	—	—	11	1	—	—	12	1	—	—	—	—	—	—	33	4
HYPER	F	—	—	100	3	7	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ILRI	F	—	—	100	3	—	—	—	—	16	1	—	—	—	—	—	—	—	—	—	—
LABI	F	50	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
LAPA5	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	5	—	—	—	—
LASE	F	—	—	—	—	15	1	11	1	—	—	12	1	—	—	—	—	14	1	—	—
LATHY	F	—	—	—	—	—	—	5	3	—	—	12	1	—	—	50	3	—	—	—	—
LIGR	F	—	—	—	—	—	—	5	1	—	—	—	—	—	—	—	—	—	—	—	—
LILIAF	F	—	—	—	—	—	—	5	1	—	—	—	—	—	—	—	—	—	—	—	—
LODI	F	—	—	—	—	—	—	—	—	—	—	12	1	—	—	—	—	7	1	—	—
LYAL	F	—	—	—	—	15	3	—	—	—	—	—	—	—	—	—	—	7	3	11	5
LYCO	F	—	—	—	—	7	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MAVU	F	—	—	—	—	7	1	—	—	—	—	—	—	—	—	—	—	—	—	11	1
MEAR4	F	—	—	—	—	7	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MECI3	F	—	—	—	—	—	—	5	3	33	3	12	1	—	—	—	—	—	—	—	—
MEOF	F	—	—	—	—	7	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MEPI	F	—	—	—	—	7	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MIGR	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	3	—	—	—	—
MIGU	F	50	10	—	—	23	1	5	3	—	—	—	—	—	—	—	—	—	—	11	1
MIMUL	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	5
MIST3	F	—	—	—	—	—	—	—	—	16	3	—	—	—	—	—	—	—	—	—	—
MOCO4	F	—	—	100	10	—	—	—	—	—	—	12	3	—	—	—	—	—	—	—	—
MOPE3	F	—	—	100	1	46	15	82	16	50	9	87	10	—	—	50	15	50	14	44	12
MOSI2	F	—	—	—	—	7	1	—	—	16	3	—	—	—	—	—	—	—	—	—	—
MYMI	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
NEPA	F	—	—	—	—	—	—	5	15	16	3	—	—	—	—	—	—	—	—	—	—
OSCH	F	—	—	—	—	38	11	52	11	50	8	75	8	—	—	50	5	21	3	22	6
OSMOR	F	—	—	—	—	7	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
OSOC	F	—	—	100	5	7	10	5	1	—	—	—	—	—	—	—	—	—	—	—	—
PAPE5	F	—	—	—	—	7	1	—	—	—	—	—	—	—	—	—	—	7	10	—	—
PENST	F	—	—	—	—	7	1	—	—	—	—	12	1	—	—	—	—	—	—	—	—
PLSC2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	1
POAR7	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—	—	—
POGR9	F	—	—	—	—	—	—	—	—	—	—	12	1	—	—	—	—	—	—	—	—
PRVU	F	—	—	100	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RANUN	F	—	—	—	—	7	1	—	—	16	1	—	—	—	—	—	—	—	—	—	—

Appendix B-5—Constancy and average cover of all species present in the following types: (continued)

Type		BEOC/WS		BEOC/PH		BEOC/FO		CRDO/FO		SYAL		ACGL		PHCA11		PHMA5		CERE/BR		PHLE/FO	
N		2		1		13		17		6		8		1		2		14		9	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
RAUN	F	50	3	100	10	—	—	5	5	16	1	—	—	—	—	—	—	—	—	—	—
RONA2	F	—	—	—	—	7	15	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RUAC2	F	—	—	—	—	—	—	—	—	16	3	—	—	—	—	—	—	—	—	—	—
RUCR	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	10
RUMEX	F	—	—	—	—	7	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RUOC2	F	—	—	100	5	7	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SAIN4	F	—	—	—	—	—	—	—	—	16	5	—	—	—	—	—	—	—	—	—	—
SAXIF	F	—	—	—	—	—	—	—	—	16	1	—	—	—	—	—	—	—	—	—	—
SESE2	F	—	—	—	—	—	—	—	—	16	5	—	—	—	—	—	—	—	—	—	—
SIAL2	F	—	—	—	—	7	1	—	—	—	—	12	1	—	—	—	—	—	—	11	1
SIME	F	—	—	—	—	—	—	—	—	16	1	—	—	—	—	—	—	—	—	—	—
SINO	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
SIOR	F	—	—	—	—	7	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SMILA	F	—	—	—	—	—	—	5	1	—	—	—	—	—	—	—	—	—	—	—	—
SMRA	F	—	—	—	—	38	1	23	3	16	1	25	4	—	—	50	10	7	1	—	—
SMST	F	—	—	—	—	—	—	5	3	66	11	12	10	100	5	—	—	—	—	—	—
SODU	F	50	5	—	—	30	2	5	3	—	—	—	—	—	—	—	—	—	—	11	1
SOMU	F	—	—	—	—	7	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
STAM2	F	—	—	—	—	—	—	—	—	33	3	—	—	—	—	—	—	—	—	—	—
STCA	F	50	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
STME2	F	—	—	—	—	23	19	17	8	16	5	25	2	—	—	—	—	21	5	22	3
SYMI	F	—	—	—	—	—	—	—	—	16	3	—	—	—	—	—	—	—	—	—	—
TAOF	F	—	—	100	1	46	1	29	2	33	3	12	1	—	—	—	—	14	6	33	1
THALI2	F	—	—	—	—	—	—	—	—	16	1	—	—	—	—	—	—	—	—	—	—
THOC	F	—	—	—	—	7	1	17	6	—	—	12	3	—	—	—	—	—	—	—	—
TOFL	F	—	—	—	—	15	10	29	7	16	3	25	5	—	—	100	12	14	4	11	2
TRCA	F	—	—	—	—	—	—	—	—	—	—	12	1	—	—	—	—	—	—	—	—
TRDU	F	—	—	—	—	—	—	5	1	16	1	—	—	—	—	—	—	7	1	11	1
TRIFO	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	30
TROV2	F	—	—	—	—	—	—	11	8	16	3	—	—	—	—	50	5	—	—	—	—
TRPE3	F	—	—	—	—	—	—	5	15	16	10	—	—	—	—	—	—	—	—	—	—
TRPR2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—
TRRE3	F	—	—	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
UMBELF	F	—	—	—	—	—	—	5	2	—	—	—	—	—	—	—	—	—	—	—	—
URDI	F	—	—	100	1	38	1	29	3	33	8	—	—	—	—	—	—	21	2	44	4
VALO	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	1
VASI	F	—	—	—	—	7	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VEAM2	F	50	3	—	—	15	1	5	5	—	—	—	—	—	—	—	—	—	—	11	1
VEAN2	F	—	—	—	—	7	1	—	—	—	—	—	—	—	—	—	—	—	—	11	5
VEPE2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	5
VERON	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	1
VETH	F	—	—	—	—	7	1	5	1	—	—	—	—	—	—	—	—	—	—	22	2
VIAM	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	8	—	—	—	—
VICA4	F	—	—	100	5	15	18	41	11	—	—	12	5	—	—	—	—	7	25	11	1

Appendix B-5—Constancy and average cover of all species present in the following types: (continued)

Type		BEOC/WS		BEOC/PH		BEOC/FO		CRDO/FO		SYAL		ACGL		PHCA11		PHMA5		CERE/BR		PHLE/FO	
N		2		1		13		17		6		8		1		2		14		9	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
VICIA	F	—	—	—	—	7	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VIOLA	F	50	1	—	—	15	14	11	3	—	—	—	—	—	—	—	—	—	—	—	—
AGCA2	G	—	—	—	—	—	—	—	—	—	—	12	2	—	—	—	—	—	—	—	—
AGSC5	G	—	—	—	—	7	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
AGSP	G	—	—	—	—	—	—	—	—	—	—	12	5	—	—	—	—	7	1	44	6
BRCA5	G	—	—	—	—	—	—	17	3	—	—	25	3	—	—	—	—	—	—	—	—
BROMU	G	—	—	—	—	—	—	5	10	16	10	—	—	—	—	—	—	—	—	—	—
BROR2	G	—	—	—	—	—	—	—	—	—	—	12	5	—	—	—	—	—	—	—	—
BRRI8	G	—	—	—	—	23	13	11	12	—	—	25	8	—	—	—	—	42	38	33	27
BRSE	G	—	—	—	—	7	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—
BRST2	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	45
BRTE	G	—	—	—	—	30	14	11	12	16	30	12	5	—	—	—	—	35	46	44	35
BRVU	G	—	—	—	—	7	10	17	2	—	—	—	—	—	—	—	—	—	—	11	1
CARU	G	—	—	—	—	—	—	5	25	—	—	—	—	—	—	—	—	—	—	—	—
DAGL	G	—	—	—	—	15	3	11	2	33	3	—	—	—	—	—	—	—	—	—	—
ELCI2	G	—	—	—	—	7	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ELGL	G	50	5	—	—	46	8	58	18	16	5	62	3	—	—	—	—	28	2	33	3
FEID	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	1
FEOC	G	—	—	—	—	—	—	—	—	16	15	12	1	—	—	—	—	—	—	—	—
FEPR	G	—	—	—	—	—	—	5	2	—	—	—	—	—	—	—	—	—	—	—	—
FESU	G	50	5	—	—	15	5	5	5	—	—	—	—	—	—	—	—	—	—	—	—
GLEL	G	50	20	—	—	7	5	5	5	—	—	—	—	—	—	—	—	—	—	—	—
MESU	G	—	—	—	—	—	—	11	12	16	15	50	5	—	—	—	—	—	—	—	—
PHAR3	G	—	—	100	40	—	—	5	5	—	—	—	—	—	—	—	—	—	—	—	—
PHPR3	G	—	—	—	—	7	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
POA	G	—	—	—	—	7	1	5	10	—	—	—	—	—	—	—	—	—	—	—	—
POBU	G	—	—	—	—	—	—	—	—	—	—	12	3	—	—	—	—	—	—	—	—
POCO	G	—	—	—	—	—	—	5	5	—	—	—	—	—	—	—	—	7	5	—	—
POPR	G	100	1	—	—	38	11	17	5	50	6	25	8	—	—	—	—	7	1	55	7
POSC	G	—	—	—	—	—	—	—	—	—	—	12	1	—	—	—	—	—	—	—	—
TRCA21	G	—	—	—	—	—	—	11	8	16	1	12	1	—	—	—	—	—	—	—	—
TRCE2	G	—	—	—	—	—	—	5	15	—	—	—	—	—	—	—	—	—	—	—	—
CAAM10	GL	100	75	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CABA3	GL	—	—	—	—	7	3	5	5	—	—	12	3	—	—	—	—	—	—	—	—
CACO11	GL	—	—	—	—	—	—	5	1	—	—	—	—	—	—	—	—	—	—	—	—
CADE9	GL	100	18	100	15	30	21	41	10	33	6	37	2	—	—	—	—	—	—	22	1
CAGE2	GL	—	—	100	1	7	20	5	1	16	15	12	6	—	—	—	—	—	—	—	—
CALA13	GL	—	—	—	—	—	—	5	1	—	—	—	—	—	—	—	—	—	—	—	—
CAREX	GL	50	3	—	—	7	1	5	5	—	—	—	—	—	—	—	—	7	1	—	—
CARO5	GL	—	—	—	—	—	—	5	1	16	5	—	—	—	—	50	20	—	—	—	—
JUBA	GL	50	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SCCY	GL	50	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SCMI2	GL	50	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ATFI	FH	100	16	—	—	—	—	5	1	—	—	—	—	—	—	—	—	—	—	—	—

Appendix B-5—Constancy and average cover of all species present in the following types: (continued)

Type		BEOC/WS		BEOC/PH		BEOC/FO		CRDO/FO		SYAL		ACGL		PHCA11		PHMA5		CERE/BR		PHLE/FO	
N		2		1		13		17		6		8		1		2		14		9	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
BOVI	FH	—	—	—	—	7	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CYFR2	FH	—	—	—	—	7	1	11	2	50	5	37	1	—	—	50	20	—	—	11	3
DRFI2	FH	—	—	100	5	7	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—
EQAR	FH	50	60	100	3	7	1	5	1	—	—	—	—	—	—	—	—	—	—	—	—
EQHY	FH	—	—	100	3	46	8	23	5	—	—	50	2	—	—	—	—	—	—	22	4
EQLA	FH	—	—	—	—	15	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—
EQPA	FH	50	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
EQUIS	FH	—	—	—	—	—	—	5	1	—	—	—	—	—	—	—	—	—	—	—	—
POMU	FH	50	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PTAQ	FH	—	—	—	—	7	3	17	6	—	—	12	1	—	—	50	15	—	—	—	—
WOOR	FH	—	—	—	—	—	—	—	—	—	—	12	1	—	—	—	—	—	—	22	1

Appendix B-6—Constancy and average cover of all species present in the following types:

- Twinberry Honeysuckle/Ladyfern Plant Community (LOIN/AT)
- Thimbleberry Plant Community Type (RUPA)
- Bartonberry Plant Community (RUBA)
- Himalayan Blackberry Plant Community (RUDI2)
- Alpine Laurel/Black Alpine Sedge Plant Association Plant Association (KAMI/CA)
- Pink Mountainheath Mounds Plant Association (PHEM)
- Labrador Tea/Holm's Rocky Mountain Sedge Plant Community (LEGL/CA)
- Shrubby Cinquefoil–Bog Birch Plant Community Type (POFR-BE)

Type		LOIN/AT		RUPA		RUBA		RUDI2		KAMI/CA		PHEM		LEGL/CA		POFR-BE	
N		1		3		1		1		4		5		1		2	
SPECIES	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
PICO	PO	100	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PIEN	PO	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	3
PSME	PO	100	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PIEN	SO	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1
ABLA	U	—	—	—	—	—	—	—	—	25	1	20	3	—	—	50	1
PICO	U	—	—	—	—	—	—	—	—	50	4	—	—	—	—	—	—
PIEN	U	—	—	—	—	—	—	—	—	25	1	—	—	—	—	100	4
PSME	U	100	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ACGL	S	—	—	66	8	—	—	—	—	—	—	—	—	—	—	—	—
AMAL2	S	—	—	33	3	—	—	—	—	—	—	—	—	—	—	—	—
BEGL	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	55
CAME7	S	—	—	—	—	—	—	—	—	25	5	60	10	—	—	—	—
CERE2	S	—	—	—	—	—	—	100	3	—	—	—	—	—	—	—	—
CLCO2	S	—	—	—	—	—	—	100	3	—	—	—	—	—	—	—	—
COST4	S	—	—	—	—	—	—	100	15	—	—	—	—	—	—	—	—
CRDO2	S	—	—	33	20	—	—	—	—	—	—	—	—	—	—	—	—
GAHU	S	—	—	—	—	—	—	—	—	50	20	40	3	100	3	—	—
GLNE	S	—	—	—	—	—	—	100	1	—	—	—	—	—	—	—	—
HODI	S	—	—	33	1	—	—	—	—	—	—	—	—	—	—	—	—
HODU	S	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
KAMI	S	—	—	—	—	—	—	—	—	100	29	100	8	—	—	—	—
LEGL	S	—	—	—	—	—	—	—	—	25	7	—	—	100	48	—	—
LOIN5	S	100	15	—	—	—	—	—	—	—	—	—	—	—	—	50	1
PHEM	S	—	—	—	—	—	—	—	—	75	2	100	46	100	22	—	—
PHLE4	S	—	—	66	9	—	—	100	5	—	—	—	—	—	—	—	—
PHMA5	S	—	—	33	5	—	—	—	—	—	—	—	—	—	—	—	—
POFR4	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	62
RHRA6	S	—	—	33	5	—	—	100	5	—	—	—	—	—	—	—	—
RILA	S	100	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RUBA	S	—	—	—	—	100	85	—	—	—	—	—	—	—	—	—	—
RUDI2	S	—	—	—	—	—	—	100	90	—	—	—	—	—	—	—	—
RUID	S	—	—	33	1	—	—	—	—	—	—	—	—	—	—	—	—
RUPA	S	100	1	100	93	—	—	—	—	—	—	—	—	—	—	—	—
SAAR27	S	—	—	—	—	—	—	—	—	25	3	—	—	—	—	—	—
SABO2	S	—	—	—	—	—	—	—	—	50	4	—	—	—	—	—	—
SACE3	S	—	—	33	20	—	—	—	—	—	—	—	—	—	—	—	—
SACO2	S	—	—	—	—	—	—	—	—	25	5	—	—	—	—	—	—
SALIX	S	—	—	—	—	—	—	—	—	25	5	—	—	—	—	50	3
SOSC2	S	100	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SYAL	S	—	—	33	15	—	—	—	—	—	—	—	—	—	—	—	—
VACA13	S	—	—	—	—	—	—	—	—	50	12	20	20	100	1	—	—
VASC	S	100	3	—	—	—	—	—	—	50	1	80	10	100	2	—	—
ACCO4	F	100	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ACMI2	F	—	—	—	—	—	—	—	—	—	—	—	—	100	1	50	1
ACRU2	F	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ALVA	F	100	1	—	—	—	—	—	—	50	9	40	22	100	30	—	—
ANAL4	F	—	—	—	—	—	—	—	—	—	—	60	22	—	—	—	—
ANMA	F	100	1	—	—	—	—	—	—	25	1	—	—	—	—	—	—
ANSC8	F	—	—	66	32	—	—	—	—	—	—	—	—	—	—	—	—
ANTEN	F	—	—	—	—	—	—	—	—	25	1	20	20	—	—	—	—
ANUM	F	—	—	—	—	—	—	—	—	—	—	—	—	100	4	—	—
AQFO	F	100	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Appendix B-6—Constancy and average cover of all species present in the following types: (continued)

Type		LOIN/AT		RUPA		RUBA		RUDI2		KAMI/CA		PHEM		LEGL/CA		POFR-BE	
N		1		3		1		1		4		5		1		2	
SPECIES	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
ARCH3	F	—	—	—	—	—	—	—	—	—	—	—	—	100	1	—	—
ARLO6	F	100	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ARMO4	F	100	10	—	—	—	—	—	—	25	3	—	—	—	—	—	—
ASAL2	F	—	—	—	—	—	—	—	—	25	1	—	—	—	—	—	—
ASOC	F	—	—	—	—	—	—	—	—	—	—	—	—	100	1	—	—
ASTER	F	—	—	—	—	—	—	—	—	25	4	—	—	—	—	100	3
ASTRA	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1
CACH16	F	—	—	—	—	—	—	—	—	50	1	20	1	—	—	—	—
CAMI12	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1
CAMPA	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1
CASTI2	F	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—
CIAL	F	—	—	100	8	—	—	—	—	—	—	—	—	—	—	—	—
DOAL	F	—	—	—	—	—	—	—	—	25	5	60	8	100	1	—	—
EPAL	F	—	—	—	—	—	—	—	—	—	—	20	3	—	—	—	—
EPAN2	F	100	10	33	1	—	—	—	—	—	—	—	—	—	—	50	1
EPILO	F	—	—	—	—	—	—	—	—	25	1	40	3	—	—	—	—
ERGR9	F	—	—	33	5	—	—	—	—	—	—	—	—	—	—	—	—
ERPE3	F	—	—	—	—	—	—	—	—	100	1	60	15	—	—	50	5
FRASE	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1
FRSP	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1
FRVI	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	5
GAAP2	F	—	—	100	8	100	1	—	—	—	—	—	—	—	—	—	—
GABO2	F	100	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—
GECA	F	—	—	—	—	—	—	—	—	100	6	100	10	100	5	—	—
HYFE	F	—	—	66	9	—	—	—	—	—	—	—	—	—	—	—	—
HYFON	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1
LATHY	F	—	—	33	3	—	—	—	—	—	—	—	—	—	—	—	—
LEPY2	F	—	—	—	—	—	—	—	—	—	—	60	6	—	—	—	—
LICA2	F	—	—	—	—	—	—	—	—	—	—	40	6	—	—	—	—
LITE2	F	—	—	—	—	—	—	—	—	100	2	20	1	—	—	50	1
MECI3	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1
MIST3	F	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MOPE3	F	—	—	100	13	—	—	—	—	—	—	—	—	—	—	—	—
OSCH	F	—	—	66	4	—	—	—	—	—	—	—	—	—	—	—	—
OSMOR	F	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PAFI3	F	100	5	—	—	—	—	—	—	25	1	—	—	—	—	50	1
PAPE5	F	—	—	—	—	100	1	—	—	—	—	—	—	—	—	—	—
PEGL5	F	—	—	—	—	—	—	—	—	—	—	—	—	100	2	—	—
PEGR2	F	—	—	—	—	—	—	—	—	50	1	20	3	—	—	—	—
POBI6	F	—	—	—	—	—	—	—	—	—	—	20	5	—	—	—	—
POFL3	F	—	—	—	—	—	—	—	—	100	4	100	11	100	10	—	—
POLYG4	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1
RAPO	F	—	—	—	—	—	—	—	—	—	—	40	2	—	—	—	—
SAAR13	F	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SASI10	F	100	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SECY	F	—	—	—	—	—	—	—	—	100	4	20	1	—	—	50	20
SEPS2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	5
SETR	F	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SIPR	F	—	—	—	—	—	—	—	—	25	1	100	17	—	—	—	—
SMST	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	3
SOLID	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	40
SOMU	F	—	—	—	—	—	—	—	—	—	—	—	—	100	1	—	—
SPRO	F	—	—	—	—	—	—	—	—	50	1	—	—	—	—	—	—
STAM2	F	100	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
STOC	F	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
TAOF	F	100	5	33	3	—	—	—	—	—	—	—	—	—	—	50	1
THAL	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	30
THOC	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	3
TOFL	F	—	—	33	3	100	1	—	—	—	—	—	—	—	—	—	—
URDI	F	—	—	33	15	—	—	—	—	—	—	—	—	—	—	—	—
VECU	F	—	—	—	—	—	—	—	—	25	1	—	—	—	—	—	—

Appendix B-6—Constancy and average cover of all species present in the following types: (continued)

Type		LOIN/AT		RUPA		RUBA		RUDI2		KAMI/CA		PHEM		LEGL/CA		POFR-BE	
N		1		3		1		1		4		5		1		2	
SPECIES	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
VERON	F	—	—	—	—	—	—	—	—	25	1	—	—	—	—	—	—
VEWO2	F	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—
VIAM	F	—	—	33	1	—	—	—	—	—	—	—	—	—	—	—	—
VIPA4	F	—	—	—	—	—	—	—	—	—	—	80	8	—	—	—	—
AGCA2	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1
AGHU	G	—	—	—	—	—	—	—	—	50	2	40	15	—	—	—	—
AGSP	G	—	—	—	—	—	—	100	1	—	—	—	—	—	—	—	—
BRRI8	G	—	—	—	—	—	—	100	5	—	—	—	—	—	—	—	—
BRTE	G	—	—	—	—	100	1	—	—	—	—	—	—	—	—	—	—
BRVU	G	100	15	33	3	—	—	—	—	—	—	—	—	—	—	—	—
CACA4	G	—	—	—	—	—	—	—	—	—	—	—	—	100	15	—	—
CALAM	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1
CARU	G	—	—	33	1	—	—	—	—	—	—	—	—	—	—	—	—
DAIN	G	—	—	—	—	—	—	—	—	75	1	40	12	—	—	100	3
DECE	G	—	—	—	—	—	—	—	—	75	3	20	20	100	2	100	2
ELGL	G	—	—	33	1	—	—	—	—	—	—	—	—	—	—	—	—
FEVI	G	—	—	—	—	—	—	—	—	—	—	40	6	—	—	—	—
MUFI2	G	—	—	—	—	—	—	—	—	25	20	—	—	100	5	50	3
PHAL2	G	—	—	—	—	—	—	—	—	25	1	20	1	100	1	—	—
POA	G	—	—	—	—	—	—	—	—	25	1	—	—	—	—	50	1
POACF	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1
TRWO3	G	—	—	—	—	—	—	—	—	25	1	—	—	—	—	—	—
STIPA	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1
CAAU3	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1
CADE9	GL	—	—	66	12	—	—	—	—	—	—	—	—	—	—	—	—
CAIL	GL	—	—	—	—	—	—	—	—	50	3	—	—	—	—	—	—
CALU7	GL	—	—	—	—	—	—	—	—	50	6	—	—	—	—	—	—
CAMI7	GL	—	—	—	—	—	—	—	—	—	—	20	5	—	—	—	—
CANI2	GL	—	—	—	—	—	—	—	—	100	34	80	18	—	—	—	—
CAREX	GL	—	—	—	—	—	—	100	1	—	—	20	3	—	—	—	—
CASC10	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	10
CASC12	GL	—	—	—	—	—	—	—	—	100	18	20	5	100	25	50	1
CASU7	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	10
ELPA6	GL	—	—	—	—	—	—	—	—	50	2	—	—	100	5	50	3
JUDR	GL	—	—	—	—	—	—	—	—	75	1	80	8	—	—	—	—
JUME3	GL	—	—	—	—	—	—	—	—	25	1	—	—	—	—	—	—
JUNCU	GL	—	—	—	—	—	—	—	—	—	—	20	1	—	—	—	—
KOSI2	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	20
LUCA2	GL	—	—	—	—	—	—	—	—	50	1	20	5	—	—	—	—
LUPA4	GL	—	—	—	—	—	—	—	—	—	—	20	5	—	—	—	—
ATFI	FH	100	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—
DRFI2	FH	—	—	33	5	—	—	—	—	—	—	—	—	—	—	—	—
EQHY	FH	—	—	33	10	—	—	—	—	—	—	—	—	—	—	—	—
EQLA	FH	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	3
EQVA	FH	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	5
PTAQ	FH	—	—	33	3	—	—	—	—	—	—	—	—	—	—	—	—
WOOR	FH	—	—	—	—	100	1	—	—	—	—	—	—	—	—	—	—

Appendix B-7—Constancy and average cover of all species present in the following types:

- Aquatic Sedge Plant Association (CAAQ)
- Widefruit Sedge Plant Association (CAEU2)
- Bladder Sedge Plant Association (CAUT)
- Inflated Sedge Plant Association (CAVE6)
- Mud Sedge Plant Association (CALI7)
- Sierra Hare Sedge Plant Association (CALE9)
- Few-Flowered Spikerush Plant Association (ELPA6)
- Lakeshore Sedge Plant Association (CALE8)
- Small-Fruit Bullrush Plant Association (SCMI2)
- Big-Leaved Sedge Plant Association (CAAM10)
- Holm's Rocky Mountain Sedge Plant Association (CASC12)

Type		**CAAQ**		**CAEU2**		**CAUT**		**CAVE6**		**CALI7**		**CALE9**		**ELPA6**		**CALE8**		**SCMI2**		**CAAM10**		**CASC12**	
N		**7**		**1**		**7**		**5**		**1**		**4**		**14**		**1**		**4**		**2**		**38**	
Species	**LF**	**CON**	**COV**	**CON**	**COV**	**CON**	**COV**	**CON**	**COV**	**CON**	**COV**	**CON**	**COV**	**CON**	**COV**	**CON**	**COV**	**CON**	**COV**	**CON**	**COV**	**CON**	**COV**
ABLA	U	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—	—	—	—	—	10	2
PIEN	U	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1
GAHU	S	—	—	—	—	—	—	—	—	—	—	—	—	7	7	—	—	—	—	—	—	5	1
KAMI	S	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—	—	—	—	—	5	9
LEGL	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1
PHEM	S	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—	—	—	—	—	5	4
SABO2	S	—	—	—	—	14	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5	4
SACO2	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1
SALIX	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1
SAMY	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5	2
VACA13	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	5
VASC	S	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—	—	—	—	—	5	2
ACCO4	F	—	—	—	—	14	3	—	—	—	—	—	—	—	—	—	—	—	—	50	1	15	5
ACMI2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1	—	—	—	—	—	—
ALVA	F	—	—	—	—	—	—	—	—	—	—	—	—	21	1	—	—	—	—	50	25	34	29
ANAL4	F	14	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5	1
ANAR3	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	2	—	—	—	—	—	—
ARCH3	F	—	—	—	—	—	—	—	—	—	—	—	—	7	1	100	1	—	—	—	—	10	1
ARMO4	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	7
ASAL2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	15
ASCA2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
ASFO	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	3	—	—	13	4
ASOC	F	28	6	—	—	14	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13	10
ASTER	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1	—	—	—	—	5	1
CABI2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5	1
CACH16	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1
CALE4	F	14	1	—	—	—	—	—	—	—	—	—	—	7	3	—	—	—	—	—	—	5	5
CALLI6	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	1	—	—	—	—
CALTH	F	—	—	—	—	—	—	—	—	—	—	—	—	14	6	—	—	—	—	—	—	—	—
CARYOF	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	2
CASTI2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1
CERAS	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	15
CEVU	F	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5	4
CIDO	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1
CIVU	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
DEDE2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5	1
DEOC	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1

Appendix B-7—Constancy and average cover of all species present in the following types: (continued)

Type		CAAQ		CAEU2		CAUT		CAVE6		CALI7		CALE9		ELPA6		CALE8		SCMI2		CAAM10		CASC12	
N		7		1		7		5		1		4		14		1		4		2		38	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
DITR2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1
DOAL	F	28	12	—	—	—	—	—	—	—	—	—	—	71	8	—	—	—	—	—	—	47	16
DOJE	F	—	—	—	—	—	—	—	—	—	—	—	—	14	3	—	—	—	—	—	—	18	15
DOPU	F	—	—	—	—	—	—	—	—	—	—	25	5	—	—	—	—	—	—	—	—	2	1
EPAL	F	14	3	100	5	—	—	—	—	—	—	—	—	7	20	—	—	—	—	—	—	—	—
EPAN2	F	—	—	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1
EPGL	F	—	—	—	—	28	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
EPGL4	F	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	75	2	100	15	15	5
EPILO	F	14	1	—	—	—	—	—	—	—	—	—	—	28	2	100	2	25	1	—	—	21	3
EPMI	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1
ERGR9	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1
ERPE3	F	—	—	100	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	18	8
FRVE	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	1	50	1	—	—
GABO2	F	14	3	—	—	—	—	20	25	—	—	—	—	—	—	—	—	—	—	50	5	7	6
GATR2	F	—	—	100	15	—	—	20	5	—	—	—	—	—	—	—	—	—	—	100	2	—	—
GECA	F	—	—	—	—	—	—	—	—	—	—	—	—	21	1	—	—	—	—	—	—	28	6
GEMA4	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	15	—	—	5	6
GENTI	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1
HADI7	F	—	—	—	—	14	3	—	—	—	—	—	—	—	—	100	2	25	3	100	6	2	1
HASA	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10	3
HAUN	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1
HYAN2	F	—	—	—	—	—	—	—	—	—	—	—	—	14	26	100	50	—	—	50	1	2	5
HYFON	F	—	—	—	—	14	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1
LICA2	F	—	—	—	—	14	5	—	—	—	—	—	—	7	3	—	—	—	—	—	—	21	14
LIGR	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10	3
LITE2	F	—	—	100	1	—	—	—	—	—	—	—	—	21	2	—	—	—	—	—	—	28	1
LUPO2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5	1
MEPI	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	3	—	—	—	—
MIGU	F	14	1	—	—	28	8	—	—	—	—	—	—	—	—	100	3	—	—	50	3	5	1
MILE2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	3
MIMO3	F	—	—	—	—	14	5	—	—	—	—	—	—	—	—	100	20	50	3	100	8	10	6
MIPE	F	14	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	5	1
MIPR	F	—	—	—	—	—	—	—	—	—	—	—	—	7	3	—	—	—	—	—	—	18	7
MIST3	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	2
MITEL	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	10
MOCO4	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	4	5	3
NUPO2	F	—	—	—	—	—	—	—	—	100	25	—	—	—	—	—	—	—	—	—	—	—	—
PAFI3	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13	5
PEBR	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	3
PEGL5	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1
PEGR2	F	14	1	—	—	14	3	—	—	—	—	—	—	21	4	—	—	—	—	—	—	26	7
POBI6	F	14	1	—	—	—	—	—	—	—	—	—	—	7	1	—	—	—	—	—	—	18	9

Appendix B-7—Constancy and average cover of all species present in the following types: (continued)

Type		CAAQ		CAEU2		CAUT		CAVE6		CALI7		CALE9		ELPA6		CALE8		SCMI2		CAAM10		CASC12	
N		7		1		7		5		1		4		14		1		4		2		38	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
POFL3	F	28	8	100	10	—	—	—	—	—	—	—	—	21	2	—	—	—	—	—	—	60	10
POLEM	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	10	—	—
POOC2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1	—	—	—	—	—	—
RAAL	F	14	15	—	—	—	—	20	1	—	—	—	—	—	—	—	—	—	—	—	—	10	15
RAPO	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10	3
RAUN	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	1	—	—	—	—
ROCU	F	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RONA2	F	28	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RUCR	F	14	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RUOC2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	1	—	—	—	—
RUOC3	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	10	—	—
SAAR13	F	—	—	—	—	14	10	—	—	—	—	—	—	—	—	100	8	—	—	—	—	13	8
SASA	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	3
SASI10	F	—	—	—	—	—	—	—	—	—	—	—	—	7	1	—	—	—	—	—	—	5	13
SECY	F	14	1	—	—	—	—	—	—	—	—	—	—	21	11	—	—	—	—	—	—	63	10
SEFO	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1
SENEC	F	—	—	—	—	14	15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1
SETR	F	—	—	—	—	14	5	—	—	—	—	—	—	—	—	100	7	—	—	50	10	7	16
SIPR	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1
SOSP	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1
SPAN2	F	14	1	—	—	—	—	20	10	—	—	—	—	—	—	—	—	—	—	—	—	2	1
SPCA5	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1
SPRO	F	—	—	—	—	—	—	—	—	—	—	—	—	28	1	—	—	—	—	—	—	5	1
STCA	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	1	—	—	—	—
STCR2	F	—	—	100	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	2	2	1
STELL	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1
SWPE	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1
TAOF	F	14	1	—	—	—	—	—	—	—	—	—	—	—	—	100	1	—	—	—	—	—	—
TRCA	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	3	—	—	—	—
TRIFO	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1
TRLA14	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1
TRLO	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1
VEAM2	F	14	1	—	—	14	3	—	—	—	—	—	—	—	—	—	—	—	—	100	4	5	2
VEAN2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	5	—	—	—	—
VECU	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5	1
VERAT	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	5
VESE	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13	3
VEWO2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1
VIGL	F	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
VIMA2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	20
VIOLA	F	—	—	100	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	5	28	8
VIPA4	F	14	15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	3
ZIEL2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1
AGCA2	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1

Appendix B-7—Constancy and average cover of all species present in the following types: (continued)

Type		CAAQ		CAEU2		CAUT		CAVE6		CALI7		CALE9		ELPA6		CALE8		SCMI2		CAAM10		CASC12	
N		7		1		7		5		1		4		14		1		4		2		38	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
AGHU	G	—	—	—	—	—	—	20	5	—	—	—	—	7	2	—	—	—	—	—	—	15	5
AGROS2	G	—	—	—	—	14	5	—	—	—	—	—	—	—	—	100	5	—	—	—	—	5	2
AGSC5	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1
AGTH2	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13	5
AGVA	G	—	—	—	—	28	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ALAE	G	—	—	—	—	—	—	20	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAAQ3	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	45	—	—	—	—
CACA4	G	14	10	—	—	14	5	20	1	—	—	—	—	14	11	100	1	25	15	50	10	23	8
DAIN	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	3
DECE	G	42	7	—	—	—	—	20	1	—	—	—	—	21	12	—	—	—	—	—	—	36	6
DEEL	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5	38
FEAR3	G	14	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
FESU	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	2	—	—
GLEL	G	—	—	—	—	—	—	20	1	—	—	—	—	—	—	100	40	25	3	100	52	7	7
GLGR	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	3
MESP	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1
MUFI2	G	14	1	—	—	—	—	—	—	—	—	—	—	14	22	—	—	—	—	—	—	18	14
PHAL2	G	—	—	—	—	14	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13	1
POLE2	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1
POPA2	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	3	—	—	—	—
POPR	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	1	—	—	—	—
PUPA3	G	—	—	100	5	—	—	—	—	—	—	—	—	—	—	—	—	50	15	—	—	7	2
STOC2	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1
TRSP2	G	—	—	—	—	14	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
TRWO3	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5	1
CAAM10	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	1	100	30	—	—
CAAQ	GL	100	74	—	—	14	3	—	—	—	—	25	15	35	20	—	—	50	14	—	—	7	9
CACA11	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	5
CADE9	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	5	—	—
CAEU2	GL	—	—	100	45	—	—	40	4	—	—	—	—	—	—	—	—	—	—	50	1	—	—
CAIL	GL	14	20	100	10	—	—	—	—	—	—	—	—	14	8	—	—	—	—	—	—	23	26
CAJO	GL	—	—	—	—	—	—	—	—	—	—	—	—	21	2	100	8	—	—	—	—	18	7
CALA13	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	1	—	—	—	—
CALE8	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	40	—	—	—	—	—	—
CALE9	GL	14	70	—	—	—	—	—	—	—	—	100	86	7	10	—	—	—	—	—	—	2	2
CALI7	GL	—	—	—	—	—	—	—	—	100	60	—	—	—	—	—	—	—	—	—	—	—	—
CALU7	GL	—	—	—	—	—	—	—	—	—	—	—	—	7	3	100	10	—	—	—	—	18	5
CAMI7	GL	—	—	—	—	14	5	—	—	—	—	—	—	—	—	100	2	—	—	50	10	2	5
CAMU7	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5	2
CANE2	GL	—	—	—	—	—	—	—	—	—	—	—	—	7	3	—	—	—	—	—	—	10	10
CANI2	GL	—	—	—	—	—	—	—	—	—	—	—	—	14	10	—	—	—	—	—	—	15	10
CAPR4	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	5
CAPR7	GL	—	—	100	1	—	—	20	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAREX	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	30	2	1

Appendix B-7—Constancy and average cover of all species present in the following types: (continued)

Type		**CAAQ**		**CAEU2**		**CAUT**		**CAVE6**		**CALI7**		**CALE9**		**ELPA6**		**CALE8**		**SCMI2**		**CAAM10**		**CASC12**	
N		**7**		**1**		**7**		**5**		**1**		**4**		**14**		**1**		**4**		**2**		**38**	
Species	**LF**	**CON**	**COV**	**CON**	**COV**	**CON**	**COV**	**CON**	**COV**	**CON**	**COV**	**CON**	**COV**	**CON**	**COV**	**CON**	**COV**	**CON**	**COV**	**CON**	**COV**	**CON**	**COV**
CASC12	GL	28	3	—	—	—	—	20	3	—	—	75	5	71	19	—	—	—	—	—	—	100	65
CAST5	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—	—	—
CASU6	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	15	—	—
CAUT	GL	28	22	—	—	100	86	—	—	—	—	—	—	14	2	—	—	25	15	—	—	5	6
CAVE6	GL	—	—	—	—	—	—	100	81	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ELEOC	GL	—	—	—	—	—	—	—	—	—	—	25	10	—	—	—	—	25	1	—	—	—	—
ELPA3	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	5	—	—	—	—
ELPA6	GL	14	1	100	5	—	—	—	—	—	—	—	—	100	70	100	10	—	—	—	—	50	25
JUBA	GL	—	—	—	—	14	15	—	—	—	—	—	—	—	—	—	—	25	5	—	—	—	—
JUBR3	GL	14	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
JUDR	GL	—	—	100	3	—	—	—	—	—	—	—	—	7	10	—	—	—	—	—	—	15	2
JUEF	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	2	—	—
JUEN	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1	50	2	100	1	2	1
JUME3	GL	—	—	100	1	—	—	—	—	—	—	—	—	7	1	—	—	—	—	—	—	13	2
JUNCU	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	10
JUPA	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1
LUCA2	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	2	—	—	—	—	13	8
SCMI2	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	66	50	8	—	—
ATFI	FH	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	10	—	—
CYFR2	FH	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
EQAR	FH	42	2	—	—	28	20	—	—	—	—	—	—	—	—	—	—	75	20	50	4	15	6
EQUIS	FH	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1
GYDR	FH	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
POMU	FH	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—

Appendix B-8—Constancy and average cover of all species present in the following types:

- Northern Singlespike Sedge-Brook Saxifrage-Spring Plant Association (CASC-SA)
- Woodrush Sedge Plant Association (CALU7)
- Black Alpine Sedge Plant Association (CANI2)
- Bluejoint Reedgrass Plant Association (CACA4)
- Tufted Hairgrass Plant Association (DECE)
- Basin Wildrye Plant Community Type (ELCI2)
- Star Sedge Plant Community Type (CAMU7)
- Jones' Sedge Plant Community (CAJO)
- Nebraska Sedge Plant Community Type (CANE2)
- Smallwing Sedge Plant Community (CAMI7)
- Brown Sedge Plant Community (CASU6)

Type		CASC-SA		CALU7		CANI2		CACA4		DECE		ELCI2		CAMU7		CAJO		CANE2		CAMI7		CASU6	
N		4		10		11		8		3		1		3		1		1		1		1	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
ABLA	PO	25	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PICO	PO	25	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PSME	SO	25	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ABGR	U	25	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ABLA	U	25	3	—	—	—	—	12	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PICO	U	25	3	10	1	9	12	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PIEN	U	25	3	10	4	9	1	12	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAME7	S	25	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
GAHU	S	—	—	—	—	9	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
KAMI	S	50	3	—	—	18	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PHEM	S	—	—	—	—	9	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ROWO	S	—	—	—	—	—	—	—	—	—	—	100	1	—	—	—	—	—	—	—	—	—	—
SYAL	S	—	—	—	—	—	—	—	—	—	—	100	1	—	—	—	—	—	—	—	—	—	—
VAMY2	S	50	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VASC	S	—	—	—	—	—	—	12	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ACCO4	F	25	5	—	—	—	—	37	15	—	—	—	—	—	—	—	—	100	5	—	—	—	—
ACMI2	F	—	—	—	—	—	—	25	3	—	—	100	1	—	—	—	—	—	—	100	15	—	—
ALVA	F	100	11	50	4	27	9	12	3	—	—	—	—	—	—	—	—	100	1	—	—	—	—
ANAL4	F	—	—	—	—	36	6	—	—	33	3	—	—	—	—	—	—	—	—	—	—	—	—
ANAR3	F	25	1	10	1	—	—	12	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ANMA	F	25	3	—	—	—	—	12	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ANTEN	F	—	—	—	—	9	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ANUM	F	—	—	—	—	9	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ARAM2	F	25	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ARCO9	F	—	—	—	—	—	—	12	30	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ARLU	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	3	—	—
ARMO4	F	25	5	—	—	—	—	25	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ASAL2	F	25	1	—	—	—	—	—	—	33	10	—	—	—	—	—	—	—	—	—	—	—	—
ASFO	F	—	—	10	1	9	10	25	8	33	20	—	—	—	—	100	10	—	—	—	—	—	—
ASMO3	F	—	—	10	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ASOC	F	—	—	10	8	36	5	12	3	33	1	—	—	—	—	—	—	—	—	—	—	—	—
ASTER	F	—	—	20	5	9	40	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CABI2	F	—	—	30	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CACH16	F	—	—	—	—	54	1	12	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CACO6	F	—	—	—	—	—	—	12	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CACU7	F	—	—	—	—	—	—	—	—	33	3	—	—	—	—	—	—	—	—	—	—	—	—
CALTH	F	—	—	20	3	18	37	—	—	—	—	—	—	—	—	100	2	—	—	—	—	—	—

Appendix B-8—Constancy and average cover of all species present in the following types: (continued)

Type		CASC-SA		CALU7		CANI2		CACA4		DECE		ELCI2		CAMU7		CAJO		CANE2		CAMI7		CASU6	
N		4		10		11		8		3		1		3		1		1		1		1	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
CENU2	F	—	—	20	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CIAR4	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	5	—	—
CIRSI	F	—	—	—	—	—	—	—	—	—	—	100	1	—	—	—	—	—	—	—	—	—	—
DISY	F	—	—	—	—	—	—	—	—	—	—	100	1	—	—	—	—	—	—	—	—	—	—
DOAL	F	50	4	60	10	18	1	12	3	—	—	—	—	66	9	—	—	—	—	—	—	—	—
DOJE	F	25	3	40	1	—	—	—	—	—	—	—	—	33	1	—	—	—	—	—	—	—	—
EPAL	F	—	—	—	—	18	5	25	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
EPGL	F	—	—	—	—	—	—	12	3	—	—	—	—	—	—	—	—	—	—	100	20	—	—
EPGL4	F	25	1	—	—	—	—	37	4	—	—	—	—	—	—	—	—	—	—	—	—	100	15
EPILO	F	—	—	20	1	18	1	—	—	33	1	—	—	33	1	100	1	100	5	—	—	—	—
EPMI	F	—	—	10	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
EPPA2	F	—	—	20	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ERPE3	F	100	10	10	5	27	9	12	20	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ERSP4	F	—	—	—	—	—	—	12	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
FRVI	F	—	—	10	1	—	—	12	3	—	—	—	—	—	—	—	—	—	—	100	10	—	—
GABI	F	—	—	20	1	—	—	—	—	—	—	—	—	33	1	—	—	—	—	—	—	—	—
GABO2	F	—	—	—	—	—	—	12	3	—	—	—	—	—	—	—	—	100	20	—	—	—	—
GATR2	F	—	—	—	—	—	—	12	1	—	—	—	—	—	—	—	—	—	—	—	—	100	5
GECA	F	75	5	40	1	72	4	25	4	33	5	—	—	—	—	—	—	—	—	—	—	—	—
GEMA4	F	—	—	—	—	—	—	25	2	—	—	—	—	—	—	—	—	100	3	100	3	—	—
HADI7	F	100	4	40	1	—	—	—	—	—	—	—	—	66	1	—	—	—	—	—	—	—	—
HELA4	F	—	—	—	—	—	—	12	1	—	—	—	—	—	—	—	—	—	—	—	—	100	1
HYAN2	F	—	—	30	2	9	1	—	—	—	—	—	—	—	—	100	3	—	—	—	—	—	—
HYFON	F	—	—	—	—	—	—	12	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
LASE	F	—	—	—	—	—	—	—	—	—	—	100	1	—	—	—	—	—	—	—	—	—	—
LICA2	F	75	3	—	—	—	—	12	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
LIGUS	F	—	—	10	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
LITE2	F	—	—	40	10	72	12	25	13	33	10	—	—	—	—	—	—	—	—	—	—	—	—
LUPO2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1	—	—	—	—
MIGU	F	50	6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	5
MILE2	F	—	—	—	—	—	—	12	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MIMO3	F	—	—	—	—	—	—	25	12	—	—	—	—	—	—	—	—	—	—	—	—	100	15
MIMUL	F	—	—	—	—	—	—	12	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MIPR	F	—	—	30	14	9	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MITEL	F	—	—	—	—	—	—	12	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MOCO4	F	—	—	—	—	—	—	12	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MONTI	F	—	—	—	—	—	—	12	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MOSI2	F	25	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PAFI3	F	100	8	—	—	—	—	—	—	—	—	—	—	33	1	—	—	—	—	—	—	—	—
PEGL5	F	—	—	—	—	—	—	25	1	33	20	—	—	—	—	—	—	—	—	—	—	—	—
PEGR2	F	100	5	50	2	18	1	—	—	33	20	—	—	66	1	—	—	—	—	—	—	—	—
POBI6	F	25	3	40	2	9	1	—	—	33	1	—	—	—	—	—	—	—	—	—	—	—	—
PODI2	F	—	—	—	—	—	—	—	—	33	1	—	—	—	—	—	—	—	—	—	—	—	—
POFL3	F	—	—	40	4	81	22	75	12	33	1	—	—	—	—	100	2	100	1	—	—	—	—

Appendix B-8—Constancy and average cover of all species present in the following types: (continued)

Type		CASC-SA		CALU7		CANI2		CACA4		DECE		ELCI2		CAMU7		CAJO		CANE2		CAMI7		CASU6	
N		4		10		11		8		3		1		3		1		1		1		1	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
POGR9	F	—	—	—	—	9	1	—	—	—	—	—	—	—	—	—	—	—	—	100	15	—	—
POOV2	F	25	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RAAL	F	—	—	—	—	9	20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RAES	F	—	—	—	—	—	—	—	—	33	1	—	—	—	—	—	—	—	—	—	—	—	—
RANUN	F	—	—	—	—	—	—	12	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RAPO	F	—	—	—	—	9	5	12	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RAUN	F	—	—	—	—	—	—	12	1	—	—	—	—	—	—	—	—	—	—	100	1	—	—
RUOC2	F	25	1	—	—	—	—	—	—	—	—	100	1	—	—	—	—	—	—	—	—	100	1
SAAR13	F	100	4	10	1	—	—	12	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SASA	F	25	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SASI10	F	100	8	50	5	9	1	—	—	—	—	—	—	33	1	—	—	—	—	—	—	—	—
SECY	F	50	10	70	4	72	9	25	2	66	28	—	—	66	2	—	—	100	1	—	—	—	—
SEIN2	F	—	—	—	—	—	—	—	—	33	5	—	—	—	—	—	—	—	—	—	—	—	—
SEPS2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	20	—	—
SETR	F	100	4	—	—	—	—	25	12	—	—	—	—	—	—	—	—	—	—	—	—	100	1
SIOR	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	3	—	—
SIPR	F	—	—	—	—	18	16	—	—	33	1	—	—	—	—	—	—	—	—	—	—	—	—
SOSP	F	—	—	—	—	—	—	—	—	—	—	—	—	33	1	—	—	—	—	—	—	—	—
SPRO	F	—	—	40	1	27	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
STLO	F	—	—	—	—	—	—	12	1	—	—	—	—	—	—	—	—	—	—	—	—	100	5
STOC	F	100	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SWPE	F	75	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
TAOF	F	—	—	10	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	3	—	—
TITR	F	—	—	—	—	—	—	12	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
TRCA	F	—	—	—	—	—	—	12	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
TRPR2	F	—	—	—	—	—	—	—	—	—	—	100	1	—	—	—	—	—	—	—	—	—	—
VASI	F	—	—	—	—	—	—	12	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VEAM2	F	25	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	5	100	15
VECU	F	—	—	10	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VERAT	F	—	—	—	—	9	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VERON	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1	—	—
VESE	F	—	—	—	—	18	6	—	—	—	—	—	—	—	—	100	1	—	—	—	—	—	—
VEWO2	F	—	—	—	—	9	1	12	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VIOLA	F	—	—	10	1	9	5	50	6	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VIPA4	F	—	—	—	—	—	—	12	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ZIEL2	F	—	—	—	—	—	—	—	—	—	—	—	—	33	1	—	—	—	—	—	—	—	—
AGCA2	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	5	—	—
AGHU	G	—	—	—	—	18	12	—	—	33	3	—	—	—	—	100	2	—	—	—	—	100	5
AGROS2	G	—	—	20	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
AGST2	G	—	—	—	—	—	—	—	—	—	—	100	5	—	—	—	—	—	—	—	—	—	—
AGTH2	G	50	3	10	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
AGVA	G	—	—	—	—	9	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
BRCA5	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	10	—	—
BROMU	G	—	—	—	—	—	—	—	—	—	—	100	20	—	—	—	—	—	—	—	—	—	—

Appendix B-8—Constancy and average cover of all species present in the following types: (continued)

Type		CASC-SA		CALU7		CANI2		CACA4		DECE		ELCI2		CAMU7		CAJO		CANE2		CAMI7		CASU6	
N		4		10		11		8		3		1		3		1		1		1		1	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
BRVU	G	25	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CACA4	G	—	—	20	2	9	1	100	72	—	—	—	—	—	—	—	—	—	—	—	—	100	1
DAIN	G	—	—	—	—	36	3	—	—	33	35	—	—	—	—	—	—	—	—	—	—	—	—
DECE	G	75	8	70	17	45	4	12	5	100	42	—	—	66	1	—	—	100	15	—	—	—	—
DEEL	G	—	—	—	—	9	20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ELCI2	G	—	—	—	—	—	—	—	—	—	—	100	40	—	—	—	—	—	—	—	—	—	—
ELGL	G	—	—	—	—	—	—	12	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—
GLEL	G	50	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	20
MUFI2	G	—	—	90	18	27	8	12	5	—	—	—	—	33	1	100	2	—	—	—	—	—	—
PHAL2	G	—	—	40	1	27	1	12	3	—	—	—	—	—	—	100	2	100	1	—	—	—	—
PHPR3	G	—	—	—	—	—	—	—	—	—	—	100	1	—	—	—	—	—	—	—	—	—	—
POCO	G	—	—	—	—	—	—	12	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
POPR	G	—	—	—	—	—	—	—	—	—	—	100	10	—	—	—	—	—	—	100	15	—	—
PUPA3	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	3	—	—	—	—
STOC2	G	—	—	—	—	—	—	—	—	—	—	100	2	—	—	—	—	—	—	100	5	—	—
TRWO3	G	—	—	20	1	9	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAAB2	GL	—	—	—	—	9	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAAQ	GL	—	—	40	25	—	—	—	—	33	3	—	—	66	10	—	—	—	—	—	—	—	—
CAAU3	GL	—	—	—	—	—	—	—	—	—	—	—	—	33	1	—	—	—	—	—	—	—	—
CABI10	GL	25	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAEU2	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	30
CAHO5	GL	—	—	—	—	—	—	—	—	33	20	—	—	—	—	—	—	—	—	—	—	—	—
CAIL	GL	—	—	10	5	54	7	12	15	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAJO	GL	—	—	40	2	27	11	—	—	—	—	—	—	—	—	100	60	—	—	—	—	—	—
CALE9	GL	—	—	—	—	9	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CALU7	GL	75	8	100	61	9	3	—	—	—	—	—	—	33	25	100	3	—	—	—	—	100	3
CAMI7	GL	—	—	20	1	—	—	25	8	—	—	—	—	—	—	—	—	—	—	100	65	—	—
CAMU7	GL	—	—	20	1	—	—	—	—	—	—	—	—	100	68	—	—	—	—	—	—	—	—
CANE2	GL	—	—	—	—	—	—	12	15	—	—	—	—	33	1	—	—	100	75	—	—	—	—
CANI2	GL	—	—	—	—	100	48	12	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAPA14	GL	—	—	—	—	—	—	—	—	33	5	—	—	—	—	—	—	—	—	—	—	—	—
CAREX	GL	—	—	10	5	—	—	37	9	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CASC10	GL	100	40	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CASC12	GL	25	3	90	7	90	12	62	18	33	15	—	—	66	6	100	25	100	20	—	—	—	—
CASI2	GL	—	—	—	—	—	—	—	—	33	1	—	—	—	—	—	—	—	—	—	—	—	—
CASU6	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	60
CAUT	GL	—	—	30	4	—	—	12	5	33	10	—	—	—	—	—	—	—	—	—	—	—	—
ELEOC	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	20
ELPA6	GL	50	15	90	18	27	20	25	1	—	—	—	—	100	23	100	30	—	—	—	—	—	—
JUBA	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	10
JUBR3	GL	—	—	—	—	9	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
JUDR	GL	—	—	10	1	63	2	12	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—
JUEN	GL	25	1	10	1	—	—	—	—	—	—	—	—	33	1	—	—	—	—	—	—	—	—
JUME3	GL	50	2	20	1	9	1	12	1	33	1	—	—	—	—	—	—	—	—	—	—	—	—

Appendix B-8—Constancy and average cover of all species present in the following types: (continued)

Type		CASC-SA		CALU7		CANI2		CACA4		DECE		ELCI2		CAMU7		CAJO		CANE2		CAMI7		CASU6	
N		4		10		11		8		3		1		3		1		1		1		1	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
JUNCU	GL	—	—	10	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
JUPA	GL	—	—	—	—	9	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
LUCA2	GL	—	—	50	2	27	1	12	3	—	—	—	—	33	1	—	—	—	—	—	—	—	—
SCMI2	GL	—	—	—	—	—	—	12	20	—	—	—	—	—	—	—	—	—	—	—	—	—	—
EQAR	FH	—	—	30	1	—	—	25	2	—	—	—	—	33	1	—	—	—	—	—	—	—	—
EQLA	FH	—	—	10	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Appendix B-9—Constancy and average cover of all species present in the following types:

- Baltic Rush Plant Community Type (JUBA)
- Narrowleaf Bur-Reed Plant Association (SPAN2)
- Rocky Mountain Pond-Lily Plant Association (NUPO2)
- Common Cattail Plant Community Type (TYLA)
- Pacific Onion–Holm's Rocky Mountain Sedge Plant Association (ALVA-CA)
- Arrowleaf Groundsel–Purple Monkeyflower Plant Association (SETR-MI)
- Common Cowparsnip–Blue Wildrye Plant Community (HELA4-EL)
- False Hellebore Plant Community Type (VERAT)
- Western Coneflower Plant Community Type (RUOC2)
- White Sagebrush Plant Community (ARLU)

Type		JUBA		SPAN2		NUPO2		TYLA		ALVA-CA		SETR-MI		HELA4-EL		VERAT		RUOC2		ARLU	
N		1		3		2		1		20		11		1		3		2		1	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
PIEN	PO	—	—	—	—	—	—	—	—	—	—	9	3	—	—	—	—	—	—	—	—
PIEN	SO	—	—	—	—	—	—	—	—	—	—	9	4	100	5	—	—	—	—	—	—
ABGR	U	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	2
ABLA	U	—	—	—	—	—	—	—	—	20	2	27	2	—	—	—	—	50	2	—	—
PICO	U	—	—	—	—	—	—	—	—	—	—	9	2	—	—	—	—	—	—	—	—
PIEN	U	—	—	—	—	—	—	—	—	15	1	9	3	—	—	—	—	—	—	—	—
ACGL	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1
GAHU	S	—	—	—	—	—	—	—	—	5	1	—	—	—	—	—	—	—	—	—	—
KAMI	S	—	—	—	—	—	—	—	—	15	1	—	—	—	—	—	—	—	—	—	—
LEGL	S	—	—	—	—	—	—	—	—	5	1	—	—	—	—	—	—	—	—	—	—
LOIN5	S	—	—	—	—	—	—	—	—	—	—	9	1	100	2	—	—	—	—	—	—
PHEM	S	—	—	—	—	—	—	—	—	15	2	—	—	—	—	—	—	—	—	—	—
RILA	S	—	—	—	—	—	—	—	—	5	1	9	3	—	—	—	—	—	—	—	—
SABO2	S	—	—	—	—	—	—	—	—	5	1	—	—	—	—	—	—	—	—	—	—
VASC	S	—	—	—	—	—	—	—	—	10	2	9	2	—	—	—	—	—	—	—	—
ABCA	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	3
ACCO4	F	100	1	—	—	—	—	—	—	15	8	27	7	—	—	66	6	—	—	—	—
ACMI2	F	100	5	—	—	—	—	—	—	—	—	9	1	—	—	33	5	100	1	100	1
AGOSE	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
AGUR	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1
ALVA	F	—	—	—	—	—	—	—	—	100	69	—	—	—	—	—	—	50	1	—	—
ANAL4	F	—	—	—	—	—	—	—	—	5	3	—	—	—	—	—	—	—	—	—	—
ANAR3	F	—	—	—	—	—	—	—	—	5	2	18	9	100	1	—	—	—	—	—	—
ANMA	F	—	—	—	—	—	—	—	—	5	1	18	1	—	—	—	—	50	1	—	—
AQUIL	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1
ARCH3	F	—	—	—	—	—	—	—	—	10	3	18	8	—	—	—	—	—	—	—	—
ARFU3	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	1	—	—	—	—
ARLU	F	—	—	—	—	—	—	—	—	—	—	9	1	—	—	—	—	100	23	100	80
ARMA18	F	—	—	—	—	—	—	—	—	—	—	9	1	—	—	—	—	50	3	—	—
ARMO4	F	—	—	—	—	—	—	—	—	15	12	9	3	—	—	33	10	—	—	—	—
ARNIC	F	100	5	—	—	—	—	—	—	10	3	9	8	—	—	—	—	—	—	—	—
ARPA13	F	—	—	—	—	—	—	—	—	5	10	—	—	—	—	—	—	—	—	—	—
ASFO	F	—	—	—	—	—	—	—	—	5	3	—	—	—	—	100	22	—	—	—	—
ASOC	F	—	—	—	—	—	—	—	—	15	9	9	3	100	1	—	—	—	—	—	—
ASTER	F	—	—	—	—	—	—	—	—	25	24	36	3	—	—	—	—	100	16	—	—
ASTRA	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
BICE	F	—	—	—	—	—	—	100	5	—	—	—	—	—	—	—	—	—	—	—	—
BRGR	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1

Appendix B-9—Constancy and average cover of all species present in the following types: (continued)

Type		JUBA		SPAN2		NUPO2		TYLA		ALVA-CA		SETR-MI		HELA4-EL		VERAT		RUOC2		ARLU	
N		1		3		2		1		20		11		1		3		2		1	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
CABI2	F	—	—	—	—	—	—	—	—	5	12	—	—	—	—	—	—	—	—	—	—
CACH16	F	—	—	—	—	—	—	—	—	5	1	—	—	—	—	—	—	50	1	—	—
CACO6	F	—	—	—	—	—	—	100	5	5	1	—	—	100	2	—	—	—	—	—	—
CALOC	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
CALTH	F	—	—	—	—	—	—	—	—	5	1	—	—	—	—	—	—	—	—	—	—
CAMI12	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
CARH4	F	—	—	—	—	—	—	—	—	5	10	—	—	—	—	—	—	—	—	—	—
CARYOF	F	—	—	—	—	—	—	—	—	10	3	27	11	—	—	—	—	—	—	—	—
CASTI2	F	—	—	—	—	—	—	—	—	5	1	—	—	—	—	—	—	—	—	—	—
CIAL	F	—	—	—	—	—	—	100	5	—	—	9	7	—	—	—	—	—	—	—	—
CIAR4	F	100	15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CIRSI	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1
CIVU	F	—	—	—	—	—	—	100	3	—	—	—	—	—	—	—	—	—	—	—	—
CRUCIF	F	—	—	—	—	—	—	—	—	—	—	9	1	—	—	—	—	—	—	—	—
DEDE2	F	—	—	—	—	—	—	—	—	—	—	9	1	—	—	—	—	—	—	—	—
DELPH	F	—	—	—	—	—	—	—	—	5	3	27	14	—	—	—	—	50	5	—	—
DEOC	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	20	—	—	—	—
DERI2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	10	—	—	—	—
DISY	F	—	—	—	—	—	—	100	5	—	—	—	—	—	—	—	—	—	—	—	—
DOAL	F	—	—	—	—	—	—	—	—	55	5	—	—	—	—	—	—	—	—	—	—
DOJE	F	—	—	—	—	—	—	—	—	5	5	—	—	—	—	33	1	—	—	—	—
DRCR2	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1
DRST2	F	—	—	—	—	—	—	—	—	5	3	—	—	—	—	—	—	—	—	—	—
EPAL	F	—	—	—	—	—	—	—	—	10	8	9	1	—	—	—	—	—	—	—	—
EPAN2	F	—	—	—	—	—	—	—	—	—	—	18	3	—	—	—	—	—	—	—	—
EPGL	F	—	—	—	—	—	—	—	—	—	—	9	1	—	—	—	—	—	—	—	—
EPGL4	F	—	—	—	—	—	—	100	3	—	—	27	12	—	—	—	—	—	—	—	—
EPHA	F	—	—	—	—	—	—	—	—	5	3	—	—	—	—	—	—	—	—	—	—
EPILO	F	—	—	—	—	—	—	—	—	30	5	36	15	—	—	33	7	50	3	—	—
EPPA2	F	—	—	—	—	—	—	—	—	10	1	—	—	—	—	—	—	—	—	—	—
EPWA3	F	—	—	—	—	—	—	—	—	—	—	9	5	—	—	—	—	—	—	—	—
ERCO6	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	10	—	—	—	—
ERIGE2	F	—	—	—	—	—	—	—	—	5	1	9	5	—	—	—	—	50	3	—	—
ERPE3	F	—	—	—	—	—	—	—	—	45	12	18	22	—	—	—	—	50	1	—	—
FRVE	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
GABI	F	—	—	—	—	—	—	—	—	5	1	—	—	—	—	—	—	—	—	—	—
GAHU2	F	—	—	—	—	—	—	—	—	5	3	—	—	—	—	—	—	—	—	—	—
GATR3	F	—	—	—	—	—	—	—	—	5	1	—	—	100	10	—	—	—	—	—	—
GECA	F	—	—	—	—	—	—	—	—	50	12	—	—	—	—	—	—	—	—	—	—
GEMA4	F	100	3	—	—	—	—	—	—	5	1	18	2	100	1	33	10	—	—	—	—
HADI7	F	—	—	—	—	—	—	—	—	—	—	9	1	—	—	—	—	—	—	—	—
HASA	F	—	—	—	—	—	—	—	—	10	2	—	—	—	—	—	—	—	—	—	—
HEBO	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1
HELA4	F	100	1	—	—	—	—	—	—	—	—	27	13	100	60	66	45	—	—	—	—

Appendix B-9—Constancy and average cover of all species present in the following types: (continued)

Type		JUBA		SPAN2		NUPO2		TYLA		ALVA-CA		SETR-MI		HELA4-EL		VERAT		RUOC2		ARLU	
N		1		3		2		1		20		11		1		3		2		1	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
HYAN2	F	—	—	—	—	—	—	—	—	5	3	—	—	—	—	—	—	—	—	—	—
HYFE	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	3	—	—	—	—
HYFON	F	—	—	—	—	—	—	—	—	5	10	—	—	—	—	—	—	—	—	—	—
HYPE	F	—	—	—	—	—	—	100	5	—	—	—	—	—	—	—	—	—	—	—	—
ISBO	F	—	—	66	32	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
LICA2	F	—	—	—	—	—	—	—	—	20	7	—	—	—	—	—	—	—	—	—	—
LIGUS	F	—	—	—	—	—	—	—	—	5	1	—	—	—	—	—	—	50	1	—	—
LITE2	F	—	—	—	—	—	—	—	—	45	1	18	2	—	—	—	—	—	—	—	—
LUPIN	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	3	—	—	—	—
LUPO2	F	—	—	—	—	—	—	—	—	—	—	9	10	—	—	—	—	—	—	—	—
MECI3	F	100	3	—	—	—	—	—	—	—	—	9	20	100	10	—	—	—	—	100	2
MEPA	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	50	—	—	—	—
MIGU	F	100	3	—	—	—	—	—	—	10	1	27	10	—	—	—	—	—	—	—	—
MILE2	F	—	—	—	—	—	—	—	—	5	1	90	18	—	—	—	—	—	—	—	—
MIMO3	F	100	3	—	—	—	—	—	—	10	3	36	8	—	—	—	—	—	—	—	—
MIPE	F	—	—	—	—	—	—	—	—	10	2	36	1	—	—	—	—	—	—	—	—
MIPR	F	—	—	—	—	—	—	—	—	20	17	—	—	—	—	—	—	—	—	—	—
MIST3	F	—	—	—	—	—	—	—	—	5	1	9	1	—	—	—	—	—	—	—	—
MOCO4	F	—	—	—	—	—	—	—	—	15	5	27	9	—	—	66	18	—	—	—	—
MONTI	F	—	—	—	—	—	—	—	—	5	1	—	—	—	—	—	—	—	—	—	—
MOOD	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1
NUPO2	F	—	—	—	—	100	45	—	—	—	—	—	—	—	—	—	—	—	—	—	—
OSOC	F	—	—	—	—	—	—	—	—	—	—	18	4	—	—	—	—	50	1	—	—
PAFI3	F	—	—	—	—	—	—	—	—	30	7	27	2	—	—	—	—	—	—	—	—
PEBR	F	—	—	—	—	—	—	—	—	—	—	9	1	—	—	33	1	—	—	—	—
PEGR2	F	—	—	—	—	—	—	—	—	65	4	—	—	—	—	—	—	—	—	—	—
PENST	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
POBI6	F	—	—	—	—	—	—	—	—	15	7	—	—	—	—	33	1	—	—	—	—
PODI2	F	—	—	—	—	—	—	—	—	5	5	—	—	—	—	—	—	—	—	—	—
POFL3	F	—	—	—	—	—	—	—	—	55	12	9	3	—	—	33	2	—	—	—	—
POGL9	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
POGR9	F	100	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
POOC2	F	—	—	—	—	—	—	—	—	—	—	9	15	—	—	—	—	—	—	—	—
POPH	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
POTAM	F	—	—	—	—	50	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RAAC3	F	—	—	—	—	—	—	100	3	—	—	—	—	—	—	—	—	—	—	—	—
RAAL	F	—	—	—	—	—	—	—	—	10	13	—	—	—	—	—	—	—	—	—	—
RAPO	F	—	—	—	—	—	—	—	—	25	9	—	—	—	—	—	—	—	—	—	—
RAUN	F	—	—	—	—	—	—	—	—	10	8	9	1	—	—	—	—	—	—	—	—
RONA2	F	—	—	—	—	—	—	100	5	—	—	—	—	—	—	—	—	—	—	—	—
RUMEX	F	—	—	—	—	—	—	100	3	—	—	—	—	—	—	—	—	—	—	—	—
RUOC2	F	—	—	—	—	—	—	—	—	—	—	18	4	—	—	—	—	100	25	100	5
SAAM3	F	—	—	—	—	—	—	—	—	—	—	9	5	—	—	—	—	—	—	—	—
SAAR13	F	—	—	—	—	—	—	—	—	25	32	72	24	—	—	—	—	—	—	—	—

Appendix B-9—Constancy and average cover of all species present in the following types: (continued)

Type		JUBA		SPAN2		NUPO2		TYLA		ALVA-CA		SETR-MI		HELA4-EL		VERAT		RUOC2		ARLU	
N		1		3		2		1		20		11		1		3		2		1	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
SAMI3	F	—	—	—	—	—	—	—	—	5	5	—	—	—	—	—	—	—	—	—	—
SAOR2	F	—	—	—	—	—	—	—	—	5	1	—	—	—	—	—	—	—	—	—	—
SASI10	F	—	—	—	—	—	—	—	—	15	17	—	—	—	—	—	—	—	—	—	—
SECY	F	—	—	—	—	—	—	—	—	45	10	9	3	—	—	—	—	—	—	—	—
SEFO	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	1	—	—	—	—
SEPS2	F	100	15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SETR	F	—	—	—	—	—	—	—	—	30	18	100	41	—	—	66	2	—	—	—	—
SIPR	F	—	—	—	—	—	—	—	—	10	1	—	—	—	—	—	—	—	—	—	—
SODU	F	—	—	—	—	—	—	100	15	—	—	—	—	—	—	—	—	—	—	—	—
SOGI	F	—	—	—	—	—	—	100	3	—	—	—	—	—	—	—	—	—	—	—	—
SOMU	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1
SPAN2	F	—	—	100	72	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
STCR2	F	—	—	—	—	—	—	—	—	—	—	9	3	—	—	—	—	—	—	—	—
STELL	F	—	—	—	—	—	—	—	—	—	—	18	18	—	—	—	—	—	—	—	—
STOB	F	—	—	—	—	—	—	—	—	—	—	9	3	—	—	—	—	—	—	—	—
SWPE	F	—	—	—	—	—	—	—	—	5	8	—	—	—	—	—	—	—	—	—	—
TAOF	F	100	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
THOC	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
TRIFO	F	—	—	—	—	—	—	—	—	5	30	18	35	—	—	33	1	—	—	—	—
TRLA14	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	5	—	—	—	—
TYLA	F	—	—	—	—	—	—	100	25	—	—	—	—	—	—	—	—	—	—	—	—
URDI	F	—	—	—	—	—	—	—	—	—	—	36	2	100	10	33	15	50	1	—	—
VASI	F	—	—	—	—	—	—	—	—	5	1	—	—	—	—	—	—	50	1	—	—
VEAM2	F	—	—	—	—	—	—	—	—	10	1	9	3	—	—	—	—	—	—	—	—
VECU	F	—	—	—	—	—	—	—	—	10	1	9	1	—	—	—	—	—	—	—	—
VERAT	F	—	—	—	—	—	—	—	—	5	1	—	—	—	—	100	30	50	5	—	—
VERON	F	—	—	—	—	—	—	—	—	5	1	—	—	—	—	—	—	50	1	—	—
VESE	F	—	—	—	—	—	—	—	—	15	4	—	—	—	—	33	1	—	—	—	—
VEWO2	F	—	—	—	—	—	—	—	—	15	1	—	—	—	—	—	—	—	—	—	—
VIAD	F	—	—	—	—	—	—	—	—	5	1	—	—	—	—	—	—	—	—	—	—
VIMA2	F	—	—	—	—	—	—	—	—	5	5	—	—	—	—	—	—	—	—	—	—
VIOLA	F	—	—	—	—	—	—	—	—	15	6	18	1	—	—	66	10	50	2	—	—
ZIEL2	F	—	—	—	—	—	—	—	—	5	1	—	—	—	—	—	—	50	10	—	—
AGEX	G	—	—	—	—	—	—	—	—	—	—	9	3	—	—	—	—	—	—	—	—
AGHU	G	—	—	—	—	—	—	—	—	10	6	—	—	—	—	—	—	—	—	—	—
AGROS2	G	—	—	—	—	—	—	—	—	5	2	9	2	—	—	—	—	50	1	—	—
AGSC5	G	—	—	—	—	—	—	—	—	—	—	9	1	—	—	—	—	—	—	—	—
AGTH2	G	—	—	—	—	—	—	—	—	10	1	—	—	—	—	33	5	—	—	—	—
BRCA5	G	100	10	—	—	—	—	—	—	—	—	9	1	—	—	33	3	100	2	—	—
BROR2	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	8	—	—	—	—
CACA4	G	—	—	—	—	—	—	—	—	—	—	—	—	100	4	33	15	50	10	—	—
CALAM	G	—	—	—	—	—	—	—	—	—	—	9	5	—	—	—	—	—	—	—	—
CILA2	G	—	—	—	—	—	—	—	—	—	—	54	5	100	1	—	—	—	—	—	—
DAIN	G	—	—	—	—	—	—	—	—	5	1	—	—	—	—	—	—	—	—	—	—

Appendix B-9—Constancy and average cover of all species present in the following types: (continued)

Type		JUBA		SPAN2		NUPO2		TYLA		ALVA-CA		SETR-MI		HELA4-EL		VERAT		RUOC2		ARLU	
N		1		3		2		1		20		11		1		3		2		1	
Species	LF	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV	CON	COV
DECE	G	—	—	—	—	—	—	—	—	45	18	—	—	—	—	—	—	—	—	—	—
DEEL	G	—	—	—	—	—	—	—	—	20	3	9	2	—	—	33	1	50	1	—	—
ELGL	G	—	—	—	—	—	—	—	—	—	—	9	1	100	60	33	5	100	1	—	—
FESTU	G	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	3	—	—
GLEL	G	—	—	—	—	—	—	—	—	5	1	36	4	—	—	—	—	—	—	—	—
MUFI2	G	—	—	—	—	—	—	—	—	25	6	9	1	—	—	—	—	—	—	—	—
PHAL2	G	—	—	—	—	—	—	—	—	30	2	—	—	—	—	—	—	50	1	—	—
POLE2	G	—	—	—	—	—	—	—	—	—	—	9	1	—	—	—	—	—	—	—	—
POPR	G	100	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
POTR2	G	—	—	—	—	—	—	100	10	—	—	—	—	—	—	—	—	—	—	—	—
STOC2	G	100	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100	1
TRWO3	G	—	—	—	—	—	—	—	—	10	1	—	—	—	—	—	—	100	1	—	—
CAAM10	GL	—	—	—	—	—	—	100	5	—	—	—	—	—	—	—	—	—	—	—	—
CAAT3	GL	—	—	—	—	—	—	—	—	5	1	—	—	—	—	—	—	—	—	—	—
CAHO5	GL	—	—	—	—	—	—	—	—	—	—	9	1	—	—	33	1	100	3	—	—
CAIL	GL	—	—	—	—	—	—	—	—	20	4	—	—	—	—	—	—	—	—	—	—
CAJO	GL	—	—	—	—	—	—	—	—	10	6	9	2	—	—	—	—	—	—	—	—
CALE9	GL	—	—	—	—	—	—	—	—	5	3	—	—	—	—	—	—	—	—	—	—
CALU7	GL	—	—	—	—	—	—	—	—	35	4	—	—	—	—	—	—	—	—	—	—
CAMI7	GL	100	5	—	—	—	—	100	3	5	15	9	5	100	2	66	4	50	1	—	—
CANE2	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	1	—	—	—	—
CANI2	GL	—	—	—	—	—	—	—	—	40	7	—	—	—	—	—	—	—	—	—	—
CAPA14	GL	—	—	—	—	—	—	—	—	5	1	—	—	—	—	—	—	50	1	—	—
CARA6	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	1	—	—
CAREX	GL	—	—	33	1	—	—	—	—	10	2	9	1	—	—	66	2	50	1	—	—
CARO5	GL	—	—	—	—	—	—	—	—	5	5	—	—	—	—	—	—	—	—	—	—
CASC12	GL	—	—	—	—	—	—	—	—	75	7	9	5	—	—	33	2	—	—	—	—
CAST5	GL	—	—	—	—	—	—	100	5	—	—	—	—	—	—	—	—	—	—	—	—
CASU6	GL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	3	—	—	—	—
CAUT	GL	100	5	33	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ELPA6	GL	—	—	—	—	50	3	—	—	30	4	—	—	—	—	—	—	—	—	—	—
JUBA	GL	100	90	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
JUDR	GL	—	—	—	—	—	—	—	—	35	1	—	—	—	—	33	1	50	1	—	—
JUEN	GL	—	—	—	—	—	—	—	—	—	—	9	1	—	—	—	—	—	—	—	—
JUME3	GL	—	—	—	—	—	—	—	—	20	1	27	1	—	—	—	—	—	—	—	—
JUNCU	GL	—	—	—	—	—	—	—	—	15	12	—	—	—	—	—	—	—	—	—	—
JUPA	GL	—	—	—	—	—	—	—	—	5	1	—	—	—	—	—	—	—	—	—	—
LUCA2	GL	—	—	—	—	—	—	—	—	10	2	—	—	—	—	—	—	50	1	—	—
LUHI4	GL	—	—	—	—	—	—	—	—	5	10	—	—	—	—	—	—	—	—	—	—
LUPA4	GL	—	—	—	—	—	—	—	—	—	—	9	1	—	—	—	—	—	—	—	—
CYFR2	FH	—	—	—	—	—	—	—	—	—	—	9	1	—	—	—	—	—	—	—	—
EQAR	FH	100	3	—	—	—	—	100	100	40	8	18	4	—	—	—	—	—	—	—	—

Appendix C: Snag Attributes of Forested Vegetation Types

Snags sampled were at least 3 m in height and 8 cm in diameter. Snag condition classes are as follows: 1 = recent dead; 2 = fine branches gone, bark intact; 3 = bark loose, large branch stubs; 4 = solid buckskin snag; 5 = broken and rotten (following Thomas 1979).

Vegetation type	Condition class	Tree diameter at breast height				
		8–24.9 cm	25–29.9 cm	30–37.9 cm	38–52.9 cm	≥53 cm
		Trees per hectare				
ABLA-PIEN/LEGL	1	10.1	10.9	—	4.0	0.5
	2	—	—	3.2	—	2.7
	3	—	—	—	5.2	—
	4	20.3	—	—	—	—
	5	—	—	—	—	—
ABLA-PIEN/MEFE	1	—	—	—	—	—
	2	54.6	—	—	—	—
	3	162.8	—	—	—	—
	4	—	12.6	18.3	5.2	—
	5	—	—	—	—	—
ABLA/VAME	1	152.9	6.2	5.2	2.0	—
	2	145.7	13.8	5.2	—	—
	3	32.9	7.6	—	—	—
	4	—	—	—	—	—
	5	—	—	—	—	—
PIEN-ABLA/CASC12	1	—	—	—	—	1.7
	2	9.4	41.4	—	—	—
	3	—	—	—	4.2	—
	4	—	—	—	—	—
	5	—	—	—	—	—
PIEN-ABLA/SETR	1	—	—	—	—	—
	2	37.8	18.5	36.6	18.3	1.2
	3	20.7	18.5	—	20.0	4.4
	4	—	—	—	—	—
	5	—	—	—	—	—
PIEN/EQAR	1	—	—	77.1	—	4.4
	2	—	—	—	—	—
	3	—	—	—	—	—
	4	—	—	—	—	—
	5	—	—	—	—	—
PICO/CASC12	1	—	—	—	—	—
	2	126.7	—	—	—	—
	3	—	—	—	—	—
	4	—	—	—	—	—
	5	—	—	—	—	—
ABGR/TABR2/LIBO3	1	—	—	—	—	—
	2	14.3	—	—	—	10.1
	3	—	25.2	—	—	—
	4	—	—	—	—	—
	5	104.0	—	—	—	1.2
ABGR/CRDO2/CADE9	1	—	—	—	—	—
	2	—	—	—	—	—
	3	—	—	—	—	—
	4	—	—	—	—	—
	5	—	—	—	—	—
ABGR/ACGL	1	13.8	—	5.4	—	2.0
	2	22.7	—	—	3.2	3.7
	3	—	—	—	2.2	0.5
	4	—	3.5	—	—	0.5
	5	1.5	—	—	1.5	—

Appendix C—Snag Attributes of Forested Vegetation Types (continued)

Vegetation type	Condition class	Tree diameter at breast height				
		8–24.9 cm	25–29.9 cm	30–37.9 cm	38–52.9 cm	≥53 cm
		Trees per hectare				
PSME/ACGL-PHMA5	1	53.6	—	—	—	—
	2	6.2	1.2	4.4	—	2.0
	3	—	—	—	—	0.5
	4	—	—	—	—	—
	5	—	—	1.5	—	—
PSME/SYAL	1	—	—	—	—	—
	2	9.1	—	—	—	—
	3	—	—	—	—	—
	4	—	—	—	0.7	—
	5	—	—	—	—	—
PIPO/SYAL	1	161.8	6.4	—	—	—
	2	—	—	—	—	—
	3	—	—	—	—	—
	4	—	—	—	—	—
	5	—	—	—	—	—
PIPO/CRDO2	1	—	—	—	—	—
	2	—	—	—	—	—
	3	—	—	—	—	—
	4	—	—	—	—	—
	5	—	—	—	—	—
POTR15/ALIN2-COST4	1	—	—	—	—	—
	2	—	—	—	—	—
	3	—	—	—	—	0.7
	4	—	—	—	—	—
	5	—	—	—		0.7
POTR15/SYAL	1	—	—	—	—	0.2
	2	—	—	—	—	—
	3	—	—	—	—	—
	4	—	—	—	—	—
	5	—	—	—	—	—
POTR15/ACGL	1	—	—	—	—	—
	2	—	—	—	—	—
	3	—	—	—	—	—
	4	—	—	—	—	0.2
	5	—	—	—	2.2	—
ALRU2/SYAL/CADE9	1	—	—	—	—	—
	2	—	—	5.2	—	—
	3	51.4	—	5.2	—	—
	4	—	—	—	—	—
	5	—	—	—	—	—
ALRH2/RUBUS	1	—	—	—	5.2	—
	2	—	—	—	—	—
	3	—	—	—	—	—
	4	—	—	—	—	—
	5	—	—	—	—	—
ALRH2/SHRUB	1	—	—	—	—	—
	2	10.1	—	—	—	—
	3	52.4	—	—	0.5	0.2
	4	20.7	—	1.2	—	—
	5	3.5	—	—	—	—

Appendix D: Down Log Attributes of Forested Vegetation Types

As was the case in Crowe and Clausnitzer (1997), the below data do not necessarily represent the historical range of variability of downed log amounts and distributions. In some cases the number of plots sampled was small and therefore inadequate for reasonable generalizations regarding downed log attributes of particular forested vegetation types.

Methods

Downed log data were organized by forested vegetation type. Huber's cubic volume (Avery and Burkhart 2002) was calculated for each log as $(B_{1/2})L$ or cross-sectional area at midpoint (m^2) times length (m). Volumes of each piece within the 2.4- by 9.1-m (21.8 m^2) transect were scaled up to 1 ha (10 000 m^2). Within each forested vegetation type, logs were organized by decay condition class (see below) and further organized by size class (see below). Volumes were then summed for each size class within a specific decay condition class for each type.

Huber's cubic volume (HCV) was selected as the most appropriate statistic for describing the down log attributes owing to the incorporation of all available measures (diameter, length, number of pieces) of down logs into one value that is easy to calculate and interpret. For example, an 11.4-cm-diameter log, 6 m in length, would have an HCV of 28 m^3/ha, and a 46-cm-diameter log, 6 m in length, would have an HCV of 449 m^3/ha. Similarly, an 11.4-cm-diameter log, 2.7 m in length, would have an HCV of 13 m^3/ha, and an 11.4-cm-diameter log, 14 m in length, would have a HCV of 63 m^3/ha.

Condition Classes:

1—Bark intact, twigs **present**, **hard**, round, original color, log elevated and **retains original shape**
2—Bark intact, **twigs absent**, **partly soft**, round, original color, **slightly sagging**
3—**Bark trace**, few large hard pieces, round, **colors faded**, **sagging**
4—**Bark absent**, **soft blocky pieces**, round to **oval**, light brown to yellowish, entire log on ground
5—**Soft to powdery**, oval to **flattened**, light yellow to gray, entire log on ground

Size Classes:

1—The log **does not** contain a segment that is **at least 15 cm** in diameter for **a length of at least 1.5 m**.
6—The log **does** contain a segment that is **≥15 and <30 cm** in diameter for **a length of at least 1.5 m**.
12—The log **does** contain a segment that is **≥30 and <51cm** in diameter for **a length of at least 1.5 m**.
20—The log **does** contain a segment that is **≥51 cm** in diameter for **a length of at least 1.5 m**.

Huber's cubic volume (HCV) by condition and size class (SC)

Vegetation type	Condition class	HCV SC 1	HCV SC 6	HCV SC 12	HCV SC20
			Cubic meters per hectare		
ABLA-PIEN/LEGL	1	143(3[a])	1011(2)	1077(1)	—
	2	—	573(2)	—	—
	3	—	177(1)	—	—
	4	—	156(2)	—	—
	5	—	—	815(1)	—
PIEN-ABLA/CASC12	1	—	—	—	—
	2	125(2)	—	—	—
	3	47(4)	303(2)	—	—
	4	24(2)	288(2)	—	—
	5	—	255(2)	—	—
PIEN-ABLA/SETR	1	69(4)	—	—	—
	2	89(4)	149(2)	627(2)	—
	3	130(3)	838(5)	3101(5)	—
	4	74(3)	437(10)	299(1)	—
	5	11(1)	—	—	—
ABLA/VAME	1	14(1)	—	—	—
	2	95(2)	—	—	—
	3	35(2)	182(1)	1186(2)	—
	4	59(2)	113(1)	—	—
	5	—	—	—	—

Huber's cubic volume (HCV) by condition and size class (SC) (continued)

Vegetation type	Condition class	HCV SC 1	HCV SC 6	HCV SC 12	HCV SC20
			Cubic meters per hectare		
ABLA-PIEN/MEFE	1	61(1)	—	—	—
	2	—	—	—	—
	3	—	477(2)	2029(1)	—
	4	—	—	—	—
	5	—	—	—	—
PIEN/EQAR	1	—	126(1)	582(1)	—
	2	—	—	—	—
	3	—	—	—	—
	4	—	—	—	—
	5	—	—	—	—
PICO/CASC12	1	—	—	—	—
	2	—	—	—	—
	3	—	—	—	—
	4	—	—	—	—
	5	—	—	—	—
ABGR/TABR2/LIBO3	1	—	—	—	—
	2	95(1)	109(1)	—	—
	3	—	527(2)	—	—
	4	—	—	1734(3)	399(1)
	5	—	340(2)	1321(2)	1006(1)
ABGR/CRDO2/CADE9	1	8(1)	—	—	—
	2	3(1)	—	—	—
	3	—	—	—	—
	4	—	—	404(1)	—
	5	—	—	—	—
ABGR/ACGL	1	28(1)	—	—	—
	2	86(3)	238(2)	—	—
	3	61(6)	—	280(1)	1249(2)
	4	9(2)	583(2)	2758(2)	—
	5	3(1)	—	—	—
PSME/ACGL-PHMA5	1	—	89(1)	—	—
	2	38(1)	51(1)	—	—
	3	—	—	675(1)	3764(2)
	4	—	524(2)	1739(4)	4998(5)
	5	—	378(3)	344(12)	—
PSME/SYAL	1	—	—	—	—
	2	—	76(1)	—	—
	3	—	—	—	76(1)
	4	—	—	446(1)	—
	5	13(1)	—	—	—
PIPO/SYAL	1	—	—	—	—
	2	—	—	—	—
	3	—	—	—	—
	4	17(1)	—	—	—
	5	—	—	—	—
PIPO/CRDO2	1	—	—	—	—
	2	6(1)	—	—	—
	3	—	—	716(1)	—
	4	—	—	—	—
	5	—	—	100(1)	—
POTR15/ALIN2-COST4	1	—	—	—	—
	2	62(3)	75(1)	—	—
	3	207(11)	74(2)	659(2)	—
	4	18(3)	462(3)	235(1)	861(1)
	5	—	—	—	—
POTR15/SYAL	1	—	—	—	—
	2	35(1)	—	—	—
	3	67(2)	80(1)	—	—
	4	—	45(1)	—	—
	5	—	—	643(1)	—
POTR15/ACGL	1	—	—	—	—
	2	14(1)	—	—	—
	3	22(1)	—	171(1)	—
	4	—	51(1)	—	—
	5	—	—	—	—

Huber's cubic volume (HCV) by condition and size class (SC) (continued)

Vegetation type	Condition class	HCV SC 1	HCV SC 6	HCV SC 12	HCV SC20
			Cubic meters per hectare		
ALRU2/SYAL/CADE9	1	—	—	—	—
	2	—	—	—	—
	3	38(3)	—	799(2)	—
	4	—	—	—	—
	5	—	—	—	—
ALRH2/SHRUB	1	82(5)	250(3)	148(1)	—
	2	143(8)	—	—	—
	3	239(14)	422(6)	175(1)	—
	4	214(12)	63(1)	892(3)	—
	5	—	45(1)	—	—
ALRH2/RUBUS	1	—	—	—	—
	2	—	—	—	—
	3	—	—	—	—
	4	134(2)	156(1)	—	—
	5	—	—	—	—

[a] Values in parentheses indicate the number of individual logs of each size and condition class that were summed to obtain the cumulative value of HCV.

Appendix E: Available Water Capacity of Mineral Soils By Texture

U.S. Department of Agriculture, Soil Conservation Service, California Technical Note 15

Available water capacity related to soil texture

General term	Texture	Probable range on basis of texture[a]	Total permissible range
		- - - - - Inches per inch	*- - - - - -*
Fine	Clay	0.12–0.15	0.12–0.17
	Silty clay	.13–.16	.12–.17
	Sandy clay	.13–.16	.12–.17
Moderately fine	Silty clay loam	.18–.19	.17–.19
	Clay loam	.17–.18	.17–.19
	Sandy clay loam	.17–.18	.17–.19
Medium	Silt loam	.15–.17	.12–.17
	Loam	.14–.16	.12–.17
	Very fine sandy loam	.14–.16	.12–.17
Moderately coarse	Fine sandy loam	.10–.12	.08–.12
	Sandy loam	.09–.11	.08–.12
	Loamy very fine sand	.09–.11	.08–.12
	Loamy fine sand	.08–.10	.08–.12
Coarse	Loamy sand	.06–.08	.06–.08
	Very fine sand	.06–.08	.06–.08
	Fine sand	.06–.08	.06–.08
	Sand	.06–.08	.06–.08
Very coarse	Coarse sand and gravel	.03–.06	.03–.06

Available water capacity values for each textural class should not span more than 0.03 in/in on SCS-SOILS-5 forms.

Where gravel or other coarse fragments are present, values for textures shown above should be reduced by the percentage of coarse fragments in the soil mass.

[a] These figures represent the probable ranges for each textural class based only on texture. Soil structure, organic matter content, stratification, etc. may alter these figures but only within the total permissible range shown above.

Appendix F: Species Traits

A listing of species traits for all species encountered during the field sampling effort. The Wetland column reports U.S. Department of Agriculture, Forest Service Pacific Northwest Region (Region 6) wetland indicator status. All information from the USDA Plants Database (USDA NRCS 2002b).

Code	Layer	Scientific name	Duration	Nativity	Noxious	Wetland[a]
ABGR	TREE	*Abies grandis*	Perennial	Native to U.S.	—	—
ABLA	TREE	*Abies lasiocarpa*	Perennial	Native to U.S.	—	FACU
ACNE2	TREE	*Acer negundo*	Perennial		—	FAC+
ALRH2	TREE	*Alnus rhombifolia*	Perennial	Native to U.S.	—	FACW
ALRU2	TREE	*Alnus rubra*	Perennial	Native to U.S.	—	FAC
BEPAS	TREE	*Betula papyrifera* var. *subcordata*	Perennial	Native to U.S.	—	—
JUNI	TREE	*Juglans nigra*	Perennial	Native and introduced to U.S.	—	—
JUOC	TREE	*Juniperus occidentalis*	Perennial	Native to U.S.	—	—
LAOC	TREE	*Larix occidentalis*	Perennial	Native to U.S.	—	FACU+
PIAL	TREE	*Pinus albicaulis*	Perennial	Native to U.S.	—	—
PICO	TREE	*Pinus contorta*	Perennial	Native to U.S.	—	FAC-
PIEN	TREE	*Picea engelmannii*	Perennial	Native to U.S.	—	FAC
PIPO	TREE	*Pinus ponderosa*	Perennial	Native to U.S.	—	FACU-
POTR15	TREE	*Populus trichocarpa*	Perennial	Native to U.S.	—	—
PRAM	TREE	*Prunus americana*	Perennial	Native and introduced to U.S.	—	FACU
PRAV	TREE	*Prunus avium*	Perennial	Introduced to U.S.	—	—
PSME	TREE	*Pseudotsuga menziesii*	Perennial	Native to U.S.	—	—
ROPS	TREE	*Robinia pseudoacacia*	Perennial	Native and introduced to U.S.	—	FACU-
TSME	TREE	*Tsuga mertensiana*	Perennial	Native to U.S.	—	FACU
ACER	S	*Acer*	—	—	—	—
ACGL	S	*Acer glabrum*	Perennial	Native to U.S.	—	FAC
ACGLD4	S	*Acer glabrum* var. *douglasii*	Perennial	Native to U.S.	—	FAC
ALIN2	S	*Alnus incana*	Perennial	Native to U.S.	—	FACW
ALSI3	S	*Alnus sinuata*	Perennial	Native to U.S.	—	FACW
AMAL2	S	*Amelanchier alnifolia*	Perennial	Native to U.S.	—	FACU
ARCA13	S	*Artemisia cana*	Perennial	Native to U.S.	—	FAC
ARTRV	S	*Artemisia tridentata* ssp. *vaseyana*	Perennial	Native to U.S.	—	—
ARUV	S	*Arctostaphylos uva-ursi*	Perennial	Native to U.S.	—	FACU-
BEAQ	S	*Berberis aquifolium*	Perennial	Native to U.S.	—	—
BEGL	S	*Betula glandulosa*	Perennial	Native to U.S.	—	OBL
BEOC2	S	*Betula occidentalis*	Perennial	Native to U.S.	—	FACW
BERE	S	*Berberis repens*	Perennial	Native to U.S.	—	—
BETUL	S	*Betula*	—	—	—	—
CAME7	S	*Cassiope mertensiana*	Perennial	Native to U.S.	—	FACU+
CASSI3	S	*Cassiope*	—	—	—	—
CELE3	S	*Cercocarpus ledifolius*	Perennial	Native to U.S.	—	—
CERE2	S	*Celtis reticulata*	Perennial	Native to U.S.	—	FAC-
CESA	S	*Ceanothus sanguineus*	Perennial	Native to U.S.	—	NI
CHME	S	*Chimaphila menziesii*	Perennial	Native to U.S.	—	—
CHUM	S	*Chimaphila umbellata*	Perennial	Native to U.S.	—	—
CLCO2	S	*Clematis columbiana*	Perennial	Native to U.S.	—	—
CLEMA	S	*Clematis*	—	—	—	—
CLLI2	S	*Clematis ligusticifolia*	Perennial	Native to U.S.	—	FACU
COST4	S	*Cornus stolonifera*	Perennial	Native to U.S.	—	FACW
CRDO2	S	*Crataegus douglasii*	Perennial	Native to U.S.	—	FAC
EMNI	S	*Empetrum nigrum*	Perennial	Native to U.S.	—	FAC
GAHU	S	*Gaultheria humifusa*	Perennial	Native to U.S.	—	FAC+
GLNE	S	*Glossopetalon nevadense*	Perennial	Native to U.S.	—	—
HODI	S	*Holodiscus discolor*	Perennial	Native to U.S.	—	—
HODU	S	*Holodiscus dumosus*	Perennial	Native to U.S.	—	—
KAMI	S	*Kalmia microphylla*	Perennial	Native to U.S.	—	FACW+
KAOC	S	*Kalmia occidentalis*	Perennial	Native to U.S.	—	FACW+
LEDE5	S	*Ledum decumbens*	Perennial	Native to U.S.	—	—
LEGL	S	*Ledum glandulosum*	Perennial	Native to U.S.	—	FACW+
LIBO3	S	*Linnaea borealis*	Perennial	Native to U.S.	—	FACU-
LOCI3	S	*Lonicera ciliosa*	Perennial	Native to U.S.	—	—
LOIN5	S	*Lonicera involucrata*	Perennial	Native to U.S.	—	FAC
LOUT2	S	*Lonicera utahensis*	Perennial	Native to U.S.	—	FACU+
MEFE	S	*Menziesia ferruginea*	Perennial	Native to U.S.	—	FACU+
MYGA	S	*Myrica gale*	Perennial	Native to U.S.	—	OBL

Appendix F—Species traits (continued)

Code	Layer	Scientific name	Duration	Nativity	Noxious	Wetland[a]
OPHO	S	*Oplopanax horridus*	Perennial	Native to U.S.	—	FAC
PAMY	S	*Paxistima myrsinites*	Perennial	Native to U.S.	—	—
PHCA11	S	*Physocarpus capitatus*	Perennial	Native to U.S.	—	FAC+
PHEM	S	*Phyllodoce empetriformis*	Perennial	Native to U.S.	—	FAC
PHLE4	S	*Philadelphus lewisii*	Perennial	Native to U.S.	—	—
PHMA5	S	*Physocarpus malvaceus*	Perennial	Native to U.S.	—	—
POBA2	S	*Populus balsamifera*	Perennial	Native to U.S.	—	FAC
POFR4	S	*Potentilla fruticosa*	Perennial	Native to U.S.	—	FAC-
PRAR3	S	*Prunus armeniaca*	Perennial	Introduced to U.S.	—	—
PRCE	S	*Prunus cerasus*	Perennial	Introduced to U.S.	—	—
PRDO	S	*Prunus domestica*	Perennial	Introduced to U.S.	—	—
PREM	S	*Prunus emarginata*	Perennial	Native to U.S.	—	—
PRUNU	S	*Prunus*	—	—	—	—
PRVI	S	*Prunus virginiana*	Perennial	Native to U.S.	—	FACU
QUGA4	S	*Quercus garryana*	Perennial	Native to U.S.	—	—
RHAL2	S	*Rhododendron albiflorum*	Perennial	Native to U.S.	—	FAC
RHGL	S	*Rhus glabra*	Perennial	Native to U.S.	—	—
RHPU	S	*Rhamnus purshiana*	Perennial	Native to U.S.	—	NI
RHRA6	S	*Rhus radicans*	Perennial	Native to U.S.	—	—
RIBES	S	*Ribes*	—	—	—	—
RICE	S	*Ribes cereum*	Perennial	Native to U.S.	—	NI
RICO	S	*Ribes cognatum*	Perennial	Native to U.S.	—	—
RIHU	S	*Ribes hudsonianum*	Perennial	Native to U.S.	—	OBL
RIIN2	S	*Ribes inerme*	Perennial	Native to U.S.	—	FAC
RIIR	S	*Ribes irriguum*	Perennial	Native to U.S.	—	—
RILA	S	*Ribes lacustre*	Perennial	Native to U.S.	—	FAC+
RIMO2	S	*Ribes montigenum*	Perennial	Native to U.S.	—	—
RINI2	S	*Ribes niveum*	Perennial	Native to U.S.	—	—
RIWO	S	*Ribes wolfii*	Perennial	Native to U.S.	—	NI
ROGY	S	*Rosa gymnocarpa*	Perennial	Native to U.S.	—	NI
RONU	S	*Rosa nutkana*	Perennial	Native to U.S.	—	NI
ROSA5	S	*Rosa*	—	—	—	—
ROWO	S	*Rosa woodsii*	Perennial	Native to U.S.	—	FACU
RUBA	S	*Rubus bartonianus*	Perennial	Native to U.S.	—	NI
RUBUS	S	*Rubus*	—	—	—	—
RUDI2	S	*Rubus discolor*	Perennial	Introduced to U.S.	—	FACU-
RUID	S	*Rubus idaeus*	Perennial	Native to U.S.	—	FACU
RULA	S	*Rubus laciniatus*	Perennial	Introduced to U.S.	—	FACU+
RULE	S	*Rubus leucodermis*	Perennial	Native to U.S.	—	—
RUPA	S	*Rubus parviflorus*	Perennial	Native to U.S.	—	FACU+
SAEA	S	*Salix eastwoodiea*	Perennial	Native to U.S.	—	FACW
SATW	S	*Salix tweedyi*	Perennial	Native to U.S.	—	FACW+
SAGE2	S	*Salix geyeriana*	Perennial	Native to U.S.	—	—
SABE2	S	*Salix bebbiana*	Perennial	Native to U.S.	—	FACW
SAAR27	S	*Salix arctica*	Perennial	Native to U.S.	—	—
SABA3	S	*Salix barclayi*	Perennial	Native to U.S.	—	FACW
SABO2	S	*Salix boothii*	Perennial	Native to U.S.	—	OBL
SACE3	S	*Sambucus cerulea*	Perennial	Native to U.S.	—	FAC-
SACO2	S	*Salix commutata*	Perennial	Native to U.S.	—	OBL
SADR	S	*Salix drummondiana*	Perennial	Native to U.S.	—	FACW
SAEX	S	*Salix exigua*	Perennial	Native to U.S.	—	OBL
SAFA	S	*Salix farriae*	Perennial	Native to U.S.	—	OBL
SALA5	S	*Salix lasiandra*	Perennial	Native to U.S.	—	FACW+
SALA6	S	*Salix lasiolepis*	Perennial	Native to U.S.	—	FACW
SALE	S	*Salix lemmonii*	Perennial	Native to U.S.	—	FACW+
SALIX	S	*Salix*	—	—	—	—
SAMBU	S	*Sambucus*	—	—	—	—
SAMY	S	*Salix myrtillifolia*	Perennial	Native to U.S.	—	FACW+
SAPL2	S	*Salix planifolia*	Perennial	Native to U.S.	—	OBL
SARA2	S	*Sambucus racemosa*	Perennial	Native to U.S.	—	FACU
SARI2	S	*Salix rigida*	Perennial	Native to U.S.	—	—
SASC	S	*Salix scouleriana*	Perennial	Native to U.S.	—	FAC
SASI2	S	*Salix sitchensis*	Perennial	Native to U.S.	—	FACW
SAWO	S	*Salix wolfii*	Perennial	Native to U.S.	—	FACW+

Appendix F—Species traits (continued)

Code	Layer	Scientific name	Duration	Nativity	Noxious	Wetland[a]
SHCA	S	*Shepherdia canadensis*	Perennial	Native to U.S.	—	NI
SOAU	S	*Sorbus aucuparia*	Perennial	Introduced to U.S.	—	—
SOSC2	S	*Sorbus scopulina*	Perennial	Native to U.S.	—	NI
SPBE2	S	*Spiraea betulifolia*	Perennial	Native to U.S.	—	NI
SPDE	S	*Spiraea densiflora*	Perennial	Native to U.S.	—	—
SPDO	S	*Spiraea douglasii*	Perennial	Native to U.S.	—	FACW
SPIRA	S	*Spiraea*	—	—	—	—
SYAL	S	*Symphoricarpos albus*	Perennial	Native to U.S.	—	FACU
SYOR2	S	*Symphoricarpos oreophilus*	Perennial	Native to U.S.	—	UPL
TABR2	S	*Taxus brevifolia*	Perennial	Native to U.S.	—	FACU-
VACA13	S	*Vaccinium caespitosum*	Perennial	Native to U.S.	—	FACU
VACCI	S	*Vaccinium*	—	—	—	—
VAME	S	*Vaccinium membranaceum*	Perennial	Native to U.S.	—	FACU+
VAMY2	S	*Vaccinium myrtillus*	Perennial	Native to U.S.	—	NI
VASC	S	*Vaccinium scoparium*	Perennial	Native to U.S.	—	FACU-
VAUL	S	*Vaccinium uliginosum*	Perennial	Native to U.S.	—	FACW+
ABCA	F	*Abronia carletonii*	Perennial	Native to U.S.	—	—
ACCO4	F	*Aconitum columbianum*	Perennial	Native to U.S.	—	FACW
ACMI2	F	*Achillea millefolium*	Perennial	Native and introduced to U.S.	—	FACU
ACRU2	F	*Actaea rubra*	Perennial	Native to U.S.	—	—
ADBI	F	*Adenocaulon bicolor*	Perennial	Native to U.S.	—	—
AGAST	F	*Agastache*	—	—	—	—
AGAU2	F	*Agoseris aurantiaca*	Perennial	Native to U.S.	—	FAC
AGOSE	F	*Agoseris*	—	—	—	—
AGUR	F	*Agastache urticifolia*	Perennial	Native to U.S.	—	—
ALAC4	F	*Allium acuminatum*	Perennial	Native to U.S.	—	—
ALVA	F	*Allium validum*	Perennial	Native to U.S.	—	OBL
AMLY	F	*Amsinckia lycopsoides*	Annual	Native to U.S.	—	—
AMRE2	F	*Amsinckia retrorsa*	Annual	Native to U.S.	—	—
ANAL4	F	*Antennaria alpina*	Perennial	Native to U.S.	—	—
ANAR3	F	*Angelica arguta*	Perennial	Native to U.S.	—	FACW
ANEMO	F	*Anemone*	—	—	—	—
ANMA	F	*Anaphalis margaritacea*	Perennial	Native to U.S.	—	—
ANMI3	F	*Antennaria microphylla*	Perennial	Native to U.S.	—	—
ANPI	F	*Anemone piperi*	Perennial	Native to U.S.	—	FACU-
ANRA	F	*Antennaria racemosa*	Perennial	Native to U.S.	—	—
ANSC8	F	*Anthriscus scandicina*	Annual	Introduced to U.S.	—	—
ANTEN	F	*Antennaria*	—	—	—	—
ANUM	F	*Antennaria umbrinella*	Perennial	Native to U.S.	—	FACU
APAN2	F	*Apocynum androsaemifolium*	Perennial	Native to U.S.	—	—
APIACF	F	*Apiaceae*	—	—	—	—
AQFL	F	*Aquilegia flavescens*	Perennial	Native to U.S.	—	—
AQFO	F	*Aquilegia formosa*	Perennial	Native to U.S.	—	FAC
AQUIL	F	*Aquilegia*	—	—	—	—
ARAM2	F	*Arnica amplexicaulis*	Perennial	Native to U.S.	—	FACW
ARCH3	F	*Arnica chamissonis*	Perennial	Native to U.S.	—	FACW
ARCO9	F	*Arnica cordifolia*	Perennial	Natve to U.S.	—	NI
ARCTI	F	*Arctium*	—	—	—	—
ARDI2	F	*Arabis ×divaricarpa*	Biennial, perennial	Native to U.S.	—	FACU
ARFU3	F	*Arnica fulgens*	Perennial	Natve to U.S.	—	NI
ARGL	F	*Arabis glabra*	Annual, biennial, perennial	Native to U.S.	—	NI
ARLA8	F	*Arnica latifolia*	Perennial	Native to U.S.	—	FAC-
ARLO6	F	*Arnica longifolia*	Perennial	Native to U.S.	—	FACW
ARLU	F	*Artemisia ludoviciana*	Perennial	Native to U.S.	—	UPL
ARMA18	F	*Arenaria macrophylla*	Perennial	Native to U.S.	—	NI
ARMI2	F	*Arctium minus*	Biennial	Introduced to U.S.	WY	NI
ARMO4	F	*Arnica mollis*	Perennial	Native to U.S.	—	FAC
ARNIC	F	*Arnica*	—	—	—	—
ARPA13	F	*Arnica parryi*	Perennial	Native to U.S.	—	NI
ARSE2	F	*Arenaria serpyllifolia*	Annual	Introduced to U.S.	—	FACU
ASAL2	F	*Aster alpigenus*	Perennial	Native to U.S.	—	UPL
ASAL7	F	*Astragalus alpinus*	Perennial	Native to U.S.	—	FAC-
ASCA11	F	*Astragalus canadensis*	Perennial	Native to U.S.	—	FACW-
ASCA2	F	*Asarum caudatum*	Perennial	Native to U.S.	—	—

Appendix F—Species traits (continued)

Code	Layer	Scientific name	Duration	Nativity	Noxious	Wetland[a]
ASCH2	F	*Aster chilensis*	Perennial	Native to U.S.	—	FAC
ASCO3	F	*Aster conspicuus*	Perennial	Native to U.S.	—	NI
ASCU5	F	*Astragalus cusickii*	Perennial	Native to U.S.	—	—
ASEA	F	*Aster eatonii*	Perennial	Native to U.S.	—	FAC+
ASFO	F	*Aster foliaceus*	Perennial	Native to U.S.	—	FACW-
ASMO3	F	*Aster modestus*	Perennial	Native to U.S.	—	FAC+
ASOC	F	*Aster occidentalis*	Perennial	Native to U.S.	—	FAC
ASPR	F	*Asperugo procumbens*	Annual	Introduced to U.S.	—	—
ASRO	F	*Astragalus robbinsii*	Perennial	Native to U.S.	—	FAC+
ASTER	F	*Aster*	—	—	—	—
ASTERF	F	*Asteraceae*	—	—	—	—
ASTRA	F	*Astragalus*	—	—	—	—
BASA3	F	*Balsamorhiza sagittata*	Perennial	Native to U.S.	—	NI
BICE	F	*Bidens cernua*	Annual	Native to U.S.	—	FACW+
BRDO	F	*Brodiaea douglasii*	Perennial	Native to U.S.	—	NI
BRGR	F	*Brickellia grandiflora*	Perennial	Native to U.S.	—	NI
BRHO	F	*Brodiaea howellii*	Perennial	Native to U.S.	—	NI
BRHY2	F	*Brodiaea hyacinthina*	Perennial	Native to U.S.	—	FACU
BRODI	F	*Brodiaea*	—	—	—	—
CABI2	F	*Caltha biflora*	Perennial	Native to U.S.	—	NI
CABU2	F	*Capsella bursa-pastoris*	Annual	Introduced to U.S.	—	FAC-
CACH16	F	*Castilleja chrysantha*	Perennial	Native to U.S.	—	NI
CACO6	F	*Cardamine cordifolia*	Perennial	Native to U.S.	—	FACW
CACU7	F	*Castilleja cusickii*	Perennial	Native to U.S.	—	NI
CALE4	F	*Caltha leptosepala*	Perennial	Native to U.S.	—	OBL
CALLI6	F	*Callitriche*	—	—	—	—
CALOC	F	*Calochortus*	—	—	—	—
CALTH	F	*Caltha*	—	—	—	—
CAMI12	F	*Castilleja miniata*	Perennial	Native to U.S.	—	FAC
CAMPA	F	*Campanula*	—	—	—	—
CAOL	F	*Cardamine oligosperma*	Annual, biennial, perennial	Native to U.S.	—	FACW
CARDA	F	*Cardamine*	—	—	—	—
CARDU	F	*Carduus*	—	—	—	—
CARH4	F	*Castilleja rhexiifolia*	Perennial	Native to U.S.	—	FAC
CARO2	F	*Campanula rotundifolia*	Perennial	Native to U.S.	—	FACU+
CARYOF	F	*Caryophyllaceae*	—	—	—	—
CASTI2	F	*Castilleja*	—	—	—	—
CEAR4	F	*Cerastium arvense*	Perennial	Native to U.S.	—	FACU
CENU2	F	*Cerastium nutans*	Annual, perennial	Native to U.S.	—	FACU
CERAS	F	*Cerastium*	—	—	—	—
CEVI3	F	*Cerastium viscosum*	Annual	Introduced to U.S.	—	UPL
CEVU	F	*Cerastium vulgatum*	Biennial, perennial	Introduced to U.S.	—	FACU
CHHY	F	*Chenopodium hybridum*	Annual	Native to U.S.	—	NI
CHLE80	F	*Chrysanthemum leucanthemum*	Perennial	Introduced to U.S.	WA, WY	NI
CHTE2	F	*Chorispora tenella*	Annual	Introduced to U.S.	—	NI
CIAL	F	*Circaea alpina*	Perennial	Native to U.S.	—	FACW
CIAR4	F	*Cirsium arvense*	Perennial	Introduced to U.S.	ID, MO, OR, WA, WY	FACU+
CICA6	F	*Cirsium canovirens*	Biennial, perennial	Native to U.S.	—	NI
CIDO	F	*Cicuta douglasii*	Perennial	Native to U.S.	—	OBL
CIRSI	F	*Cirsium*	—	—	—	—
CIUN	F	*Cirsium undulatum*	Biennial, perennial	Native to U.S.	—	FACU+
CIVU	F	*Cirsium vulgare*	Biennial	Introduced to U.S.	OR	FACU
CLME	F	*Claytonia megarhiza*	Perennial	Native to U.S.	—	FACU
CLUN2	F	*Clintonia uniflora*	Perennial	Native to U.S.	—	NI
COAR4	F	*Convolvulus arvensis*	Perennial	Introduced to U.S.	ID, MT, OR, WA, WY	NI
COCA13	F	*Cornus canadensis*	Perennial	Native to U.S.	—	FAC-
COCA5	F	*Conyza canadensis*	Annual, biennial	Native to U.S.	—	FACU
COGR4	F	*Collomia grandiflora*	Annual	Native to U.S.	—	NI
COLI2	F	*Collomia linearis*	Annual	Native to U.S.	—	FACU
COMA4	F	*Corallorrhiza maculata*	Perennial	Native to U.S.	—	FAC-
COOR	F	*Conringia orientalis*	Annual	Introduced to U.S.	—	NI
COPA3	F	*Collinsia parviflora*	Annual	Native to U.S.	—	NI
CRFR2	F	*Cryptantha fragilis*	Annual	Native to U.S.	—	NI
CRUCIF	F	*Cruciferae*	—	—	—	—

Appendix F—Species traits (continued)

Code	Layer	Scientific name	Duration	Nativity	Noxious	Wetland[a]
CYOF	F	*Cynoglossum officinale*	Annual	Introduced to U.S.	MT, OR, WA, WY	NI
DEDE2	F	*Delphinium depauperatum*	Perennial	Native to U.S.	—	NI
DELPH	F	*Delphinium*	—	—	—	—
DEOC	F	*Delphinium ×occidentale*	Perennial	Native to U.S.	—	FACU-
DERI2	F	*Descurainia richardsonii*	Annual, biennial	Native to U.S.	—	NI
DICU	F	*Dicentra cucullaria*	Perennial	Native to U.S.	—	NI
DIHO3	F	*Disporum hookeri*	Perennial	Native to U.S.	—	NI
DISM2	F	*Disporum smithii*	Perennial	Native to U.S.	—	NI
DISPO	F	*Disporum*	—	—	—	—
DISY	F	*Dipsacus sylvestris*	Biennial	Introduced to U.S.	—	NI
DITR2	F	*Disporum trachycarpum*	Perennial	Native to U.S.	—	NI
DOAL	F	*Dodecatheon alpinum*	Perennial	Native to U.S.	—	FACW+
DODEC	F	*Dodecatheon*	—	—	—	—
DOJE	F	*Dodecatheon jeffreyi*	Perennial	Native to U.S.	—	FACW
DOPU	F	*Dodecatheon pulchellum*	Perennial	Native to U.S.	—	FACW
DRCR2	F	*Draba crassifolia*	Annual, biennial, perennial	Native to U.S.	—	NI
DRST2	F	*Draba stenoloba*	Annual, biennial, perennial	Native to U.S.	—	NI
EPAL	F	*Epilobium alpinum*	Perennial	Native to U.S.	—	FACU-
EPAN2	F	*Epilobium angustifolium*	Perennial	Native to U.S.	—	FACU+
EPGI	F	*Epipactis gigantea*	Perennial	Native to U.S.	—	FACW+
EPGL	F	*Epilobium glaberrimum*	Perennial	Native to U.S.	—	FACW
EPGL4	F	*Epilobium glandulosum*	Perennial	Native to U.S.	—	NI
EPHA	F	*Epilobium halleanum*	Perennial	Native to U.S.	—	FACW
EPILO	F	*Epilobium*	—	—	—	—
EPLA	F	*Epilobium latifolium*	Perennial	Native to U.S.	—	FACW-
EPMI	F	*Epilobium minutum*	Annual	Native to U.S.	—	NI
EPPA2	F	*Epilobium paniculatum*	Annual	Native to U.S.	—	UPL
EPWA3	F	*Epilobium watsonii*	Perennial	Native to U.S.	—	NI
ERAS2	F	*Erysimum asperum*	Biennial, perennial	Native to U.S.	—	NI
ERCO6	F	*Erigeron coulteri*	Perennial	Native to U.S.	—	FACW
ERGR9	F	*Erythronium grandiflorum*	Perennial	Native to U.S.	—	FAC-
ERIGE2	F	*Erigeron*	—	—	—	—
ERPE3	F	*Erigeron peregrinus*	Perennial	Native to U.S.	—	FACW
ERPH	F	*Erigeron philadelphicus*	Biennial, perennial	Native to U.S.	—	FACU
ERSP4	F	*Erigeron speciosus*	Perennial	Native to U.S.	—	NI
FRASE	F	*Frasera*	—	—	—	—
FRSP	F	*Frasera speciosa*	Perennial	Native to U.S.	—	UPL
FRVE	F	*Fragaria vesca*	Perennial	Native to U.S.	—	NI
FRVI	F	*Fragaria virginiana*	Perennial	Native to U.S.	—	UPL
GAAP2	F	*Galium aparine*	Annual	Native to U.S.	—	FACU
GAAS3	F	*Galium asperrimum*	Perennial	Native to U.S.	—	NI
GABI	F	*Galium bifolium*	Annual	Native to U.S.	—	NI
GABO2	F	*Galium boreale*	Perennial	Native to U.S.	—	FACU
GAHU2	F	*Gayophytum humile*	Annual	Native to U.S.	—	NI
GALIU	F	*Galium*	—	—	—	—
GAMU2	F	*Galium multiflorum*	Perennial	Native to U.S.	—	NI
GATR2	F	*Galium trifidum*	Perennial	Native to U.S.	—	FACW+
GATR3	F	*Galium triflorum*	Perennial	Native to U.S.	—	FACU
GEAL3	F	*Geum aleppicum*	Perennial	Native to U.S.	—	FACW-
GEBI2	F	*Geranium bicknellii*	Annual, biennial	Native to U.S.	—	NI
GECA	F	*Gentiana calycosa*	Perennial	Native to U.S.	—	FACW-
GEMA4	F	*Geum macrophyllum*	Perennial	Native to U.S.	—	FACW+
GENTI	F	*Gentiana*	—	—	—	—
GEPU2	F	*Geranium pusillum*	Annual, biennial	Introduced to U.S.	—	NI
GERAN	F	*Geranium*	—	—	—	—
GEUM	F	*Geum*	—	—	—	—
GEVI2	F	*Geranium viscosissimum*	Annual, perennial	Native to U.S.	—	FACU+
GIAG	F	*Gilia aggregata*	Biennial, perennial	Native to U.S.	—	NI
GICO2	F	*Gilia congesta*	Perennial	Native to U.S.	—	NI
GILIA	F	*Gilia*	—	—	—	—
GOOB2	F	*Goodyera oblongifolia*	Perennial	Native to U.S.	—	FACU-
HABEN	F	*Habenaria*	—	—	—	—
HACKE	F	*Hackelia*	—	—	—	—
HADI7	F	*Habenaria dilatata*	Perennial	Native to U.S.	—	NI

Appendix F—Species traits (continued)

Code	Layer	Scientific name	Duration	Nativity	Noxious	Wetland[a]
HAMI	F	*Hackelia micrantha*	Perennial	Native to U.S.	—	NI
HASA	F	*Habenaria saccata*	Perennial	Native to U.S.	—	FACW
HAUN	F	*Habenaria unalascensis*	Perennial	Native to U.S.	—	FAC
HEBO	F	*Hedysarum boreale*	Perennial	Native to U.S.	—	NI
HELA4	F	*Heracleum lanatum*	Perennial	Native to U.S.	—	FAC
HEMI7	F	*Heuchera micrantha*	Perennial	Native to U.S.	—	NI
HEUCH	F	*Heuchera*	—	—	—	—
HIAL2	F	*Hieracium albiflorum*	Perennial	Native to U.S.	—	NI
HIERA	F	*Hieracium*	—	—	—	—
HIGR	F	*Hieracium gracile*	Perennial	Native to U.S.	—	NI
HYAN2	F	*Hypericum anagalloides*	Annual, perennial	Native to U.S.	—	OBL
HYCA4	F	*Hydrophyllum capitatum*	Perennial	Native to U.S.	—	NI
HYDRO4	F	*Hydrophyllum*	—	—	—	—
HYFE	F	*Hydrophyllum fendleri*	Perennial	Native to U.S.	—	FAC
HYFON	F	*Hypericum formosum* var. *nortoniae*	Perennial	Native to U.S.	—	FAC
HYFOS	F	*Hypericum formosum* var. *scouleri*	Perennial	Native to U.S.	—	FAC
HYOC	F	*Hydrophyllum occidentale*	Perennial	Native to U.S.	—	FACW
HYPE	F	*Hypericum perforatum*	Perennial	Introduced to U.S.	MT, OR, WA	NI
HYPER	F	*Hypericum*	—	—	—	—
ILRI	F	*Iliamna rivularis*	Perennial	Native to U.S.	—	FAC-
ISBO	F	*Isoetes bolanderi*	Perennial	Native to U.S.	—	OBL
LAAM	F	*Lamium amplexicaule*	Annual, biennial	Introduced to U.S.	—	NI
LABI	F	*Lactuca biennis*	Annual, biennial	Native to U.S.	—	FAC
LABIAF	F	*Labiata*	—	—	—	—
LACO3	F	*Lapsana communis*	Annual	Introduced to U.S.	—	NI
LACTU	F	*Lactuca*	—	—	—	—
LANE3	F	*Lathyrus nevadensis*	Perennial	Native to U.S.	—	NI
LAPA5	F	*Lathyrus pauciflorus*	Perennial	Native to U.S.	—	NI
LASE	F	*Lactuca serriola*	Annual, biennial	Introduced to U.S.	—	FAC-
LATHY	F	*Lathyrus*	—	—	—	—
LEGUMF	F	Legumaceae	—	—	—	—
LEMI3	F	*Lemna minor*	Perennial	Native to U.S.	—	OBL
LEPY2	F	*Lewisia pygmaea*	Perennial	Native to U.S.	—	FACU
LICA2	F	*Ligusticum canbyi*	Perennial	Native to U.S.	—	FAC
LICO6	F	*Listera cordata*	Perennial	Native to U.S.	—	FACW
LIGR	F	*Ligusticum grayi*	Perennial	Native to U.S.	—	NI
LIGUS	F	*Ligusticum*	—	—	—	—
LILIAF	F	*Liliaceae*	—	—	—	—
LIPA5	F	*Lithophragma parviflorum*	Perennial	Native to U.S.	—	NI
LISTE	F	*Listera*	—	—	—	—
LITE2	F	*Ligusticum tenuifolium*	Perennial	Native to U.S.	—	FACW
LOCO6	F	*Lotus corniculatus*	Perennial	Introduced to U.S.	—	FAC
LODI	F	*Lomatium dissectum*	Perennial	Native to U.S.	—	NI
LOMAT	F	*Lomatium*	—	—	—	—
LOPU3	F	*Lotus purshianus*	Annual	Native to U.S.	—	NI
LULE3	F	*Lupinus leucophyllus*	Perennial	Native to U.S.	—	NI
LUPIN	F	*Lupinus*	—	—	—	—
LUPO2	F	*Lupinus polyphyllus*	Perennial	Native to U.S.	—	FAC+
LYAL	F	*Lychnis alba*	Biennial, perennial	Introduced to U.S.	WA	NI
LYAN2	F	*Lycopodium annotinum*	Perennial	Native to U.S.	—	FAC
LYCO	F	*Lychnis coronaria*	Perennial	Introduced to U.S.	—	NI
LYUN	F	*Lycopus uniflorus*	Perennial	Native to U.S.	—	OBL
MAGR3	F	*Madia gracilis*	Annual	Native to U.S.	—	NI
MAVU	F	*Marrubium vulgare*	Perennial	Introduced to U.S.	—	FACU+
MEAL2	F	*Melilotus albus*	Annual, biennial, perennial	Introduced to U.S.	—	FACU
MEAR4	F	*Mentha arvensis*	Perennial	Native to U.S.	—	FAC
MECI3	F	*Mertensia ciliata*	Perennial	Native to U.S.	—	FACW+
MELU	F	*Medicago lupulina*	Annual, perennial	Introduced to U.S.	—	FAC
MENTH	F	*Mentha*	—	—	—	—
MEOF	F	*Melilotus officinalis*	Annual, biennial, perennial	Introduced to U.S.	—	FACU
MEPA	F	*Mertensia paniculata*	Perennial	Native to U.S.	—	FAC
MEPI	F	*Mentha ×piperita*	Perennial	Introduced to U.S.	—	FACW+
MERTE	F	*Mertensia*	—	—	—	—
METR3	F	*Menyanthes trifoliata*	Perennial	Native to U.S.	—	OBL

Appendix F—Species traits (continued)

Code	Layer	Scientific name	Duration	Nativity	Noxious	Wetland[a]
MIGR	F	*Microsteris gracilis*	Annual	Native to U.S.	—	FACU
MIGU	F	*Mimulus guttatus*	Annual, perennial	Native to U.S.	—	OBL
MILE2	F	*Mimulus lewisii*	Perennial	Native to U.S.	—	FACW+
MIMO3	F	*Mimulus moschatus*	Perennial	Native to U.S.	—	FACW+
MIMUL	F	*Mimulus*	—	—	—	—
MINU	F	*Microseris nutans*	Perennial	Native to U.S.	—	NI
MIPE	F	*Mitella pentandra*	Perennial	Native to U.S.	—	FACW+
MIPR	F	*Mimulus primuloides*	Perennial	Native to U.S.	—	FACW+
MIST3	F	*Mitella stauropetala*	Perennial	Native to U.S.	—	FAC
MITEL	F	*Mitella*	—	—	—	—
MOCO4	F	*Montia cordifolia*	Perennial	Native to U.S.	—	FACW+
MONTI	F	*Montia*	—	—	—	—
MOOD	F	*Monardella odoratissima*	Perennial	Native to U.S.	—	FACU-
MOPA2	F	*Montia parvifolia*	Perennial	Native to U.S.	—	FACW-
MOPE3	F	*Montia perfoliata*	Annual, perennial	Native to U.S.	—	NI
MOSI2	F	*Montia sibirica*	Annual, perennial	Native to U.S.	—	NI
MOUN3	F	*Monotropa uniflora*	Perennial	Native to U.S.	—	FACU
MYMI	F	*Myosotis micrantha*	Annual	Introduced to U.S.	—	NI
MYOSO	F	*Myosotis*	—	—	—	—
NEPA	F	*Nemophila parviflora*	Annual	Native to U.S.	—	NI
NUPO2	F	*Nuphar polysepala*	Perennial	Native to U.S.	—	NI
OSCH	F	*Osmorhiza chilensis*	Perennial	Native to U.S.	—	NI
OSMOR	F	*Osmorhiza*	—	—	—	—
OSOC	F	*Osmorhiza occidentalis*	Perennial	Native to U.S.	—	NI
PAFI3	F	*Parnassia fimbriata*	Perennial	Native to U.S.	—	OBL
PAPE5	F	*Parietaria pensylvanica*	Annual	Native to U.S.	—	FACU
PEFRP	F	*Petasites frigidus* var. *palmatus*	Perennial	Native to U.S.	—	FAC
PEBR	F	*Pedicularis bracteosa*	Perennial	Native to U.S.	—	NI
PEGL5	F	*Penstemon globosus*	Perennial	Native to U.S.	—	FAC+
PEGR2	F	*Pedicularis groenlandica*	Perennial	Native to U.S.	—	OBL
PENST	F	*Penstemon*	—	—	—	—
PEPA3	F	*Pedicularis parryi*	Perennial	Native to U.S.	—	FACU
PEPA29	F	*Penstemon payettensis*	Perennial	Native to U.S.	—	NI
PERA	F	*Pedicularis racemosa*	Perennial	Native to U.S.	—	NI
PHHA	F	*Phacelia hastata*	Perennial	Native to U.S.	—	NI
PLLA	F	*Plantago lanceolata*	Annual, biennial, perennial	Introduced to U.S.	—	FACU+
PLMA2	F	*Plantago major*	Perennial	Native to U.S.	—	FAC+
PLSC2	F	*Plagiobothrys scouleri*	Annual	Native to U.S.	—	FACW
POAR7	F	*Potentilla arguta*	Perennial	Native to U.S.	—	FACU
POBI6	F	*Polygonum bistortoides*	Perennial	Native to U.S.	—	FACW+
POBI7	F	*Potentilla biennis*	Annual, biennial	Native to U.S.	—	FACW
POCU6	F	*Polygonum cuspidatum*	Perennial	Introduced to U.S.	OR, WA	NI
PODI2	F	*Potentilla diversifolia*	Perennial	Native to U.S.	—	FACU
POFL3	F	*Potentilla flabellifolia*	Perennial	Native to U.S.	—	NI
POGL9	F	*Potentilla glandulosa*	Perennial	Native to U.S.	—	FAC-
POGR9	F	*Potentilla gracilis*	Perennial	Native to U.S.	—	FAC
POLA4	F	*Polygonum lapathifolium*	Annual	Native to U.S.	—	FACW+
POLEM	F	*Polemonium*	—	—	—	—
POLYG4	F	*Polygonum*	—	—	—	—
POOC2	F	*Polemonium occidentale*	Perennial	Native to U.S.	—	FACW
POOV2	F	*Potentilla ovina*	Perennial	Native to U.S.	—	NI
POPH	F	*Polygonum phytolaccifolium*	Perennial	Native to U.S.	—	FAC-
POPU3	F	*Polemonium pulcherrimum*	Perennial	Native to U.S.	—	NI
POTAM	F	*Potamogeton*	—	—	—	—
POTEN	F	*Potentilla*	—	—	—	—
POVI3	F	*Polygonum viviparum*	Perennial	Native to U.S.	—	FAC
PRVU	F	*Prunella vulgaris*	Perennial	Native to U.S.	—	FACU+
PTAN2	F	*Pterospora andromedea*	Perennial	Native to U.S.	—	NI
PYAS	F	*Pyrola asarifolia*	Perennial	Native to U.S.	—	FACU
PYMI	F	*Pyrola minor*	Perennial	Native to U.S.	—	FACU+
PYROL	F	*Pyrola*	—	—	—	—
PYSE	F	*Pyrola secunda*	Perennial	Native to U.S.	—	FACU
RAAC3	F	*Ranunculus acris*	Perennial	Native and introduced to U.S.	MT	FACW-
RAAL	F	*Ranunculus alismifolius*	Perennial	Native to U.S.	—	FACW

Appendix F—Species traits (continued)

Code	Layer	Scientific name	Duration	Nativity	Noxious	Wetland[a]
RAES	F	*Ranunculus eschscholtzii*	Perennial	Native to U.S.	—	FACW
RANUN	F	*Ranunculus*	—	—	—	—
RAOC	F	*Ranunculus occidentalis*	Perennial	Native to U.S.	—	FACW
RAPO	F	*Ranunculus populago*	Perennial	Native to U.S.	—	FACW
RARE3	F	*Ranunculus repens*	Perennial	Introduced to U.S.	—	FACW
RAUN	F	*Ranunculus uncinatus*	Annual, perennial	Native to U.S.	—	FAC
ROCU	F	*Rorippa curvisiliqua*	Annual, biennial	Native to U.S.	—	FACW+
RONA2	F	*Rorippa nasturtium-aquaticum*	Perennial	Native to U.S.	—	OBL
RUAC2	F	*Rumex acetosa*	Perennial	Native and introduced to U.S.	—	NI
RUCR	F	*Rumex crispus*	Perennial	Introduced to U.S.	—	FACW
RUMEX	F	*Rumex*	—	—	—	—
RUOB	F	*Rumex obtusifolius*	Perennial	Introduced to U.S.	—	FAC
RUOC2	F	*Rudbeckia occidentalis*	Perennial	Native to U.S.	—	FAC-
RUOC3	F	*Rumex occidentalis*	Perennial	Native to U.S.	—	FACW+
RUPA5	F	*Rumex patientia*	Perennial	Introduced to U.S.	—	NI
RUSA	F	*Rumex salicifolius*	Perennial	Native to U.S.	—	FACW
SAAM3	F	*Saussurea americana*	Perennial	Native to U.S.	—	NI
SAAR13	F	*Saxifraga arguta*	Perennial	Native to U.S.	—	FACW+
SAIN4	F	*Saxifraga integrifolia*	Perennial	Native to U.S.	—	FACW
SAMI3	F	*Sanguisorba minor*	Perennial	Introduced to U.S.	—	UPL
SAOR2	F	*Saxifraga oregana*	Perennial	Native to U.S.	—	FACW+
SASA	F	*Sagina saginoides*	Biennial, perennial	Native to U.S.	—	FACW-
SASI10	F	*Sanguisorba sitchensis*	Perennial	Native to U.S.	—	FACW
SAXIF	F	*Saxifraga*	—	—	—	—
SCAN2	F	*Scleranthus annuus*	Annual	Introduced to U.S.	—	UPL
SCLA	F	*Scrophularia lanceolata*	Perennial	Native to U.S.	—	FAC
SECY	F	*Senecio cymbalarioides*	Perennial	Native to U.S.	—	FACW+
SEDUM	F	*Sedum*	—	—	—	—
SEFO	F	*Senecio foetidus*	Biennial, perennial	Native to U.S.	—	FACW-
SEIN2	F	*Senecio integerrimus*	Biennial, perennial	Native to U.S.	—	FAC
SENEC	F	*Senecio*	—	—	—	—
SEPS2	F	*Senecio pseudaureus*	Perennial	Native to U.S.	—	FACW
SESE2	F	*Senecio serra*	Perennial	Native to U.S.	—	FAC
SEST2	F	*Sedum stenopetalum*	Perennial	Native to U.S.	—	NI
SETR	F	*Senecio triangularis*	Perennial	Native to U.S.	—	FACW+
SIAC	F	*Silene acaulis*	Perennial	Native to U.S.	—	UPL
SIAL2	F	*Sisymbrium altissimum*	Annual, biennial	Introduced to U.S.	—	FACU-
SIME	F	*Silene menziesii*	Perennial	Native to U.S.	—	FAC
SINO	F	*Silene noctiflora*	Annual	Introduced to U.S.	—	NI
SIOR	F	*Sidalcea oregana*	Perennial	Native to U.S.	—	FACW-
SIPR	F	*Sibbaldia procumbens*	Perennial	Native to U.S.	—	NI
SMILA	F	*Smilacina*	—	—	—	—
SMRA	F	*Smilacina racemosa*	Perennial	Native to U.S.	—	FAC-
SMST	F	*Smilacina stellata*	Perennial	Native to U.S.	—	FAC-
SOCA6	F	*Solidago canadensis*	Perennial	Native to U.S.	—	FACU
SODU	F	*Solanum dulcamara*	Perennial	Introduced to U.S.	WA	FAC
SOGI	F	*Solidago gigantea*	Perennial	Native to U.S.	—	FACW-
SOLID	F	*Solidago*	—	—	—	—
SOMU	F	*Solidago multiradiata*	Perennial	Native to U.S.	—	FACU
SOSP	F	*Solidago spathulata*	Perennial	Native to U.S.	—	FACU
SPAN2	F	*Sparganium angustifolium*	Perennial	Native to U.S.	—	OBL
SPCA5	F	*Sphenosciadium capitellatum*	Perennial	Native to U.S.	—	FACW
SPER	F	*Sparganium erectum*	Perennial	Native to U.S.	—	OBL
SPNA	F	*Sparganium natans*	Perennial	Native to U.S.	—	OBL
SPRO	F	*Spiranthes romanzoffiana*	Perennial	Native to U.S.	—	OBL
STAM2	F	*Streptopus amplexifolius*	Perennial	Native to U.S.	—	FAC-
STCA	F	*Stellaria calycantha*	Annual, perennial	Native to U.S.	—	FACW+
STCR2	F	*Stellaria crispa*	Perennial	Native to U.S.	—	FAC+
STELL	F	*Stellaria*	—	—	—	—
STLO	F	*Stellaria longifolia*	Perennial	Native to U.S.	—	FACW
STLO2	F	*Stellaria longipes*	Perennial	Native to U.S.	—	FACW-
STME2	F	*Stellaria media*	Annual, perennial	Introduced to U.S.	—	UPL
STOB	F	*Stellaria obtusa*	Perennial	Native to U.S.	—	FACW
STOC	F	*Stenanthium occidentale*	Perennial	Native to U.S.	—	FACW

Appendix F—Species traits (continued)

Code	Layer	Scientific name	Duration	Nativity	Noxious	Wetland[a]
STREP3	F	*Streptopus*	—	—	—	—
SWPE	F	*Swertia perennis*	Perennial	Native to U.S.	—	FACW
SYMI	F	*Synthyris missurica*	Perennial	Native to U.S.	—	NI
TAOF	F	*Taraxacum officinale*	Perennial	Native and introduced to U.S.	—	FACU
TARAX	F	*Taraxacum*	—	—	—	—
THAL	F	*Thalictrum alpinum*	Perennial	Native to U.S.	—	FACW-
THALI2	F	*Thalictrum*	—	—	—	—
THOC	F	*Thalictrum occidentale*	Perennial	Native to U.S.	—	FACU
THVE	F	*Thalictrum venulosum*	Perennial	Native to U.S.	—	NI
TITR	F	*Tiarella trifoliata*	Perennial	Native to U.S.	—	FAC-
TOFL	F	*Tonella floribunda*	Annual	Native to U.S.	—	NI
TRCA	F	*Trautvetteria caroliniensis*	Perennial	Native to U.S.	—	FAC
TRDU	F	*Tragopogon dubius*	Annual, biennial	Introduced to U.S.	—	NI
TRIFO	F	*Trifolium*	—	—	—	—
TRLA14	F	*Trollius laxus*	Perennial	Native to U.S.	—	OBL
TRLA6	F	*Trientalis latifolia*	Perennial	Native to U.S.	—	FAC-
TRLA8	F	*Trifolium latifolium*	Perennial	Native to U.S.	—	NI
TRLO	F	*Trifolium longipes*	Perennial	Native to U.S.	—	FAC-
TROV2	F	*Trillium ovatum*	Perennial	Native to U.S.	—	NI
TRPE3	F	*Trillium petiolatum*	Perennial	Native to U.S.	—	NI
TRPR2	F	*Trifolium pratense*	Biennial, perennial	Introduced to U.S.	—	FACU
TRRE3	F	*Trifolium repens*	Perennial	Introduced to U.S.	—	FACU+
TRWO	F	*Trifolium wormskioldii*	Annual, perennial	Native to U.S.	—	FACW+
TYLA	F	*Typha latifolia*	Perennial	Native to U.S.	—	OBL
UMBELF	F	*Umbelliferae*	—	—	—	—
URDI	F	*Urtica dioica*	Perennial	Native and introduced to U.S.	—	FAC+
VALO	F	*Valerianella locusta*	Annual	Introduced to U.S.	—	NI
VASI	F	*Valeriana sitchensis*	Perennial	Native to U.S.	—	FAC
VEAM2	F	*Veronica americana*	Perennial	Native to U.S.	—	OBL
VEAN2	F	*Veronica anagallis-aquatica*	Biennial, perennial	Native to U.S.	—	OBL
VECA2	F	*Veratrum californicum*	Perennial	Native to U.S.	—	OBL
VECU	F	*Veronica cusickii*	Perennial	Native to U.S.	—	FACW
VEPE2	F	*Veronica peregrina*	Annual	Native to U.S.	—	OBL
VERAT	F	*Veratrum*	—	—	—	—
VERON	F	*Veronica*	—	—	—	—
VESE	F	*Veronica serpyllifolia*	Perennial	Native and introduced to U.S.	—	FAC
VETH	F	*Verbascum thapsus*	Biennial	Introduced to U.S.	WA	NI
VEVI	F	*Veratrum viride*	Perennial	Native to U.S.	—	OBL
VEWO2	F	*Veronica wormskjoldii*	Perennial	Native to U.S.	—	FAC+
VIAD	F	*Viola adunca*	Perennial	Native to U.S.	—	FAC
VIAM	F	*Vicia americana*	Perennial	Native to U.S.	—	NI
VICA4	F	*Viola canadensis*	Perennial	Native to U.S.	—	NI
VICIA	F	*Vicia*	—	—	—	—
VIGL	F	*Viola glabella*	Perennial	Native to U.S.	—	FACW+
VIMA2	F	*Viola macloskeyi*	Perennial	Native to U.S.	—	OBL
VIOLA	F	*Viola*	—	—	—	—
VIOR	F	*Viola orbiculata*	Perennial	Native to U.S.	—	NI
VIPA4	F	*Viola palustris*	Perennial	Native to U.S.	—	OBL
XETE	F	*Xerophyllum tenax*	Perennial	Native to U.S.	—	NI
ZIEL2	F	*Zigadenus elegans*	Perennial	Native to U.S.	—	FAC+
AGAL3	G	*Agrostis alba*	Perennial	Introduced to U.S.	—	FACW
AGCA2	G	*Agropyron caninum*	Perennial	Introduced to U.S.	—	FAC-
AGDI	G	*Agrostis diegoensis*	Perennial	Native to U.S.	—	—
AGEX	G	*Agrostis exarata*	Perennial	Native to U.S.	—	FACW
AGHU	G	*Agrostis humilis*	Perennial	Native to U.S.	—	FACW
AGIN5	G	*Agropyron inerme*	Perennial	Native to U.S.	—	NI
AGRE2	G	*Agropyron repens*	Perennial	Introduced to U.S.	OR, WY	FACU
AGROP2	G	*Agropyron*	—	—	—	—
AGROS2	G	*Agrostis*	—	—	—	—
AGSC5	G	*Agrostis scabra*	Perennial	Native to U.S.	—	FAC
AGSP	G	*Agropyron spicatum*	Perennial	Native to U.S.	—	FACU-
AGST2	G	*Agrostis stolonifera*	Perennial	Native to U.S.	—	FAC+
AGTE	G	*Agrostis tenuis*	Perennial	Introduced to U.S.	—	NI
AGTH2	G	*Agrostis thurberiana*	Perennial	Native to U.S.	—	FACW

Appendix F—Species traits (continued)

Code	Layer	Scientific name	Duration	Nativity	Noxious	Wetland[a]
AGVA	G	*Agrostis variabilis*	Perennial	Native to U.S.	—	NI
ALAE	G	*Alopecurus aequalis*	Perennial	Native to U.S.	—	OBL
ALPR3	G	*Alopecurus pratensis*	Perennial	Introduced to U.S.	—	FACW
ANOD	G	*Anthoxanthum odoratum*	Perennial	Introduced to U.S.	—	FACU
AREL3	G	*Arrhenatherum elatius*	Perennial	Introduced to U.S.	—	UPL
BRAN	G	*Bromus anomalus*	Perennial	Native to U.S.	—	NI
BRBR5	G	*Bromus briziformis*	Annual	Introduced to U.S.	—	NI
BRCA5	G	*Bromus carinatus*	Annual, biennial, perennial	Native to U.S.	—	NI
BRCI2	G	*Bromus ciliatus*	Perennial	Native to U.S.	—	FAC+
BRJA	G	*Bromus japonicus*	Annual	Introduced to U.S.	—	FACU
BROMU	G	*Bromus*	—	—	—	—
BROR2	G	*Bromus orcuttianus*	Perennial	Native to U.S.	—	NI
BRPA3	G	*Bromus pacificus*	Perennial	Native to U.S.	—	NI
BRRI8	G	*Bromus rigidus*	Perennial	Introduced to U.S.	—	NI
BRSE	G	*Bromus secalinus*	Annual	Introduced to U.S.	—	NI
BRST2	G	*Bromus sterilis*	Annual	Introduced to U.S.	—	NI
BRSU2	G	*Bromus suksdorfii*	Perennial	Native to U.S.	—	NI
BRTE	G	*Bromus tectorum*	Annual	Introduced to U.S.	—	NI
BRVU	G	*Bromus vulgaris*	Perennial	Native to U.S.	—	FACU-
CAAQ3	G	*Catabrosa aquatica*	Perennial	Native to U.S.	—	OBL
CACA4	G	*Calamagrostis canadensis*	Perennial	Native to U.S.	—	FACW+
CALAM	G	*Calamagrostis*	—	—	—	—
CAPU	G	*Calamagrostis purpurascens*	Perennial	Native to U.S.	—	NI
CARU	G	*Calamagrostis rubescens*	Perennial	Native to U.S.	—	NI
CILA2	G	*Cinna latifolia*	Perennial	Native to U.S.	—	FACW
DAGL	G	*Dactylis glomerata*	Perennial	Introduced to U.S.	—	FACU
DAIN	G	*Danthonia intermedia*	Perennial	Native to U.S.	—	FACU+
DECE	G	*Deschampsia cespitosa*	Perennial	Native to U.S.	—	FACW
DEEL	G	*Deschampsia elongata*	Perennial	Native to U.S.	—	FACW-
DISP	G	*Distichlis spicata*	Perennial	Native to U.S.	—	FACW
ELCI2	G	*Elymus cinereus*	Perennial	Native to U.S.	—	NI
ELGL	G	*Elymus glaucus*	Perennial	Native to U.S.	—	FACU
FEAR3	G	*Festuca arundinacea*	Perennial	Introduced to U.S.	—	FACU-
FEID	G	*Festuca idahoensis*	Perennial	Native to U.S.	—	NI
FEOC	G	*Festuca occidentalis*	Perennial	Native to U.S.	—	NI
FEPR	G	*Festuca pratensis*	Perennial	Introduced to U.S.	—	FACU+
FESTU	G	*Festuca L.*	—	—	—	—
FESU	G	*Festuca subulata*	Perennial	Native to U.S.	—	FAC
FEVI	G	*Festuca viridula*	Perennial	Native to U.S.	—	NI
GLEL	G	*Glyceria elata*	Perennial	Native to U.S.	—	FACW+
GLGR	G	*Glyceria grandis*	Perennial	Native to U.S.	—	NI
GLST	G	*Glyceria striata*	Perennial	Native to U.S.	—	OBL
GLYCE	G	*Glyceria*	—	—	—	—
KOCR	G	*Koeleria cristata*	Perennial	Native to U.S.	—	NI
MESM	G	*Melica smithii*	Perennial	Native to U.S.	—	NI
MESP	G	*Melica spectabilis*	Perennial	Native to U.S.	—	FAC
MESU	G	*Melica subulata*	Perennial	Native to U.S.	—	NI
MUAN	G	*Muhlenbergia andina*	Perennial	Native to U.S.	—	FAC+
MUFI2	G	*Muhlenbergia filiformis*	Annual	Native to U.S.	—	FACW
PHAL2	G	*Phleum alpinum*	Perennial	Native to U.S.	—	FAC
PHAR3	G	*Phalaris arundinacea*	Perennial	Native to U.S.	WA	FACW
PHPR3	G	*Phleum pratense*	Perennial	Introduced to U.S.	—	FACU
POA	G	*Poa*	—	—	—	—
POACF	G	*Poaceae*	—	—	—	—
POBU	G	*Poa bulbosa*	Perennial	Introduced to U.S.	—	NI
POCO	G	*Poa compressa*	Perennial	Introduced to U.S.	—	FACU
POCU3	G	*Poa cusickii*	Perennial	Native to U.S.	—	—
POLE2	G	*Poa leptocoma*	Perennial	Native to U.S.	—	FACW+
PONE2	G	*Poa nervosa*	Perennial	Native to U.S.	—	FACU-
POPA2	G	*Poa palustris*	Perennial	Native to U.S.	—	FAC
POPR	G	*Poa pratensis*	Perennial	Native and introduced to U.S.	—	FACU+
POSA12	G	*Poa sandbergii*	Perennial	Native to U.S.	—	—
POSC	G	*Poa scabrella*	Perennial	Native to U.S.	—	FACU
POTR2	G	*Poa trivialis*	Perennial	Introduced to U.S.	—	FACW-

Appendix F—Species traits (continued)

Code	Layer	Scientific name	Duration	Nativity	Noxious	Wetland[a]
PUPA3	G	*Puccinellia pauciflora*	Perennial	Native to U.S.	—	OBL
STIPA	G	*Stipa*	—	—	—	—
STOC2	G	*Stipa occidentalis*	Perennial	Native to U.S.	—	NI
TRCA21	G	*Trisetum canescens*	Perennial	Native to U.S.	—	FACU
TRCE2	G	*Trisetum cernuum*	Perennial	Native to U.S.	—	FACU
TRSP2	G	*Trisetum spicatum*	Perennial	Native to U.S.	—	FACU-
TRWO3	G	*Trisetum wolfii*	Perennial	Native to U.S.	—	FACU-
CAAB2	GL	*Carex abrupta*	Perennial	Native to U.S.	—	NI
CAAM10	GL	*Carex amplifolia*	Perennial	Native to U.S.	—	FACW+
CAAQ	GL	*Carex aquatilis*	Perennial	Native to U.S.	—	OBL
CAAR2	GL	*Carex arcta*	Perennial	Native to U.S.	—	FACW+
CAAT3	GL	*Carex athrostachya*	Perennial	Native to U.S.	—	FACW
CAAU3	GL	*Carex aurea*	Perennial	Native to U.S.	—	FACW+
CABA3	GL	*Carex backii*	Perennial	Native to U.S.	—	NI
CABI10	GL	*Carex bipartita*	Perennial	Native to U.S.	—	OBL
CACA11	GL	*Carex canescens*	Perennial	Native to U.S.	—	FACW+
CACA12	GL	*Carex capillaris*	Perennial	Native to U.S.	—	FACW
CACO11	GL	*Carex concinnoides*	Perennial	Native to U.S.	—	NI
CACU5	GL	*Carex cusiskii*	Perennial	Native to U.S.	—	OBL
CADE9	GL	*Carex deweyana*	Perennial	Native to U.S.	—	FAC+
CADI6	GL	*Carex disperma*	Perennial	Native to U.S.	—	FACW
CAEU2	GL	*Carex eurycarpa*	Perennial	Native to U.S.	—	FACW+
CAGE2	GL	*Carex geyeri*	Perennial	Native to U.S.	—	NI
CAHE7	GL	*Carex hendersonii*	Perennial	Native to U.S.	—	NI
CAHO5	GL	*Carex hoodii*	Perennial	Native to U.S.	—	NI
CAIL	GL	*Carex illota*	Perennial	Native to U.S.	—	FAC
CAJO	GL	*Carex jonesii*	Perennial	Native to U.S.	—	FACW+
CALA11	GL	*Carex lasiocarpa*	Perennial	Native to U.S.	—	OBL
CALA13	GL	*Carex laeviculmis*	Perennial	Native to U.S.	—	FACW
CALA30	GL	*Carex lanuginosa*	Perennial	Native to U.S.	—	OBL
CALE8	GL	*Carex lenticularis*	Perennial	Native to U.S.	—	FACW+
CALE9	GL	*Carex leporinella*	Perennial	Native to U.S.	—	NI
CALEL	GL	*Carex lenticularis* var. *lenticularis*	Perennial	Native to U.S.	—	FACW+
CALI7	GL	*Carex limosa*	Perennial	Native to U.S.	—	OBL
CALU7	GL	*Carex luzulina*	Perennial	Native to U.S.	—	OBL
CAMI7	GL	*Carex microptera*	Perennial	Native to U.S.	—	FAC
CAMU7	GL	*Carex muricata*	Perennial	Introduced to U.S.	—	NI
CANE2	GL	*Carex nebrascensis*	Perennial	Native to U.S.	—	OBL
CANI2	GL	*Carex nigricans*	Perennial	Native to U.S.	—	FACW
CANU5	GL	*Carex nudata*	Perennial	Native to U.S.	—	FACW
CAPA14	GL	*Carex pachystachya*	Perennial	Native to U.S.	—	FAC
CAPA18	GL	*Carex parryana*	Perennial	Native to U.S.	—	FAC+
CAPR4	GL	*Carex praeceptorium*	Perennial	Native to U.S.	—	FACW+
CAPR5	GL	*Carex praegracilis*	Perennial	Native to U.S.	—	FACW
CAPR7	GL	*Carex praticola*	Perennial	Native to U.S.	—	FACW
CARA6	GL	*Carex raynoldsii*	Perennial	Native to U.S.	—	FACU
CAREX	GL	*Carex*	—	—	—	—
CARO5	GL	*Carex rossii*	Perennial	Native to U.S.	—	NI
CARO6	GL	*Carex rostrata*	Perennial	Native to U.S.	—	OBL
CASA10	GL	*Carex saxatilis*	Perennial	Native to U.S.	—	FACW+
CASC10	GL	*Carex scirpoidea*	Perennial	Native to U.S.	—	FACU+
CASC12	GL	*Carex scopulorum*	Perennial	Native to U.S.	—	FACW
CASCP	GL	*Carex scopulorum* var. *prionophylla*	Perennial	Native to U.S.	—	FACW
CASH	GL	*Carex sheldonii*	Perennial	Native to U.S.	—	OBL
CASI2	GL	*Carex simulata*	Perennial	Native to U.S.	—	OBL
CASP5	GL	*Carex spectabilis*	Perennial	Native to U.S.	—	FACW
CAST5	GL	*Carex stipata*	Perennial	Native to U.S.	—	OBL
CASU6	GL	*Carex subfusca*	Perennial	Native to U.S.	—	FACU
CASU7	GL	*Carex subnigricans*	Perennial	Native to U.S.	—	FAC
CAUT	GL	*Carex utriculata*	Perennial	Native to U.S.	—	OBL
CAVE6	GL	*Carex vesicaria*	Perennial	Native to U.S.	—	OBL
ELBE	GL	*Eleocharis bella*	Perennial	Native to U.S.	—	FACW
ELEOC	GL	*Eleocharis*	—	—	—	—
ELPA3	GL	*Eleocharis palustris*	Perennial	Native to U.S.	—	OBL

Appendix F—Species traits (continued)

Code	Layer	Scientific name	Duration	Nativity	Noxious	Wetland[a]
ELPA6	GL	*Eleocharis pauciflora*	Perennial	Native to U.S.	—	OBL
JUBA	GL	*Juncus balticus*	Perennial	Native to U.S.	—	OBL
JUBR3	GL	*Juncus brachyphyllus*	Perennial	Native to U.S.	—	NI
JUCO2	GL	*Juncus confusus*	Perennial	Native to U.S.	—	FAC
JUDR	GL	*Juncus drummondii*	Perennial	Native to U.S.	—	FACW-
JUEF	GL	*Juncus effusus*	Perennial	Native to U.S.	—	FACW+
JUEN	GL	*Juncus ensifolius*	Perennial	Native to U.S.	—	FACW
JUFI	GL	*Juncus filiformis*	Perennial	Native to U.S.	—	FACW+
JUME3	GL	*Juncus mertensianus*	Perennial	Native to U.S.	—	OBL
JUNCU	GL	*Juncus*	—	—	—	—
JUPA	GL	*Juncus parryi*	Perennial	Native to U.S.	—	FAC+
KOSI2	GL	*Kobresia simpliciuscula*	Perennial	Native to U.S.	—	FAC
LUCA2	GL	*Luzula campestris*	Perennial	Native to U.S.	—	NI
LUHI4	GL	*Luzula hitchcockii*	Perennial	Native to U.S.	—	NI
LUPA4	GL	*Luzula parviflora*	Perennial	Native to U.S.	—	FAC-
LUZUL	GL	*Luzula*	—	—	—	—
SCCY	GL	*Scirpus cyperinus*	Perennial	Native to U.S.	—	NI
SCIRP	GL	*Scirpus*	—	—	—	—
SCMI2	GL	*Scirpus microcarpus*	Perennial	Native to U.S.	—	OBL
ADPE	FH	*Adiantum pedatum*	Perennial	Native to U.S.	—	FAC
ATFI	FH	*Athyrium filix-femina*	Perennial	Native to U.S.	—	FAC
BOVI	FH	*Botrychium virginianum*	Perennial	Native to U.S.	—	FACU
CYFR2	FH	*Cystopteris fragilis*	Perennial	Native to U.S.	—	FACU
DRAU8	FH	*Dryopteris austriaca*	Perennial	Native to U.S.	—	NI
DRFI2	FH	*Dryopteris filix-mas*	Perennial	Native to U.S.	—	NI
EQAR	FH	*Equisetum arvense*	Perennial	Native to U.S.	OR	FAC
EQHY	FH	*Equisetum hyemale*	Perennial	Native to U.S.	—	FACW
EQLA	FH	*Equisetum laevigatum*	Perennial	Native to U.S.	—	FACW
EQPA	FH	*Equisetum palustre*	Perennial	Native to U.S.	—	FACW
EQUIS	FH	*Equisetum*	—	—	—	—
EQVA	FH	*Equisetum variegatum*	Perennial	Native to U.S.	—	FACW
GYDR	FH	*Gymnocarpium dryopteris*	Perennial	Native to U.S.	—	FAC
POMU	FH	*Polystichum munitum*	Perennial	Native to U.S.	—	NI
PTAQ	FH	*Pteridium aquilinum*	Perennial	Native to U.S.	—	FACU
WOOR	FH	*Woodsia oregana*	Perennial	Native to U.S.	—	NI
SPHAG2	MOSS	*Sphagnum*	—	—	—	—

[a] UPL = obligate upland; FACU = facultative upland; FAC = facultative; + = faculative species more frequently found in wetlands; - = facultative species less frequently found in wetlands; FACW = facultative wetland; OBL = obligate wetland; NI = no indicator; — = insufficient or no information.

Appendix G: Subspecies and Varieties

Code	Layer	Scientific name	Common name
Subalpine Fir Series:			
ABLA-PIEN/LEGL-FLOODPLAIN			
ACCOC3	F	*Aconitum columbianum* Nutt. ssp. *columbianum*	Columbian monkshood
CASCB	GL	*Carex scopulorum* Holm var. *bracteosa* (Bailey) F.J. Herm.	Holm's Rocky Mountain sedge
ERPEC	F	*Erigeron peregrinus* (Banks ex Pursh) Greene ssp. *callianthemus* (Greene) Cronq.	subalpine fleabane
GECAO	F	*Gentiana calycosa* Griseb. var. *obtusiloba* (Rydb.) C.L. Hitchc.	explorer's gentian
LUPOB3	F	*Lupinus polyphyllus* Lindl. var. *burkei* (S. Wats.) C.L. Hitchc.	largeleaf lupine
TITRU	F	*Tiarella trifoliata* L. var. *unifoliata* (Hook.) Kurtz	oneleaf foamflower
ABLA-PIEN/MEFE-FLOODPLAIN			
MEFEG2	S	*Menziesia ferruginea* Sm. var. *glabella* (Gray) M.E. Peck	rusty menziesia
ABLA/VAME-FLOODPLAIN			
ASFOC2	F	*Aster foliaceus* Lindl. ex DC. var. *cusickii* (Gray) Cronq.	Cusick's aster
CACAA8	G	*Calamagrostis canadensis* (Michx.) Beauv. var. *acuminata* Vasey ex Shear & Rydb.	northern reedgrass
CASCB	GL	*Carex scopulorum* Holm var. *bracteosa* (Bailey) F.J. Herm.	Holm's Rocky Mountain sedge
LUPOB3	F	*Lupinus polyphyllus* Lindl. var. *burkei* (S. Wats.) C.L. Hitchc.	largeleaf lupine
RAUNP	F	*Ranunculus uncinatus* D. Don ex G. Don var. *parviflorus* (Torr.) L. Benson	Idaho buttercup
TITRU	F	*Tiarella trifoliata* L. var. *unifoliata* (Hook.) Kurtz	oneleaf foamflower
Engelmann Spruce Series:			
PIEN-ABLA/CASC12			
ERPEC	F	*Erigeron peregrinus* (Banks ex Pursh) Greene ssp. *callianthemus* (Greene) Cronq.	subalpine fleabane
ELGLG	F	*Elymus glaucus* Buckl. ssp. *glaucus*	blue wildrye
EPALN	F	*Epilobium alpinum* L. var. *nutans* Hornem.	Hornemann's willowherb
ERSPS	F	*Erigeron speciosus* (Lindl.) DC. var. *speciosus*	aspen fleabane
LUCAM3	GL	*Luzula campestris* (L.) DC. var. *multiflora* (Ehrh.) Celak.	common woodrush
PUPAM2	G	*Puccinellia pauciflora* (J. Presl) Munz var. *microtheca* (Buckl.) C.L. Hitchc.	weak alkaligrass
PIEN-ABLA/SETR			
ACCOC3	F	*Aconitum columbianum* Nutt. ssp. *columbianum*	Columbian monkshood
ARLUI	F	*Artemisia ludoviciana* Nutt. var. *incompta* (Nutt.) Keck	white sagebrush
ASFOC2	F	*Aster foliaceus* Lindl. ex DC. var. *cusickii* (Gray) Cronq.	Cusick's aster
ELGLJ	G	*Elymus glaucus* Buckl. var. *jepsonii* Burtt-Davy	Jepson's blue wildrye
EPALL2	F	*Epilobium alpinum* L. var. *lactiflorum* (Hausskn.) C.L. Hitchc.	milkflower willowherb
EPALN	F	*Epilobium alpinum* L. var. *nutans* Hornem.	Hornemann's willowherb
ERPEC	F	*Erigeron peregrinus* (Banks ex Pursh) Greene ssp. *callianthemus* (Greene) Cronq.	subalpine fleabane
GECAO	F	*Gentiana calycosa* Griseb. var. *obtusiloba* (Rydb.) C.L. Hitchc.	explorer's gentian
HADIL	F	*Habenaria dilatata* (Pursh) Hook. var. *leucostachys* (Lindl.) Ames	Sierra bog orchid
SOSPN2	F	*Solidago spathulata* DC. var. *neomexicana* (Gray) Cronq.	Mt. Albert goldenrod
PIEN/EQAR			
ASFOC2	F	*Aster foliaceus* Lindl. ex DC. var. *cusickii* (Gray) Cronq.	Cusick's aster
Grand Fir Series:			
ABGR/TABR2/LIBO3-FLOODPLAIN			
TITRU	F	*Tiarella trifoliata* L. var. *unifoliata* (Hook.) Kurtz	oneleaf foamflower
VICAR	F	*Viola canadensis* L. var. *rugulosa* (Greene) C.L. Hitchc.	creepingroot violet
ABGR/CRDO2/CADE9			
AGEXM3	G	*Agrostis exarata* Trin. ssp. *minor* (Hook.) C.L. Hitchc.	spike bentgrass
TRCAO	F	*Trautvetteria caroliniensis* (Walt.) Vail var. *occidentalis* (Gray) C.L. Hitchc.	western bugbane
ABGR/ACGL-FLOODPLAIN			
BEPAS	SD	*Betula papyrifera* Marsh. var. *subcordata* (Rydb.)	heartleaved paper birch
AGEXM3	G	*Agrostis exarata* Trin. ssp. *minor* (Hook.) C.L. Hitchc.	spike bentgrass
LANEC	F	*Lathyrus nevadensis* S. Wats. ssp. *cusickii* (S. Wats.) C.L. Hitchc.	Sierra pea
TITRU	F	*Tiarella trifoliata* L. var. *unifoliata* (Hook.) Kurtz	oneleaf foamflower
TRCAO	F	*Trautvetteria caroliniensis* (Walt.) Vail var. *occidentalis* (Gray) C.L. Hitchc.	western bugbane
VICAR	F	*Viola canadensis* L. var. *rugulosa* (Greene) C.L. Hitchc.	creepingroot violet

Appendix G—Subspecies and varieties (continued)

Code	Layer	Scientific name	Common name
Douglas-Fir Series:			
PSME/ACGL-PHMA5-FLOODPLAIN			
ELGLG	G	*Elymus glaucus* Buckl. ssp. *glaucus*	blue wildrye
HYFOS2	F	*Hypericum formosum* Kunth ssp. *scouleri* (Hook.) C.L. Hitchc.	Scouler's St. Johnswort
LUCAM3	GL	*Luzula campestris* (L.) DC. var. *multiflora* (Ehrh.) Celak.	common woodrush
SEINE	F	*Senecio integerrimus* Nutt. var. *exaltatus* (Nutt.) Cronq.	Columbia ragwort
VIAMT2	F	*Vicia americana* Muhl. ex Willd. var. *truncata* (Nutt.) Brewer	American vetch
VICAR	F	*Viola canadensis* L. var. *rugulosa* (Greene) C.L. Hitchc.	creepingroot violet
PSME/SYAL-FLOODPLAIN			
ELGLJ	G	*Elymus glaucus* Buckl. var. *jepsonii* Burtt-Davy	Jepson's blue wildrye
PONEW	G	*Poa nervosa* (Hook.) Vasey var. *wheeleri* (Vasey) C.L. Hitchc.	Wheeler's bluegrass
SIMEM	F	*Silene menziesii* Hook. ssp. *menziesii*	Menzies' campion
SPBEL	S	*Spiraea betulifolia* Pallas var. *lucida* (Dougl. ex Greene) C.L. Hitchc.	shinyleaf spirea
Ponderosa Pine Series:			
PIPO/SYAL-FLOODPLAIN			
SALAC	S	*Salix lasiandra* Benth. var. *caudata* (Nutt.) Sudworth	greenleaf willow
LODIM	F	*Lomatium dissectum* (Nutt.) Mathias & Constance var. *multifidum* (Nutt.) Mathias & Constance	carrotleaf biscuitroot
VIAMT2	F	*Vicia americana* Muhl. ex Willd. var. *truncata* (Nutt.) Brewer	American vetch
PIPO/CRDO2			
VICAR	F	*Viola canadensis* L. var. *rugulosa* (Greene) C.L. Hitchc.	creepingroot violet
Lodgepole Pine Series:			
PICO/CASC12			
ERPEC	F	*Erigeron peregrinus* (Banks ex Pursh) Greene ssp. *callianthemus* (Greene) Cronq.	subalpine fleabane
Black Cottonwood Series:			
POTR15/ALIN2-COST4			
ERPEC	F	*Erigeron peregrinus* (Banks ex Pursh) Greene ssp. *callianthemus* (Greene) Cronq.	subalpine fleabane
RUIDG	S	*Rubus idaeus* L. var. *gracilipes* M.E. Jones	grayleaf red raspberry
TRCAO	F	*Trautvetteria caroliniensis* (Walt.) Vail var. *occidentalis* (Gray) C.L. Hitchc.	western bugbane
VICAR	F	*Viola canadensis* L. var. *rugulosa* (Greene) C.L. Hitchc.	creepingroot violet
POTR15/SYAL			
VICAR	F	*Viola canadensis* L. var. rugulosa (Greene) C.L. Hitchc.	creepingroot violet
POTR15/ACGL			
ELGLG	G	*Elymus glaucus* Buckl. ssp. *glaucus*	blue wildrye
LUCAM3	GL	*Luzula campestris* (L.) DC. var. *multiflora* (Ehrh.) Celak.	common woodrush
VIAMT2	F	*Vicia americana* Muhl. ex Willd. var. *truncata* (Nutt.) Brewer	American vetch
Red Alder Series:			
ALRU2/SYAL/CADE9			
ELGLJ	G	*Elymus glaucus* Buckl. var. *jepsonii* Burtt-Davy	Jepson's blue wildrye
White Alder Series:			
ALRH2/MESIC SHRUB			
ELGLG	G	*Elymus glaucus* Buckl. ssp. *glaucus*	blue wildrye
PRVIM	S	*Prunus virginiana* L. var. *melanocarpa* (A. Nels.) Sarg.	black chokecherry
RUIDG	S	*Rubus idaeus* L. var. *gracilipes* M.E. Jones	grayleaf red raspberry
VICAR	F	*Viola canadensis* L. var. *rugulosa* (Greene) C.L. Hitchc.	creepingroot violet
ALRH2/RUBUS			
RUIDG	S	*Rubus idaeus* L. var. *gracilipes* M.E. Jones	grayleaf red raspberry
Willow Series:			
SAAR27			
ASALH	F	*Aster alpigenus* (Torr. & Gray) Gray var. *haydenii* (Porter) Cronq.	tundra aster
SAARP5	S	*Salix arctica* Pallas var. *petraea* (Anderss.) Bebb	alpine willow
SABO2/CASC12			
ERPEC	F	*Erigeron peregrinus* (Banks ex Pursh) Greene ssp. *callianthemus* (Greene) Cronq.	subalpine fleabane
GECAO	F	*Gentiana calycosa* Griseb. var. *obtusiloba* (Rydb.) C.L. Hitchc.	explorer's gentian
LUCAM3	GL	*Luzula campestris* (L.) DC. var. *multiflora* (Ehrh.) Celak.	common woodrush

Appendix G—Subspecies and varieties (continued)

Code	Layer	Scientific name	Common name
SACO2/CASC12			
ERPEC	F	*Erigeron peregrinus* (Banks ex Pursh) Greene ssp. *callianthemus* (Greene) Cronq.	subalpine fleabane
GECAO	F	*Gentiana calycosa* Griseb. var. *obtusiloba* (Rydb.) C.L. Hitchc.	explorer's gentian
LUCAM3	GL	*Luzula campestris* (L.) DC. var. *multiflora* (Ehrh.) Celak.	common woodrush
LUPOB3	F	*Lupinus polyphyllus* Lindl. var. *burkei* (S. Wats.) C.L. Hitchc.	largeleaf lupine
SALIX/MESIC FORB			
ASFOC2	F	*Aster foliaceus* Lindl. ex DC. var. *cusickii* (Gray) Cronq.	Cusick's aster
EPALL2	F	*Epilobium alpinum* L. var. *lactiflorum* (Hausskn.) C.L. Hitchc.	milkflower willowherb
EPGLM2	F	*Epilobium glandulosum* Lehm. var. *macounii* (Trel.) C.L. Hitchc.	fringed willowherb
ERPEC	F	*Erigeron peregrinus* (Banks ex Pursh) Greene ssp. *callianthemus* (Greene) Cronq.	subalpine fleabane
LUCAM3	GL	*Luzula campestris* (L.) DC. var. *multiflora* (Ehrh.) Celak.	common woodrush
LUPOB3	F	*Lupinus polyphyllus* Lindl. var. *burkei* (S. Wats.) C.L. Hitchc.	largeleaf lupine
VESEH4	F	*Veronica serpyllifolia* L. var. *humifusa* (Dickson) Vahl	brightblue speedwell
VIMAM	F	*Viola macloskeyi* Lloyd ssp. *macloskeyi*	small white violet
SALIX/CACA4			
ERPEC	F	*Erigeron peregrinus* (Banks ex Pursh) Greene ssp. *callianthemus* (Greene) Cronq.	subalpine fleabane
SAEX			
AGCAM	G	*Agropyron caninum* (L.) Beauv. ssp. *majus* (Vasey) C.L. Hitchc.	slender wheatgrass
ARCHF	F	*Arnica chamissonis* Less. ssp. *foliosa* (Nutt.) Maguire	Chamisso arnica
ARLUI	F	*Artemisia ludoviciana* Nutt. var. *incompta* (Nutt.) Keck	white sagebrush
ARLUL	F	*Artemisia ludoviciana* Nutt. var. *latiloba* Nutt.	white sagebrush
ASFOC2	F	*Aster foliaceus* Lindl. ex DC. var. *cusickii* (Gray) Cronq.	Cusick's aster
CAMIM5	F	*Castilleja miniata* Dougl. ex Hook. ssp. *miniata*	giant red Indian paintbrush
ERPEC	F	*Erigeron peregrinus* (Banks ex Pursh) Greene ssp. *callianthemus* (Greene) Cronq.	subalpine fleabane
HYFOS2	F	*Hypericum formosum* Kunth ssp. *scouleri* (Hook.) C.L. Hitchc.	Scouler's St. Johnswort
SAEXM	S	*Salix exigua* Nutt. ssp. *melanopsis* (Nutt.) Cronq.	coyote willow
SALAC	S	*Salix lasiandra* Benth. var. *caudata* (Nutt.) Sudworth	greenleaf willow
SARIM4	S	*Salix rigida* Muhl. var. *mackenzieana* (Hook.) Cronq.	MacKenzie's willow
SAWOI2	S	*Salix wolfii* Bebb var. *idahoensis* Ball	Wolf's willow
SABO2/CAVE6			
None			
SALIX/CAAQ			
None			
SAFA/ALVA			
None			
SACO2/CAUT			
None			
SADR/SETR			
None			
SALE/MESIC FORB			
ASFOC2	F	*Aster foliaceus* Lindl. ex DC. var. *cusickii* (Gray) Cronq.	Cusick's aster
LUPOB3	F	*Lupinus polyphyllus* Lindl. var. *burkei* (S. Wats.) C.L. Hitchc.	largeleaf lupine
SAEXM	S	*Salix exigua* Nutt. ssp. *melanopsis* (Nutt.) Cronq.	coyote willow
SASI2/EQAR			
STCAB2	F	*Stellaria calycantha* (Ledeb.) Bong. var. *bongardiana* (Fern.) Fern.	Sitka starwort
Low Shrub Series:			
KAMI/CANI2			
ERPEC	F	*Erigeron peregrinus* (Banks ex Pursh) Greene ssp. *callianthemus* (Greene) Cronq.	subalpine fleabane
LUCAM3	GL	*Luzula campestris* (L.) DC. var. *multiflora* (Ehrh.) Celak.	common woodrush
PHEM MOUNDS			
CAMEG	S	*Cassiope mertensiana* (Bong.) D. Don var. *gracilis* (Piper) C.L. Hitchc.	western moss heather
EPALL2	F	*Epilobium alpinum* L. var. *lactiflorum* (Hausskn.) C.L. Hitchc.	milkflower willowherb
POFR4-BEGL			
ERPEC	F	*Erigeron peregrinus* (Banks ex Pursh) Greene ssp. *callianthemus* (Greene) Cronq.	subalpine fleabane
LEGL/CASC12			
None			

Appendix G—Subspecies and varieties (continued)

Code	Layer	Scientific name	Common name
Sitka Alder Series:			
ALSI3/MESIC FORB			
ACCOC3	F	*Aconitum columbianum* Nutt. ssp. *columbianum*	Columbian monkshood
ARLUL	F	*Artemisia ludoviciana* Nutt. var. *latiloba* Nutt.	white sagebrush
ASFOC2	F	*Aster foliaceus* Lindl. ex DC. var. *cusickii* (Gray) Cronq.	Cusick’s aster
EPALL2	F	*Epilobium alpinum* L. var. *lactiflorum* (Hausskn.) C.L. Hitchc.	milkflower willowherb
SEINE	F	*Senecio integerrimus* Nutt. var. *exaltatus* (Nutt.) Cronq.	Columbia ragwort
STAMC	F	*Streptopus amplexifolius* (L.) DC. var. *chalazatus* Fassett	tubercle twistedstalk
TITRU	F	*Tiarella trifoliata* L. var. *unifoliata* (Hook.) Kurtz	oneleaf foamflower
ALSI3/ATFI			
ASFOC2	F	*Aster foliaceus* Lindl. ex DC. var. *cusickii* (Gray) Cronq.	Cusick’s aster
EPALN	F	*Epilobium alpinum* L. var. *nutans* Hornem.	Hornemann’s willowherb
ALSI3/CILA2			
ASFOC2	F	*Aster foliaceus* Lindl. ex DC. var. *cusickii* (Gray) Cronq.	Cusick’s aster
EPALN	F	*Epilobium alpinum* L. var. *nutans* Hornem.	Hornemann’s willowherb
Mountain Alder Series:			
ALIN2/ATFI			
EPGLM2	F	*Epilobium glandulosum* Lehm. var. *macounii* (Trel.) C.L. Hitchc.	fringed willowherb
TITRU	F	*Tiarella trifoliata* L. var. *unifoliata* (Hook.) Kurtz	oneleaf foamflower
ALIN2-COST4/MESIC FORB			
VICAR	F	*Viola canadensis* L. var. *rugulosa* (Greene) C.L. Hitchc.	creepingroot violet
ALIN2/GLEL			
RIHUP	S	*Ribes hudsonianum* Richards. var. *petiolare* (Dougl.) Jancz.	western black currant
ALIN2/EQAR			
JUBAM	GL	*Juncus balticus* Willd. var. *montanus* Engelm.	mountain rush
SPBEL	S	*Spiraea betulifolia* Pallas var. *lucida* (Dougl. ex Greene) C.L. Hitchc.	shinyleaf spirea
ALIN2-SYAL			
None			
ALIN2/CADE9			
TRCAO	F	*Trautvetteria caroliniensis* (Walt.) Vail var. *occidentalis* (Gray) C.L. Hitchc.	western bugbane
Other Tall Shrub Series:			
BEOC2/MESIC FORB			
ELGLG	G	*Elymus glaucus* Buckl. ssp. *glaucus*	blue wildrye
RUIDG	*S*	*Rubus idaeus* L. var. *gracilipes* M.E. Jones	grayleaf red raspberry
COST4			
VICAR	F	*Viola canadensis* L. var. *rugulosa* (Greene) C.L. Hitchc.	creepingroot violet
CRDO2/MESIC FORB			
AMALP2	S	*Amelanchier alnifolia* (Nutt.) Nutt. ex M. Roemer var. *pumila* (Torr. & Gray) Schneid.	dwarf serviceberry
VICAR	F	*Viola canadensis* L. var. *rugulosa* (Greene) C.L. Hitchc.	creepingroot violet
SYAL			
SAINC	F	*Saxifraga integrifolia* Hook. var. *claytoniifolia* (Canby ex Small) Rosendahl	peak saxifrage
SIMEM	F	*Silene menziesii* Hook. ssp. *menziesii*	Menzies’ campion
ACGL			
POGRE	F	*Potentilla gracilis* Dougl. ex Hook. var. *elmeri* (Rydb.) Jepson	combleaf cinquefoil
TRCAO	F	*Trautvetteria caroliniensis* (Walt.) Vail var. *occidentalis* (Gray) C.L. Hitchc.	western bugbane
CERE2/BROMU			
LODIM	F	*Lomatium dissectum* (Nutt.) Mathias & Constance var. *multifidum* (Nutt.) Mathias & Constance	carrotleaf biscuitroot
VICAR	F	*Viola canadensis* L. var. *rugulosa* (Greene) C.L. Hitchc.	creepingroot violet
PHLE4/FORB			
AMALP2	S	*Amelanchier alnifolia* (Nutt.) Nutt. ex M. Roemer var. *pumila* (Torr. & Gray) Schneid.	dwarf serviceberry
ELGLG	G	*Elymus glaucus* Buckl. ssp. *glaucus*	blue wildrye
VICAR	F	*Viola canadensis* L. var. *rugulosa* (Greene) C.L. Hitchc.	creepingroot violet
VEPEX	F	*Veronica peregrina* L. var. *xalapensis* (Kunth) Pennell	hairy purslane speedwell

Appendix G—Subspecies and varieties (continued)

Code	Layer	Scientific name	Common name
LOIN5/ATFI			
None			
BEOC2/WET SEDGE			
ASFOC	F	*Aster foliaceus* Lindl. ex DC. var. *canbyi* Gray	Canby's aster
STCAB2	F	*Stellaria calycantha* (Ledeb.) Bong. var. *bongardiana* (Fern.) Fern.	Sitka starwort
BEOC2/PHAR3			
None			
COST4/ATFI			
EPGLM2	F	*Epilobium glandulosum* Lehm. var. *macounii* (Trel.) C.L. Hitchc.	fringed willowherb
TRCAO	F	*Trautvetteria caroliniensis* (Walt.) Vail var. *occidentalis* (Gray) C.L. Hitchc.	western bugbane
PHCA11			
None			
PHMA5-SYAL			
LAPAP2	F	*Lathyrus pauciflorus* Fern. var. *pauciflorus*	fewflower pea
POARC	F	*Potentilla arguta* Pursh ssp. *convallaria* (Rydb.) Keck	cream cinquefoil
RUIDG	S	*Rubus idaeus* L. var. *gracilipes* M.E. Jones	grayleaf red raspberry
VIAMT2	F	*Vicia americana* Muhl. ex Willd. var. *truncata* (Nutt.) Brewer	American vetch
RUPA			
RUIDG	S	*Rubus idaeus* L. var. *gracilipes* M.E. Jones	grayleaf red raspberry
VIAMT2	F	*Vicia americana* Muhl. ex Willd. var. *truncata* (Nutt.) Brewer	American vetch
RUBA			
None			
RUDI2			
None			
Wet Sedge Series:			
CAAQ			
EPALL2	F	*Epilobium alpinum* L. var. *lactiflorum* (Hausskn.) C.L. Hitchc.	milkflower willowherb
EPGLM2	F	*Epilobium glandulosum* Lehm. var. *macounii* (Trel.) C.L. Hitchc.	fringed willowherb
CAUT			
JUBAV	GL	*Juncus balticus* Willd. var. *vallicola* Rydb.	valley rush
MIGUD2	F	*Mimulus guttatus* DC. var. *depauperatus* (Gray) A.L. Grant	seep monkeyflower
CAVE6			
None			
ELPA6			
EPALL2	F	*Epilobium alpinum* L. var. *lactiflorum* (Hausskn.) C.L. Hitchc.	milkflower willowherb
SCMI2			
ASFOC	F	*Aster foliaceus* Lindl. ex DC. var. *canbyi* Gray	Canby's aster
EPGLM2	F	*Epilobium glandulosum* Lehm. var. *macounii* (Trel.) C.L. Hitchc.	fringed willowherb
STCAB2	F	*Stellaria calycantha* (Ledeb.) Bong. var. *bongardiana* (Fern.) Fern.	Sitka starwort
TRCAO	F	*Trautvetteria caroliniensis* (Walt.) Vail var. *occidentalis* (Gray) C.L. Hitchc.	western bugbane
CAEU2			
EPALN	F	*Epilobium alpinum* L. var. *nutans* Hornem.	Hornemann's willowherb
CALI7			
None			
CALE9			
None			
CALE8			
CALEL	GL	*Carex lenticularis* Michx. var. *lenticularis*	lakeshore sedge
CAAM10			
GATRP3	F	*Galium trifidum* L. ssp. *pacificum* (Wieg.) Piper	threepetal bedstraw
HADIL	F	*Habenaria dilatata* (Pursh) Hook. var. *leucostachys* (Lindl.) Ames	Sierra bog orchid
RUOCP	F	*Rumex occidentalis* S. Wats. var. *procerus* (Greene) J.T. Howell	western dock

Appendix G—Subspecies and varieties (continued)

Code	Layer	Scientific name	Common name
Moist Graminoid Series:			
CASC12			
ACCOC3	F	*Aconitum columbianum* Nutt. ssp. *columbianum*	Columbian monkshood
AGCAM	G	*Agropyron caninum* (L.) Beauv. ssp. *majus* (Vasey) C.L. Hitchc.	slender wheatgrass
ASFOC2	F	*Aster foliaceus* Lindl. ex DC. var. *cusickii* (Gray) Cronq.	Cusick's aster
ASFOP	F	*Aster foliaceus* Lindl. ex DC. var. *parryi* (D.C. Eat.) Gray	Parry's aster
CACAA8	G	*Calamagrostis canadensis* (Michx.) Beauv. var. *acuminata* Vasey ex Shear & Rydb.	northern reedgrass
CACAP4	G	*Calamagrostis canadensis* (Michx.) Beauv. var. *pallida* (Vasey & Scribn.) Stebbins	bluejoint reedgrass
EPGLM2	F	*Epilobium glandulosum* Lehm. var. *macounii* (Trel.) C.L. Hitchc.	fringed willowherb
ERPEC	F	*Erigeron peregrinus* (Banks ex Pursh) Greene ssp. *callianthemus* (Greene) Cronq.	subalpine fleabane
ERPEE	F	*Erigeron peregrinus* (Banks ex Pursh) Greene var. *eucallianthemus* Cronq.	subalpine fleabane
HYFON	F	*Hypericum formosum* Kunth var. *nortoniae* (M.E. Jones) C.L. Hitchc.	Nortons's St. Johnswort
LUCAM3	GL	*Luzula campestris* (L.) DC. var. *multiflora* (Ehrh.) Celak.	common woodrush
LUPOB3	F	*Lupinus polyphyllus* Lindl. var. *burkei* (S. Wats.) C.L. Hitchc.	bigleaf lupine
MIMOM2	F	*Mimulus moschatus* Dougl. ex Lindl. var. *moschatus*	muskflower
STOCM	G	*Stipa occidentalis* Thurb. ex S. Wats. var. *minor* sensu C.L. Hitchc., non (Vasey) C.L. Hitchc.	Dore's needlegrass
VESEH4	F	*Veronica serpyllifolia* L. var. *humifusa* (Dickson) Vahl	brightblue speedwell
VIMAM	F	*Viola macloskeyi* Lloyd ssp. *macloskeyi*	small white violet
CASC10-SAAR13			
ASALH	F	*Aster alpigenus* (Torr. & Gray) Gray var. *haydenii* (Porter) Cronq.	tundra aster
CASCP2	GL	*Carex scirpoidea* Michx. var. *pseudoscirpoidea* (Rydb.) Cronq.	western singlespike sedge
HADIL	F	*Habenaria dilatata* (Pursh) Hook. var. *leucostachys* (Lindl.) Ames	Sierra bog orchid
CALU7			
ERPEC	F	*Erigeron peregrinus* (Banks ex Pursh) Greene ssp. *callianthemus* (Greene) Cronq.	subalpine fleabane
GECAO	F	*Gentiana calycosa* Griseb. var. *obtusiloba* (Rydb.) C.L. Hitchc.	explorer's gentian
LUCAM3	GL	*Luzula campestris* (L.) DC. var. *multiflora* (Ehrh.) Celak.	common woodrush
CANI2			
EPALL2	F	*Epilobium alpinum* L. var. *lactiflorum* (Hausskn.) C.L. Hitchc.	milkflower willowherb
EPALN	F	*Epilobium alpinum* L. var. *nutans* Hornem.	Hornemann's willowherb
ERPEC	F	*Erigeron peregrinus* (Banks ex Pursh) Greene ssp. *callianthemus* (Greene) Cronq.	subalpine fleabane
LUCAM3	GL	*Luzula campestris* (L.) DC. var. *multiflora* (Ehrh.) Celak.	common woodrush
VESEH4	F	*Veronica serpyllifolia* L. var. *humifusa* (Dickson) Vahl	brightblue speedwell
CACA4			
ASFOC2	F	*Aster foliaceus* Lindl. ex DC. var. *cusickii* (Gray) Cronq.	Cusick's aster
EPALN	F	*Epilobium alpinum* L. var. *nutans* Hornem.	Hornemann's willowherb
EPGLM2	F	*Epilobium glandulosum* Lehm. var. *macounii* (Trel.) C.L. Hitchc.	fringed willowherb
ERSPS	F	*Erigeron speciosus* (Lindl.) DC. var. *speciosus*	aspen fleabane
GATRP3	F	*Galium trifidum* L. ssp. *pacificum* (Wieg.) Piper	threepetal bedstraw
RAUNP	F	*Ranunculus uncinatus* D. Don ex G. Don var. *parviflorus* (Torr.) L. Benson	Idaho buttercup
TITRU	F	*Tiarella trifoliata* L. var. *unifoliata* (Hook.) Kurtz	oneleaf foamflower
DECE			
None			
ELCI2			
None			
CAMU7			
LUCAM3	GL	*Luzula campestris* (L.) DC. var. *multiflora* (Ehrh.) Celak.	common woodrush
CAJO			
VESEH4	F	*Veronica serpyllifolia* L. var. *humifusa* (Dickson) Vahl	brightblue speedwell
CANE2			
LUPOB3	F	*Lupinus polyphyllus* Lindl. var. *burkei* (S. Wats.) C.L. Hitchc.	largeleaf lupine
PUPAH	G	*Puccinellia pauciflora* (J. Presl) Munz var. *holmii* (Beal) C.L. Hitchc.	Holm's pale false mannagrass

Appendix G—Subspecies and varieties (continued)

Code	Layer	Scientific name	Common name
CASU6			
GATRP3	F	*Galium trifidum* L. ssp. *pacificum* (Wieg.) Piper	threepetal bedstraw
CAMI7			
AGCAM	G	*Agropyron caninum* (L.) Beauv. ssp. *majus* (Vasey) C.L. Hitchc.	slender wheatgrass
ARLUI	F	*Artemisia ludoviciana* Nutt. var. *incompta* (Nutt.) Keck	white sagebrush
POGRB	F	*Potentilla gracilis* Dougl. ex Hook. var. *brunnescens* (Rydb.) C.L. Hitchc.	slender cinquefoil
RAUNP	F	*Ranunculus uncinatus* D. Don ex G. Don var. *parviflorus* (Torr.) L. Benson	Idaho buttercup
STOCM	G	*Stipa occidentalis* Thurb. ex S. Wats. var. *minor* sensu C.L. Hitchc., non (Vasey) C.L. Hitchc.	Dore's needlegrass
JUBA			
POGRB	F	*Potentilla gracilis* Dougl. ex Hook. var. *brunnescens* (Rydb.) C.L. Hitchc.	slender cinquefoil
JUBAV	GL	*Juncus balticus* Willd. var. *vallicola* Rydb.	valley rush
STOCM	G	*Stipa occidentalis* Thurb. ex S. Wats. var. *minor* sensu C.L. Hitchc., non (Vasey) C.L. Hitchc.	Dore's needlegrass
Forb Series:			
ALVA-CASC12			
ACCOC3	F	*Aconitum columbianum* Nutt. ssp. *columbianum*	Columbian monkshood
EPALL2	F	*Epilobium alpinum* L. var. *lactiflorum* (Hausskn.) C.L. Hitchc.	milkflower willowherb
EPALN	F	*Epilobium alpinum* L. var. *nutans* Hornem.	Hornemann's willowherb
ERPEC	F	*Erigeron peregrinus* (Banks ex Pursh) Greene ssp. *callianthemus* (Greene) Cronq.	subalpine fleabane
ERPEE	F	*Erigeron peregrinus* (Banks ex Pursh) Greene var. *eucallianthemus* Cronq.	subalpine fleabane
GECAO	F	*Gentiana calycosa* Griseb. var. *obtusiloba* (Rydb.) C.L. Hitchc.	explorer's gentian
HYFON	F	*Hypericum formosum* Kunth var. *nortoniae* (M.E. Jones) C.L. Hitchc.	Nortons's St. Johnswort
LUCAM3	GL	*Luzula campestris* (L.) DC. var. *multiflora* (Ehrh.) Celak.	common woodrush
VESEH4	F	*Veronica serpyllifolia* L. var. *humifusa* (Dickson) Vahl	brightblue speedwell
VIMAM	F	*Viola macloskeyi* Lloyd ssp. *macloskeyi*	small white violet
SETR-MILE2			
ARCHF	F	*Arnica chamissonis* Less. ssp. *foliosa* (Nutt.) Maguire	Chamisso arnica
EPALN	F	*Epilobium alpinum* L. var. *nutans* Hornem.	Hornemann's willowherb
EPWAO2	F	*Epilobium watsonii* Barbey var. *occidentale* (Trel.) C.L. Hitchc.	Watson's willowherb
ERPEC	F	*Erigeron peregrinus* (Banks ex Pursh) Greene ssp. *callianthemus* (Greene) Cronq.	subalpine fleabane
LUPOB3	F	*Lupinus polyphyllus* Lindl. var. *burkei* (S. Wats.) C.L. Hitchc.	largeleaf lupine
SPAN2			
None			
NUPO2			
None			
TYLA			
None			
HELA4-ELGL			
None			
VERAT			
ASFOC2	F	*Aster foliaceus* Lindl. ex DC. var. *cusickii* (Gray) Cronq.	Cusick's aster
BRCAC2	G	*Bromus carinatus* Hook. & Arn. var. *californicus* (Nutt. ex Buckl.) Shear	California brome
CACAP4	G	*Calamagrostis canadensis* (Michx.) Beauv. var. *pallida* (Vasey & Scribn.) S.	bluejoint reedgrass
MEPAB	F	*Mertensia paniculata* (Ait.) G. Don var. *borealis* (J.F. Macbr.) L.O. Williams	northern bluebells
VESEH4	F	*Veronica serpyllifolia* L. var. *humifusa* (Dickson) Vahl	brightblue speedwell
RUOC2			
ERPEC	F	*Erigeron peregrinus* (Banks ex Pursh) Greene ssp. *callianthemus* (Greene) Cronq.	subalpine fleabane
LUCAM3	GL	*Luzula campestris* (L.) DC. var. *multiflora* (Ehrh.) Celak.	common woodrush
ARLU			
ARLUL	F	*Artemisia ludoviciana* Nutt. var. *latiloba* Nutt.	white sagebrush

Appendix H: List of Animal Species Names

Common name	Scientific name
American robin	*Turdus migratorius*
Beaver	*Castor canadensis*
Black bear	*Ursus americanus*
Black-billed magpie	*Pica hudsonia*
Blue grouse	*Dendragapus obscurus*
Canada goose	*Branta canadensis*
Canyon wren	*Catherpes mexicanus*
Cedar waxwing	*Bombycilla cedrorum*
Chickadee	*Poecile* spp.
Chipmunk	*Tamias* spp.
Chukar	*Alectoris chukar*
Common snipe	*Gallinago gallinago*
Common yellowthroat	*Geothlypis trichas*
Crow	*Corvus* spp.
Dark-eyed juncos	*Junco hyemalis*
Deer mouse	*Peromyscus* spp.
Elk	*Cervus elaphus*
Flycatcher	*Empidonax* spp.
Golden-crowned kinglet	*Regulus satrapa*
Great blue heron	*Ardea herodias*
Green-winged teal	*Anas crecca*
Hermit thrush	*Catharus guttatus*
Kingfisher	*Ceryle alcyon*
Lazuli bunting	*Passerina amoena*
Lesser yellowlegs	*Tringa flavipes*
Long-eared owl	*Asio otus*
Mountain chickadee	*Poecile gambeli*
Mule deer	*Odocoileus hemionus*
Muskrat	*Ondatra zibethicus*
Nuthatch	*Sitta* spp.
Orioles	*Icterus* spp.
Pheasant	*Phasianus colchicus*
Quail	*Perdix californica*
Rattlesnake	*Crotalus viridis*
Red-winged blackbird	*Agelaius phoeniceus*
Ruby-crowned kinglet	*Regulus calendula*
Ruffed grouse	*Bonasa umbellus*
Rufous-sided towhee	*Pipilo erythrophthalmus*
Sage grouse	*Centrocercus urophasianus*
Sandhill crane	*Grus canadensis*
Sharp-tailed grouse	*Tympanuchus phasianellus*
Snowshoe hare	*Lepus americanus*
Song sparrow	*Melospiza melodia*
Squirrel	*Tamiasciurus* spp.
Steller’s jay	*Cyanocitta stelleri*
Thrush	*Catharus* spp.
Tree frog	*Pseudacris regilla*
Trout	*Oncorhynchus* spp., *Salvelinus* spp.
Vireos	*Vireo* spp.
Vole	*Microtus* spp.
Warblers	*Dendroica* spp.
Weasel	*Mustela frenata*
Western garter snake	*Thamnophis ordinoides*
Wild turkey	*Meleagris gallopavo*
Willow flycatcher	*Empidonax traillii*
Winter wren	*Troglodytes troglodytes*
Woodpeckers	Picidae family
Yellow warbler	*Dendroica petechia*

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