CONSERVATION STRATEGY
FOR WETLANDS IN EAST-CENTRAL IDAHO

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SUMMARY

The Idaho Department of Fish and Game, Conservation Data Center (CDC) received wetland protection funding from the Environmental Protection Agency under the authority of Section 104 (b)(3) of the Clean Water Act to enhance existing wetland information systems. Project areas completed to date include the Henrys Fork Basin, Big Wood River Basin, Idaho Panhandle Watersheds, and Southeastern Idaho Watersheds. Work is continuing in the East-central Idaho Watersheds and the Spokane River Basin. This document is a summary of work completed in the East-central Idaho Watersheds. The information summarized here can be applied to state biodiversity, conservation, and water quality enhancement projects on a watershed basis.

Assessment of the quality and condition of plant communities and the occurrence of rare plant and animal species allowed us to categorize 36 wetland sites based on conservation intent. Twelve wetlands are high priority due to species richness and condition and full protection is the priority. The biological significance of the surveyed wetland sites and abstracts for rare plant communities, plant species, and animal species are provided to guide management activities. Land managers can apply the process presented here to categorize wetlands which were not surveyed.

Only portions of the information from the database records are summarized in this conservation strategy. All information contained in the databases is available for public use except a limited amount of threatened and endangered species information considered sensitive by the United States Fish and Wildlife Service (USFWS). Contacts for accessing digital and analog data are included at the end of this manuscript.

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INTRODUCTION

The broad definition of wetlands describes land areas where water regimes determine soil characteristics and the distribution of plant and animal species. This definition includes not only jurisdictional wetlands, supporting wetland hydrology, hydric soils, and hydrophytic vegetation (Environmental Laboratory 1987), but a broader range of ecologically significant areas such as riparian corridors and vernal pools (World Wildlife Fund 1992, Cowardin et al. 1979). In spite of the significance of wetlands, these highly productive land areas have often been overlooked with studies focusing on aquatic or terrestrial ecosystems. However, in the past two decades it has become widely recognized that the importance of wetland functions, including water quality protection, storm water control, groundwater protection, and fish and wildlife habitat, are disproportionate to their small areal extant.

Upon European settlement, wetlands were regarded as areas with little economic value. Human settlements typically began and grew out from river channels and government programs were enacted which encouraged the development of wetlands. In Idaho an estimated 386,000 acres of wetland habitat (56 percent) were lost from 1780 to 1980 (Dahl 1990). Many remaining wetlands have been degraded by actions, such as hydrologic alteration and impacts to vegetation and soils, reducing wetland functions.

The recognition of the value of wetlands in the landscape has resulted in regulations, incentive programs, research, and protection of wetland habitat. Controversy over wetland definitions, the government's authority, and the appropriateness of restrictions are ongoing. Wetland legislation during the Bush administration built on previous policy, such as the 1985 Food Security Act and Emergency Wetlands Resources Act of 1985, to achieve "no overall net loss of wetlands". Currently, the Clinton administration's review of the reauthorization of the Clean Water Act places an emphasis on categorization of wetlands. This would serve to protect functionally and biologically significant wetlands and relax regulations for wetlands that are less significant.

The purpose of this plan is to enhance our ability to identify and classify wetlands to set priorities for wetland conservation. Wetlands-related data are frequently retained by agencies in an analog format. Retrieval and application are cumbersome and wetland conservation opportunities have been lost due to the fragmented nature of specific protection, management, and restoration information.

It is our goal to make wetlands-related information available to agencies and organizations involved in planning activities and the protection of wetlands and watersheds. Information on specific wetland sites can be used to identify proposed conservation sites, sites with opportunities for restoration, and to comment on potential projects or permit activities within sites. The framework presented here, describing wetlands based on the plant community, can be applied by land managers to sites that were not surveyed as part of this project. Rare plant and animal data can be requested from the Idaho Department of Fish and Game, Conservation Data Center (CDC) and the site significance may be assessed. Description, management, and status of rare plant

communities, plant species, and animal species are included to guide management activities. Additional data including Geographic Information System (GIS) data layers, containing rare species distributions, site and protected area boundaries, and analog database records are available at the CDC. The methods for accessing this information are included at the end of this document (Table 6).

SURVEY AREA

The survey area is in east-central Idaho and includes the Lemhi, Birch Creek, Little Lost, Big Lost, Pahsimeroi, and East Fork Salmon rivers and the mainstem of the Salmon River from its confluence with the East Fork to near its confluence with the North Fork. Lemhi, Custer, and Butte Counties are mostly contained within the survey area.

The east-central valleys of Idaho are mostly within the Middle Rocky Mountain Steppe Province (M332) of Bailey's Ecoregions with a small portion of the Intermontane Semi-Desert Province (342) included in the southern part of the survey area. The Beaverhead Mountains (M332E) and Challis Volcanics (M332F) sections make up the majority of the survey area.

The Beaverhead Mountains Section is mostly sagebrush steppe vegetation with lesser amounts of Douglas-fir forest. Broad northwest trending valleys are bisected by the Lemhi, Birch Creek, Little Lost, Lower Big Lost, and Pahsimeroi drainages. The Salmon River downstream of the town of Challis to North Fork Salmon River is also included within the Beaverhead Mountains Section. Glacial cirques with alpine wetlands are present at high elevations in the Beaverhead Mountains. Valley bottoms include glacial and fluvial valleys, and alluvial fans, terraces, and floodplains. The nearly parallel valleys were formed by northwest trending basin and range block faults that dropped as the Northern Rocky Mountains rose 5 to 10 million years ago. The valleys accumulated deep deposits of alluvium from the Pliocene to the late Pleistocene. Deposition of sediment from mountain streams created large alluvial fans that extend over nearly half of the valley bottoms in places (McNab and Avers 1994). Intermittent drainages are common as many mountain streams sink into the alluvium before reaching the valley bottoms. Groundwater percolating from the mountain streams emerge as springs to create the headwaters of many of the drainages in the broad intermontane valley bottoms.

The Challis Volcanics Section is a mix of western spruce-fir forest and sagebrush steppe. Major drainages within the survey area include the East Fork Salmon, mainstem Salmon River to Challis, and East Fork Big Lost River. Vegetation includes lodgepole pine-subalpine fir forest and Douglas-fir forest with fringes of sagebrush steppe. Challis volcanic rocks consisting of latite-andesite flows, basalts, tuffs, and rhyolites are dominant. The White Knob Mountains and White Cloud Pioneer Mountains at the headwaters of the Big Lost River and East Fork Salmon Rivers contain precambrian intrusions consisting primarily of quartzite and granite rocks (McNab and Avers 1994). Alpine habitats including high mountain lakes are well represented in the White Cloud Mountains.

The Snake River Basalt Section is characterized by an arid landscape supporting sagebrush vegetation. Prior to agricultural development the Big Lost River, Little Lost River, and Birch Creek all flowed along the Snake River plain and sank into the plains before reaching the Snake River. In high water years the Big Lost River flows through a closed topographic basin, south then east of the town of Arco, along the edge of the Snake River Plain, before reaching the sinks of the Big Lost playas. Prior to its complete diversion for irrigation and hydropower Birch Creek ran into a playa contiguous with the Big Lost playa. Historically, the Little Lost River also ended in playa near Howe. Present day wetlands are limited to periodically flooded wetlands in the vicinity of the Big Lost River sinks (Anderson et al. 1996).

Climate in the survey area is extremely variable due to a wide range of elevations. Winter and spring weather patterns are influenced by westerly winds from the Pacific Ocean. This maritime influence weakens during summer months and continental climatic conditions prevail with air masses from the south producing thunderstorm activity. Average annual precipitation in the valleys ranges from 7 inches at Challis (5,180 feet in elevation) to 15 inches at Shoup just downstream of Salmon (3,400 feet in elevation). Average low temperatures are near 32^{o} C and average high temperatures are near 58^{o} at both the Challis and Shoup climate stations (Abramovich et al. 1998). At higher alpine elevations average annual precipitation is estimated at 30 inches with depths of snow to 98 inches. Average temperatures range from -12^{o} C in January to 21^{o} C in July (Knoll 1973).

STATUS OF WETLANDS

The World Wildlife Fund (1992) developed a general framework for assessing wetland losses and gains that can be used to address the condition of and threats to wetlands. The basis for the framework are wetland functions. Wetland losses occur when functions are eliminated and an area no longer meets the definition of a wetland. Wetlands may also undergo functional shifts including impairments, type changes, or enhancements.

WETLAND LOSSES

Wetland losses may be permanent or reversible. The distinction is made to identify those areas where restoration may be possible albeit costly. In east-central Idaho, agriculture, mining, and urbanization account for wetland losses. Drainage and land clearing (for agriculture) qualify as a permanent loss. Road construction and home building account for minor losses in the survey area.

The National Resource Inventory estimates that watersheds within the project area were stable in terms of wetland losses and gains on private land from 1982 to 1992 (SCS 1992). The estimates represent net gain versus net loss and do not evaluate the quality of the wetland habitat. Nationally, losses of forested and scrub-shrub habitats have been offset by gains in open water and emergent habitat (Dahl 1990). A similar shift of wetland types has occurred in east-central Idaho due to tree and shrub removal and hydrologic development.

FUNCTIONAL SHIFTS

Most wetlands in the survey area are accessible and have been impacted by human influences resulting in a shift of wetland functions. **Impairments** are functional shifts that reduce wetland functions and include degradation and fragmentation. Degradation, the loss of one or more wetland functions, is indicated by shifts in species composition and may result in lowered water quality due to sediment input or increased water temperatures. Fragmentation occurs when functions are lost due to barriers restricting water or gene flow. **Type changes** occur when a wetland is converted from one type to another (e.g., emergent to open water). Functional shifts improving wetland functions are considered **enhancements**.

IMPAIRMENTS

Shifts in species composition occur when native species such as shrubs and trees are removed and when exotics invade or are introduced. Poor water quality often results due to loss of thermal cover, loss of filtering functions, and decreased bank or shore stability. The 1992 National Resource Inventory indicates that 28 percent and 17 percent of nonfederal wetlands in the project area are used for pasture and rangeland respectively (SCS 1992). Pasture development has included ditching and reseeding or interseeding with pasture grasses and removal of native tree and shrub species. Use of wetlands for rangeland affects species composition through the suppression of native woody species, the introduction of exotic species, and compaction of soils.

Human activities including grazing and ground disturbance may introduce exotic plant species, create suitable conditions for the increase of less desirable native species, eliminate woody tree and shrub cover, and compact wetland soils. *Euphorbia esula* (leafy spurge) and *Centaurea maculosa* (spotted knapweed) are noxious weeds which seem to pose the largest threat to wetland and riparian habitat. The latter two species are quite common on the mainstem of the Salmon River. Other noxious weed species that were found both within and adjacent to wetland and riparian areas include *Cardaria draba* (pepperweed whitetop), *Centaurea repens* (Russian knapweed), *Cirsium arvense* (Canada thistle), *Conium maculatum* (poison hemlock), *Hyoscyamus niger* (henbane), and *Linaria dalmatica* (dalmatian toadflax). Locations of these species should be identified and potentially be controlled when they are small. *Phalaris arundinacea* (reed canary grass) is a grass species where it is questionable whether it is native or introduced. While this species was noted along the mainstem of the Salmon River and the Lemhi River it does not seem to be as invasive or widespread in the east-central valleys as compared to other parts of the state. A number of exotic graminoid species, including *Agropyron repens* (quack grass), *Agrostis stolonifera* (creeping bentgrass), *Hordeum jubatum* (foxtail barley), *Poa pratensis* (Kentucky bluegrass), and *Poa palustris* (fowl bluegrass), have become established as the dominant understory species in some wetlands and lack the soil and bank stabilizing characteristics of native species. Increasers or native plants that tend to increase with grazing due to low palatability seem to be more of a threat to plant species diversity than non-native species in alkaline wetlands such as Texas Creek and Summit Creek. Increasers in the alkaline wetlands include *Potentilla anserina* (silverweed cinquefoil), *Iris missouriensis* (Rocky Mountain iris), and

Thermopsis montana (mountain thermopsis).

Fragmentation is an impairment that has occurred in the survey area as a result of water development, agriculture, road building, and housing development. Most of the major streams in the survey area have been impacted by agricultural diversion. In addition to altering the natural hydrograph, the diversions create corridors where juvenile fish leave the river system and are unable to return. Fish screens and other structures have been placed at many of the diversions to prevent this from occurring. Culverts and reservoirs may fragment fish migration with culverts frequently functioning as barriers. Large reservoirs are limited to Mackay Reservoir on the Big Lost River. Stock reservoirs are scattered throughout the valleys. Most of the valleys in east-central Idaho still have an agricultural-based economy. The threat of subdivision and development is increasing, however, as property values increase and family ranches are sold.

TYPE CHANGES

Type changes occur when a wetland is converted from one vegetation type to another and results in a shift in wetland functions. The changes most frequently are associated with changes in hydrology. This is treated by the World Wildlife Fund (1992) as a gain when the change is to a wetter type and an impairment when the change is to a drier type. Water development projects account for many of the type changes in the survey area. Agricultural activities have also changed wetland dominance from woody to herbaceous.

Summit Creek is an alkaline wetland at the head of the Little Lost River that has a history of impoundments. A reservoir is in place at the head of Summit Creek and two additional reservoirs are present that have breeched. One of the former reservoirs lies within a reach of Summit Creek that supports several rare alkaline plant species. The area that was formerly inundated by the reservoir contrasts markedly with adjacent wetlands lacking appropriate habitat for rare alkaline species and being dominated by *Carex utriculata* (bladder sedge). Downstream of the dam where coarse textured sediments from the breached dam were deposited the wetland is dominated by *Equisetum* sp. This is the only place in the Summit Creek drainage where monotypic stands of this species were found. Reservoirs replace wetlands with open water habitat and wetlands often become restricted to a narrow fringe or wetlands at the inlet(s) to the reservoir where sediments accumulate.

Agriculture activities most frequently change wetland habitat to drier types. Some ditching, draining, and clearing of woody vegetation has occurred in the survey area for development of pasture and hay ground. Livestock use may also result in type changes with heavy grazing eliminating regeneration of woody shrubs and trees.

Beaver are a keystone species in wetlands with their activity resulting in natural type changes. Beaver activity occurs in most of the low to moderate gradient streams in the survey area. Maintaining beaver populations is a critical element in sustaining natural wetland complexes and improving channel conditions. In contrast however, beaver are noticeably absent and no evidence

of past activity was observed in the Birch Creek system. Beaver are present in nearby Texas Creek and Eighteenmile Creek drainages and other broad valley bottoms in the survey area.

The Borah Peak earthquake of 1983 may have resulted in at least temporary type changes due to hydrologic alteration at Chilly Slough. The 7.3 magnitude earthquake resulted in four foot drop of the valley floor. Following the earthquake many changes in groundwater flow occurred including upwelling of large springs and drying of other springs. Long-term changes in hydrology at Chilly Slough are undocumented (Alt and Hyndman 1989).

ENHANCEMENTS

Enhancements increase or improve wetland functions. In the survey area enhancement projects have focussed on improvement of channel conditions, control of exotic species, elimination of fish barriers, and construction of fish screens to keep fish in the streams. Numerous fencing projects for livestock management are in place on the lower Pahsimeroi River, Birch Creek, Summit Creek, and at Chilly Slough.

WETLAND PLANT COMMUNITIES

The plant community is a vegetation unit representing repeating assemblages of plant species that occur in response to complex environmental factors. The plant community may be used as an indicator of difficult to measure or poorly understood environmental or site attributes. This information can be used to make predictions about the effects of management decisions and expected trends on similar units of land. Additionally, plant community descriptions, stand tables, and on-the-ground reference sites, provide a baseline for replicating plant communities in restoration efforts. Plant communities are used to guide management, as a coarse filter for preservation of biodiversity, and to assess biological significance (Bougeron and Engelking 1994, Hansen et al. 1995, Kovalchik 1993, Padgett et al. 1989 and Youngblood et al. 1985). Plant community descriptions and management information are summarized in many classifications and have been compiled for high ranking wetland plant communities occurring in east-central Idaho in Appendix B.

Our nation's biological resources are so great that management and protection of individual species is often impractical or ineffective. Community level conservation promotes protection of a more thorough range of biotic elements including rare, little known, or cryptic species whose priority for conservation has not been documented. The plant community is considered a coarse filter where species and biotic processes are represented. Species falling through the coarse or community filter are often the rarest species where fine filter protection of viable occurrences is still necessary (Grossman et al. 1994).

Plant communities are ranked similarly to the system developed by TNC to rank plant and animal species. The ranking system is intended to allow managers to identify elements at risk and determine management priorities. Community ranks are based primarily on the total number of

occurrences and the total area occupied by the community range wide. Secondarily, trends in condition, threats, and fragility contribute to ranks when the information is known. The ranks are on a scale from 1 to 5 with a G1 indicating that the community is critically imperiled range wide and a G5 indicating no risk of extinction. Plant communities where insufficient information is available to assign a conservation rank are ranked as U. Guidelines used to assign community ranks are included in Appendix C.

Review of existing classifications, gray literature, and previous survey work by the CDC were used to develop a preliminary list of wetland plant communities in Idaho. The Upper Snake River District, Big Butte and Medicine Lodge Resource Areas of the BLM contracted the Montana Riparian and Wetland Research Program (RWRP) to inventory riparian plant communities under BLM administration (University of Montana 1996). This previous and ongoing work, carried out by agencies in the survey area, was summarized along with data collected from field surveys to generate a list of plant communities occurring specifically in east-central Idaho (Table 1). A key to the plant communities occurring in the survey area is included in Appendix A. The plant communities are within the Cowardin's (1979) palustrine system and forested, scrub-shrub, or emergent (herbaceous) classes, reviewed below. Additionally, calcareous fens and playas are discussed.

FORESTED VEGETATION

Broad-leaved deciduous forests are most extensive on the Big Lost River, East Fork Salmon River, and mainstem Salmon River. The forests are most commonly dominated by *Populus trichocarpa* (black cottonwood) with lesser amounts of *Populus angustifolia* (narrowleaf cottonwood), *P. acuminata* (Rydberg's cottonwood) and *P. tremuloides* (quaking aspen). The native box-elder, *Acer negundo* var. *interius*, is reported from east-central Idaho, but the non-native species *Acer negundo* var. *violaceum* is much more common.

Needle-leaved forests occur on high gradient tributaries. Fluvial landforms are frequently absent due to stream gradient that limits lateral channel migration, and riparian vegetation is confined to narrow streamside bands. Forested communities are dominated by *Picea engelmannii* (Engelman spruce), *Abies lasiocarpa* (subalpine fir), *Psuedotsuga menziesii* (Douglas fir) or *Pinus contorta* (lodgepole pine). *Pinus flexilus* (limber pine) occurs infrequently in association with both riparian corridors and spring-fed wetlands.

SCRUB-SHRUB VEGETATION

Shrublands dominated by willows and other shrubs are common throughout the survey area in low-gradient valley bottoms. At mid- to upper-elevations shrublands are dominated by *Salix geyeriana* (Geyer's willow) and *S. boothii* (Booth's willow) with lesser amounts of *S. drummondiana* (Drummond's willow) and *S. planifolia* var. *planifolia* (plane-leaf willow). Where gradient increases shrublands dominated by *Cornus sericea* (red-osier dogwood), *Betula occidentalis* (water birch), and *Alnus incana* (mountain alder) are present. The low willows, *Salix*

wolfii (Wolf's willow), *S. brachycarpa* (short-fruit willow), *S. planifolia* var. *monica* (plane-leaf willow), and *Salix farriae* (Farr willow) , along with *Betula glandulosa* (bog birch) and *Potentilla fruticosa* (shrubby cinquefoil), occur at upper elevations. Tall willow shrublands occur at low elevations in association with higher order streams and support the willow species *Salix exigua* (coyote willow), *S. lutea* (yellow willow), *S. lasiandra* ssp. *caudata* (whiplash willow), and *Salix bebbiana* (Bebb's willow).

EMERGENT (HERBACEOUS) VEGETATION

Herbaceous wetlands in the survey area usually occur as a complex of monocultures dominated by the sedges and sedge-likes *Carex utriculata, C. aquatilis* (water sedge), *C. nebrascensis* (Nebraska sedge), *C. simulata* (soft-leaved sedge), *Scirpus acutus* (hardstem bulrush), *Juncus balticus* (baltic rush), and *Eleocharis palustris* (common spikerush). *Typha latifolia* (common cattail) is frequently present in ponds with appropriate water regimes. Seasonally flooded emergent grasslands are dominated by *Elymus cinereus* (basin wildrye), *Deschampsia cespitosa* (tufted hairgrass), *Spartina gracilis* (alkali cordgrass), *Muhlenbergia richardsonis* (mat muhly), and *Agropyron smithii* (western wheatgrass). The grasslands have been heavily impacted by grazing and pasture development.

CALCAREOUS FENS

In the broad northwest trending valleys, streams often originate as springs. The water emanating from springs is alkaline due to groundwater flows through calcareous deposits in the mountains. The wetlands support rare species, including plants as well as mollusks and unique species assemblages. While at least five large calcareous fens are known from the east-central valleys of Idaho this is a very unique ecosystem type at both statewide and regional scales. Low lying areas are vegetated with *Carex spp., Eleocharis palustris,* and *Eleocharis pauciflora* (creeping spikerush). Slightly drier areas have the grasses *Spartina gracilis, Poa juncifolia* (akali bluegrass), and *Muhlenbergia asperifolia* (alkali muhly). Hummocks may be dominated by *Potentilla fruticosa, Betula glandulosa, Elymus cinereus,* or *Sarcobatus vermiculatus* (greasewood). In the headwaters of the Pahsimeroi Valley, an area locally known as The Pines, alkaline benches support woodlands dominated by *Pinus flexilus* with an understory of *Potentilla fruticosa.*

PLAYAS

Historically the Big Lost River, the Little Lost River, and Birch Creek flowed into playas on the edge of the Snake River Plain. Water diversions have eliminated flows which supported the Little Lost River and Birch Creek playas, and wetlands are limited to periodically flooded wetlands in the vicinity of the Big Lost River sinks. Wetlands are dominated by stands of *Eleocharis palustris* and perhaps the most extensive stands of *Agropyron smithii* in the state. Addtionally, the Big Lost playa supports a large Great Basin spadefoot toad population and is recognized as an important waterfowl area.

Table 1. Wetland plant communities and ranks in east-central Idaho arranged by Cowardin system, class, and subclass.

Scientific Name	Common name		Rank
	Palustrine Forested Communities		
	Needle-leaved evergreen		
Abies lasiocarpa/Calamagrostis canadensis	Subalpine fir/Bluejoint reedgrass	G5	S3
Abies lasiocarpa/Calamagrostis canadensis Ledum glandulosum phase	Subalpine fir/Bluejoint reedgrass Labrador tea phase	G4	S3
Abies lasiocarpa/Streptopus amplexifolius	Subalpine fir/Twisted stalk	G4	S4
Juniperus scopulorum/Cornus sericea	Rocky Mountain juniper/Red-osier dogwood	G4	S3
Picea engelmannii/Carex disperma	Engelmann spruce/Soft-leaved sedge	G2	S2
Picea engelmannii/Cornus sericea	Engelmann spruce/Red-osier dogwood	G3	S2
Pinus flexilus/Potentilla fruticosa/ Distichlis spicata	Limber pine/Shrubby cinquefoil/ Inland saltgrass	G1	S1
Pseudotsuga menziesii/Cornus sericea	Douglas fir/Red-osier dogwood	G4	S4
	Broad-leaved deciduous		
Populus angustifolia/Betula occidentalis	Narrow-leaf cottonwood/Water birch	G1G3	S1
Populus angustifolia/Cornus sericea	Narrow-leaf cottonwood/Red-osier dogwood	G4	S1
Populus tremuloides/Cornus sericea	Quaking aspen/Red-osier dogwood	G4	S4
Populus tremuloides/Calamagrostis canadensis	Quaking aspen/Bluejoint reedgrass	G3	S4
Populus trichocarpa/Alnus incana	Black cottonwood/Mountain alder	G3	S3
Populus trichocarpa/Cornus sericea	Black cottonwood/Red-osier dogwood	G4	S4
Populus trichocarpa / Mesic graminoid	Black cottonwood/Mesic graminoid	GU	SU
Populus trichocarpa/ Recent alluvial bar	Black cottonwood/Recent alluvial bar	G?	S3
Populus trichocarpa/Rosa woodsii	Black cottonwood/Wood's rose	GU	SU
Populus trichocarpa/Salix lutea	Black cottonwood/Yellow willow	G?	S?
Populus trichocarpa/Symphoricarpos albus	Black cottonwood/Snowberry	G3	S2
	Palustrine Scrub-Shrub Communities		
	Broad-leaved deciduous		
Alnus incana	Mountain alder	G?	S3
Alnus incana /Mesic forb	Mountain alder/mesic forb	G2G3	S1
Artemisia cana/Festuca idahoensis	Silver sagebrush/Idaho fescue	G3	S2
Artemisia tridentata tridentata/Elymus cinereus	Basin big sagebrush/Basin wildrye	G2	S1
Betula glandulosa/Carex simulata	Bog birch/Short-beaked sedge	G2	S2
Betula glandulosa/Carex utriculata	Bog birch/Beaked sedge	G4?	S3
Betula occidentalis	Water birch	G3Q	S2
Betula occidentalis/Cornus sericea	Water birch/Red-osier dogwood	G2G3	S2
Betula occidentalis/ Mesic forb	Water birch/Mesic forb	G3	S1
Betula occidentalis/Potentilla fruticosa	Water birch/Shrubby cinquefoil	G2	S1
Cornus sericea	Red-osier dogwood	G4Q	S3
Crataegus douglasii/Rosa woodsii	Black hawthorne/Wood's rose	G2?	S1
Crataegus douglasii/Symphoricarpos albus/ Smilacina stellata	Black hawthorne/Common snowberry/ Starry false solomon's seal	G2	S1
Potentilla fruticosa/Deschampsia cespitosa	Shrubby cinquefoil/Tufted hairgrass	G4	S3
Potentilla fruticosa/ Alkaline graminoid	Shrubby cinquefoil/Alkaline graminoid	GU	SU

Table 1. Continued

Rosa woodsii	Wood's rose	G5	S4
Salix arctica/Carex subnigricans	Arctic willow/Nearlyblack sedge	GU	SU
Salix bebbiana	Bebb's willow	G?	S?
Salix boothii/Carex aquatilis	Booth's willow/Water sedge	G3	S3?
Salix boothii/Carex nebrascensis	Booth's willow/Nebraska sedge	G4G5	S3?
Salix boothii/Carex utriculata	Booth's willow/Beaked sedge	G4	S4
Salix boothii/ Mesic forb	Booth's willow/Mesic forb	G3	S3?
Salix boothii/ Mesic graminoid	Booth's willow/Mesic graminoid	G3?	S3?
Salix brachycarpa/Carex elynoides	Short fruit willow/Blackroot sedge	GU	SU
Salix drummondiana/Carex utriculata	Drummond's willow/Beaked sedge	G3	S3
Salix exigua /Barren	Coyote willow/Barren	G3?	S4
Salix exigua/Rosa woodsii	Coyote willow/Wood's rose	GU	SU
Salix exigua/ Mesic forb	Coyote willow/Mesic forb	G2?	S2?
Salix exigua /Mesic graminoid	Coyote willow/Mesic graminoid	G3?	S3
Salix geyeriana/Calamagrostis canadensis	Geyer's willow/Bluejoint reedgrass	G5	S4
Salix geyeriana/Carex aquatilis	Geyer's willow/Water sedge	G3?	S3?
Salix geyeriana/Carex utriculata	Geyer's willow/Beaked sedge	G5	S4
Salix geyeriana/Deschampsia cespitosa	Geyer's willow/Tufted hairgrass	G4	S3?
Salix lasiandra/ Mesic forb	Whiplash willow/Mesic forb	G?	SU
Salix lutea	Yellow willow	G3	S3
Salix lutea/Carex utriculata	Yellow willow/Beaked sedge	G4	S4
Salix planifolia	Plane-leaf willow	G4	S4
Salix planifolia/Carex aquatilis	Plane-leaf willow/Water sedge	G5	S4
Salix planifolia/Carex scopulorum	Plane-leaf willow/Holm's Rocky Mtn Sedge	G4	SP
Salix (farriae, planifolia)/Carex utriculata	Farr's,Plane-leaf willow/Beaked sedge	G3	S3
Sarcobatus vermiculatus/Distichlis stricta	Greasewood/Interior saltgrass	G4	S1
Sarcobatus vermiculatus/Elymus cinereus	Greasewood/Basin wildrye	G3	S2

Palustrine Emergent Communities
Persistant

Carex aquatilis	Water sedge	G5	S4
Carex limosa	Mud sedge	G3	S1
Carex nebrascensis	Nebraska sedge	G4	S3
Carex nova	Black sedge	GU	SU
Carex praegricilis	Clustered field sedge	G2G3	S2
Carex simulata	Soft-leaved sedge	G4	S2
Carex subnigricans	Nearly black sedge	GU	SU
Carex utriculata (rostrata)	Beaked sedge	G5	S4
Agropyron smithii	Western wheatgrass	G3G5	S1
Calamagrostis canadensis	Bluejoint reedgrass	G4Q	S1
Deschampsia cespitosa	Tufted hairgrass	G4?	S3
Deschampsia cespitosa/Caltha leptosepala	Tufted hairgrass/Elkslip marshmarigold	G4	S2
Elymus cinereus	Basin wildrye	G2G3	S3
Muhlenbergia richardsonis	Mat muhly	GU	SU
Poa juncifolia	Alkali bluegrass	GU	SU
Phalaris arundinacea	Reedgrass	G4	S5
Spartina gracilis	Akali cordgrass	GU	SU
Eleocharis pauciflorus	Few-flowered spikerush	G4	S1
Eleocharis palustris	Common spikerush	G5	S3

Table 1. Continued.

Eleocharis rostellata	Wandering spikerush	G2	S2
Juncus balticus	Baltic rush	G5	S4
Scirpus acutus	Hardstem bulrush	G5	S4
Scirpus americanus	Threesquare bulrush	G1Q	S1
Scirpus validus	Softstem bulrush	G4	S2
Typha latifolia	Broadleaf cattail	G5	S4
Arnica longifolia	Seep-spring arnica	GU	SU
Caltha leptosepala-Deschampsia cespitosa	Elkslip marshmarigold/Tufted hairgrass	G4	S2

RARE FLORA

Twenty-four plant species of special concern are known to occur in wetlands in east-central Idaho (Table 2). *Primula alcalina* (alkali primrose) is a narrow endemic known only from alkaline or calcareous meadows at the headwaters of spring-fed creek systems in east-central Idaho. *Astragalus diversifolius* (meadow milkvetch) and *Carex parryana* ssp. *idahoa* (Idaho sedge) are regional endemics known from Idaho and adjacent states. Most of the remaining species are at the periphery of their range or distributed throughout northern and western North America. In Idaho they are rare due to habitat loss and/or habitat specificity. Just over half of the species of concern occur in calcareous habitats. Two plant species *Epipactis gigantea* (giant helleborine) and *Primula incana* (Jones primrose) occur in association with springs which often have a thermal influence. *Juncus hallii* (Hall's rush) occurs in the survey area in association with meadows at upper elevations. The majority of the remaining species are found in alpine or high subalpine habitats. Information on the taxonomy, range, status, and management of rare plant species is included in Appendix F.

Spiranthes diluvialis (Ute ladies'- tresses orchid) is a federally Threatened species which was found on the South Fork of the Snake River in 1996. The orchid occurs in association with alluvial substrates along riparian edges, gravel bars, old oxbows, and moist to wet meadows on the floodplains of perennial streams. Surveys for *Spiranthes* were conducted in 1997 on lands below 7,000 feet managed by the United States Forest Service (Mancuso 1997). In 1998 Mancuso surveyed public lands managed by the BLM and IDFG along the Salmon River from the East Fork to the North Fork and along the East Fork Salmon River below the forest boundary. *Spiranthes diluvialis* was not found during these surveys. *Spiranthes romanzoffiana* (hooded ladies-tresses) was found in the project area on Eighteenmile Creek, Birch Creek, Clear Creek (Lemhi drainage), and at Bowery Hot Springs.

Table 2. Rare flora of east-central Idaho wetlands, conservation rank, Idaho Native Plant Society (INPS) category (G=globally rare, 1=State Priority 1, 2=State Priority 2, S= Sensitive, M=Monitor, R=Review) and general habitat in the east-central valleys of Idaho. Definitions of INPS categories are available in Rare, Threatened, and Endangered Plants and Animals of Idaho (CDC 1999).

Scientific name	Common Name	Rank		INPS	Habitat
Agoseris lackschewitzii	Pink agoseris	G4	S2	S	Subalpine/Alpine
Aster junciformis	Rush aster	G5	S1	S	Calcareous Fen
Astragalus diversifolius	Meadow milkvetch	G3	S2	G	Calcareous Fen/Meadow
Astragalus leptaleus	Park milkvetch	G4	S2	M	Calcareous Fen
Botrychium minganense	Mingan moonwort	G4	S3	S	Alpine
Carex buxbaumii	Buxbaum's sedge	G5	S3	S	Calcareous Fen
Carex parryana ssp. *idahoa*	Idaho sedge	G2Q	S1	G	Calcareous Fen
Carex livida	Pale sedge	G5	S2	S	Calcareous Fen
Epilobium palustre	Swamp willow-weed	G5	S3	M	Calcareous Fen
Epipactis gigantea	Giant helleborine	G4	S3	1	Hot Spring
Erigeron humilus	Low fleabane	G4	S2	M	Alpine
Gentianella propinqua	Four-parted gentian	G5	S1	M	Alpine
Gentianella tenella	Slender gentian	G4G5	S2	2	Subalpine/Alpine
Juncus hallii	Hall's rush	G4G5	S2	R	Meadow
Kobresia simpliciuscula	Simple kobresia	G5	S1	2	Calcareous Fen
Lomatogonium rotatum	Marsh felwort	G5	S1	1	Calcareous Fen
Parnassia kotzebuei	Kotzebue's grass-of-parnassus	G4T4	S1	M	Alpine
Primula alcalina	Alkali primrose	G1	S1	G	Calcareous Fen
Primula incana	Jones primrose	G4G5	S1	1	Calcareous Fen/Hot Spring
Salix candida	Hoary willow	G5	S2	S	Calcareous Fen
Salix farriae	Farr's willow	G4	S1	2	Subalpine
Salix pseudomonticola	False mountain willow	G5?	S1	2	Calcareous Fen
Scirpus rollandii	Rolland bulrush	G3Q	S1	G	Calcareous Fen

RARE ANIMALS

East-central Idaho wetlands and riparian corridors provide habitat for 13 wetland and riparian associated vertebrate species considered rare in the state of Idaho. Additionally, two invertebrate species have been recommended as species of concern. Birds account for the majority of rare species (Table 3). Long-billed curlews establish nesting territories in broad valley bottoms and are known from Antelope Flat, the Pahsimeroi Valley, and Chilly Slough. Lark buntings have been observed in irrigated meadows near Chilly Slough. Nesting merlins were found north of Arco and in the Lemhi Range in the mid-70s. Nests were not relocated in the late-80s, but individual birds were sighted. Common grackles have been sighted and breeding is suspected but not confirmed (CDC database 1999).

Two amphibian species of concern are known to occur in east-central Idaho wetlands: western toads and spotted frogs. Western toads are reported to be scattered throughout the survey area, but long-time locals claim that they are less common than in the past. Spotted frogs are considered one of the most common amphibian species in the east-central valleys and were the

most frequently observed amphibian in wetland surveys conducted by Yeo and Peterson (1998) and CDC staff.

The common garter snake is the most common species of garter snake in North America. Yet only one individual was encountered in herp surveys at 70 wetlands (Yeo and Peterson 1998). Peterson (pers. comm.) suggests that this species may be on the decline in east-central Idaho and its status should be monitored.

Six fish species of concern occur in the survey area. Five of these species are federally listed including bull trout, steelhead, spring/summer run chinook salmon, sockeye salmon and chinook salmon. White sturgeon are present in the Salmon River from Torreys Hole (seven miles below Sunbeam Dam) to the confluence of the Salmon and Snake rivers.

East-central Idaho is recognized by Frest and Johannes (1995) as an area with substantial mollusk endemism. Certain mollusk species are sensitive to disturbance and can be used as biological indicators. *Pyrgulopsis* n. sp. 9 and *Stagnicola hinkleyi* are recognized by Frest and Johannes as sensitive taxa and adequate information is available for listing as federally Endangered. *Fluminicola* sp 10 is considered a watch species that should be regarded as sensitive by land management and wildlife agencies (Frest and Johannes 1995). Surveys for Mollusks in east-central wetlands are limited to Birch Creek Fen, Whiskey Springs (Chilly Slough) and several other small springs (see Frest 1994). Numerous aquatic snails are visible in Summit Creek and no invertebrate work has been done at the site. It is likely, considering the isolation of Summit Creek, that these are a unique snail species. (Frest pers. comm.) Other spring systems including Texas Creek and The Pines are also unsurveyed for snails.

Seven federally listed animal species occur in east-central Idaho. A hack tower for American peregrine falcons (listed Endangered, but proposed for delisting in 1998) is in place at Chilly Slough and nine birds were released in 1988. The Salmon, Pahsimeroi, and Lemhi Rivers are bald eagle (listed Threatened) wintering areas. The Little Lost River Valley was a significant bald eagle wintering area in the mid-80s when jackrabbit populations peaked, but the area has been little used since then. Successful bald eagle nest sites are present on the Salmon River. Bull trout (listed Threatened) are known to occur in the Salmon River, Pahsimeroi River, Lemhi River, and Little Lost River. The bull trout population in the Little Lost River system is an isolated strain. The Threatened steelhead and spring/summer run chinook salmon, and Endangered fall run chinook salmon, utilize habitat in the Salmon, East Fork Salmon, Pahsimeroi, and Lemhi rivers. The Endangered sockeye salmon utilize habitat on the main Salmon River enroute to Redfish Lake.

Information from the Idaho Vertebrate Atlas (Groves et al. 1997) on the status, range, and habitat of rare vertebrate species (with the exception of fish) is included in Appendix G. Frest and Johannes present summaries for mollusk species in their 1995 report for the Interior Columbia Basin Ecosystem Management Project.

Table 3. Rare animals of east-central Idaho wetlands.

Species	Common Name	Rank	
	Birds		
Haliaeetus leucocephalus	Bald eagle	G4	S3
Falco peregrinus anatum	American peregrine falcon	G4T4	S1
Falco columbarius	Merlin	G5	S1
Numenius americanus	Long-billed curlew	G5	S3
Calamospiza melanocorys	Lark bunting	G5	S1
Quiscalus quiscula	Common grackle	G5	S2
	Amphibians		
Bufo boreas	Western toad	G4	S4
Rana luteiventris	Spotted frog	G4	S3S4
	Fish		
Acipenser transmontanus	White sturgeon	G4	S1
Salvelinus confluentus	Bull trout	G3	S3
Oncorhynchus mykiss pop 13	Steelhead (Snake River Basin)	G5T3Q	S?
Oncorhynchus nerka pop 1	Sockeye salmon (Snake River runs)	G5T1Q	S1
Oncorhynchus tschawytscha	Chinook salmon	G5T1Q	S1
	Invertebrates		
Pyrgulopsis n. sp. 9	Birch Creek springsnail	G?	S?
Stagnicola hinkeleyi	Rustic pondsnail	G?	S?

SITE IDENTIFICATION METHODS

A list of wetlands was distributed to key individuals within federal, state, and private management agencies. Input was sought on the condition and biological significance of listed sites as well as suggestions for additional sites which were overlooked or of local concern. Wetlands were surveyed during 1997 and 1998 following Western Heritage Task Force methodology to assess site condition, catalog community types, and document rare plant and animal occurrences (Bougeron et al. 1992). The surveys and information on rare species distributions from the Biological and Conservation Database provided a method to allocate sites into four management categories.The categories differentiate wetlands based on the following criteria: richness, rarity, condition, and viability. The purpose is to identify wetlands that are irreplaceable or sensitivity to disturbance is high (Washington State Department of Ecology 1991, Bursik and Moseley 1995, Grossman et al. 1994). Definitions and indicators of criteria are summarized in Table 4.

Table 4. Definitions and indicators of criteria for allocating wetland sites into management categories.

CRITERIA	DEFINITION	INDICATORS
Richness	Habitat diversity within the site.	, Assemblage of numerous plant communities within a single unit of Cowardin's classification , Assemblage of plant communities or ecological features (beaver ponds, peatlands, lakes...) within several units of Cowardin's classification (=high structural diversity)
Rarity	Presence of state rare plant community, plant, or animal species.	, High concentrations of state rare plant or animal species , High quality occurrences of state rare plant communities
Condition	Extent which site has been altered from natural conditions.	, Exotic species sparse or absent , Native species contributing the majority of cover and reproducing
Viability	Likelihood of continued existence of biota within the site	, Large size , Offsite impacts (including hydrologic alteration, weed infestations, and incompatible land use) minimal

Additional wetlands are present in the survey area that have not been surveyed for rare plants, rare animals, or native plant communities. The information presented in Table 4 can be summarized for unsurveyed or data poor wetlands by requesting plant and animal occurrence data from Idaho Conservation Data Center, and on-site evaluation of impacts. In data poor wetlands, development of a plant species list with relative abundance (abundant, infrequent, rare) and rare plant surveys by a qualified botanist may be necessary to determine the condition and rarity of the site. Site summaries for surveyed wetlands are included in Appendix D.

CLASS I SITES

Class I sites represent high quality examples of plant communities and often provide habitat for high concentrations of global and state rare plant or animal species. The condition of the plant community is an indicator of intact site features such as hydrology and water quality. Impacts resulting in wetland loss at Class I sites should be avoided as these sites are not mitigable and alteration (and in some cases enhancement) of these sites will result in significant degradation. Conservation efforts should focus on full protection with an emphasis on maintaining hydrologic regimes. Class I federal lands should be designated as Research Natural Area (RNA), Special Interest Areas (SIA), Areas of Critical Environmental Concern (ACEC), or Wildlife Refuges. Private lands should be acquired by a conservation organization or public land management agency, or be secured by the establishment of conservation easements to protect biological features.

CLASS II SITES

Class II wetlands are differentiated from Class I sites based on condition or biological significance. Class II sites may provide habitat for state rare plant or animal species. However, human influences are apparent (i.e. portions of wetland in excellent condition; however drier, accessible sites are impacted). Good to excellent assemblages of common plant community types or the occurrence of a rare community type qualifies a site as Class II. Wetlands with unique biological, geological, or other features may be included here. Impacts and modification to Class II sites should be avoided. Where impacts such as grazing are present they should be managed intensively or removed. Class II federal lands should be designated as RNA, ACEC, or SIA. Private lands should be acquired by conservation organizations or have voluntary or legal protection.

REFERENCE SITES

Reference sites represent high quality assemblages of common community types or areas where changes in management practices can be documented. The use of a reference area as a model for restoration or enhancement projects is the best way to replicate wetland functions and the distribution and composition of native plant communities. Reference areas may also serve as donor sites for plant material. Application of Best Management Practices by the current landowner or manager, or fee title acquisition to ensure the continued existence of plant community types, should be the priority for reference sites.

HABITAT SITES

Habitat sites have moderate to outstanding wildlife functions, such as food chain support or maintenance of water quality, and may have high potential for designation as or expansion of existing wildlife refuges or managed areas. Human influences are often present and management may be necessary to maintain natural communities. For the sites listed here livestock and human access management may be the only actions necessary. Public and federal lands should be managed to maintain and improve wildlife values. Voluntary protection and incentives for private landowners to apply Best Management Practices may be used on private lands.

CONSERVATION OF EAST-CENTRAL IDAHO WETLANDS

It is widely recognized that wetland creation is more costly than conservation or restoration. Wetland creation projects have had minimal success and are usually limited to small portions of the landscape. Conservation, on the other hand, and the restoration of relatively intact wetland and riparian habitat accomplish resource goals more efficiently by reducing labor and material costs (Stevens and Vanbianchi 1991). Large, viable wetland complexes can be the result.

The east-central Idaho survey identified 36 wetland sites based on previous work by Pfeifer and

Toweill (1992) and consultation with agency personnel (Table 5, Figure 1). Many of these sites represent relatively intact systems, where actions such as livestock management, buffer creation, and public education will maintain and potentially improve wetland functions. Gains in wetland function can also be achieved by restoring hydrology at or adjacent to many of the identified sites.

CLASS I SITES

Seven wetlands meet the richness, rarity, condition, and viability criteria to qualify as Class I sites. The sites meet the criteria by providing habitat for high quality examples of plant communities, assemblages of rare plant species, or unique wetlands. Five of the sites are at least partially protected. Two alpine/subalpine wetlands, Smiley Mountaian and Suprise Valley, are Class I sites and are established as USFS Research Natural Areas. Kane Lake Cirque, proposed Special Interest Area-Botanical, supports subalpine wetlands and provides habitat for eight plant species of concern. The remainder of the Class I sites are calcareous wetlands. While calcareous wetlands are represented by multiple occurrences in the east-central valleys, statewide this is a rare wetland type. Birch Creek Fen is partially protected with tracts held by TNC, IDFG, and BLM. Currently, lands managed by IDFG and the BLM at Birch Creek do not have special designation though, the agencies are managing to maintain wetland functions. Additionally, private lands including headwater springs at Birch Creek remain unprotected. Summit Creek includes a BLM RNA/ACEC and parcels managed by TNC. Several unprotected tracts are managed by the State Department of Lands, BLM, and private landowners. The Pines and Tex Creek are extensive, mostly privately owned, unprotected sites with tracts (100 acres or less) managed by the BLM. Acquisition or conservation easements/agreements with private landowners should be pursued at all of the privately owned sites. Designation as Research Natural Area, Area of Critical Environmental Concern, Special Interest Area, or Wetland Conservation Area would be appropriate on public lands.

CLASS II SITES

The five Class II sites include areas that can be characterized as intermediate and rich fens and subalpine wetlands. Wetlands at Merriam Lake Basin and Iron Bog are protected by designation as Research Natural Area. Chilly Slough is partially protected with parcels managed by the BLM and IDFG. Portions of the land managed by the BLM are designated as Research Natural Area/Area of Critical Environmental Concern. Additional tracts at Chilly Slough owned by the BLM and IDFG considered Wetland Conservation Project Areas and management implications of this designation are outlined in the proposed Resource Management Plan for the Challis Resource Area (U. S. Department of Interior, Bureau of Land Management 1998). Portions of Chilly Slough, including the headwater springs are unprotected.

Fisher Springs and West Fork Pahsimeroi headwaters are currently unprotected parcels managed by the United States Forest Service (USFS) where Special Interest Area-Botanical designation would be appropriate. Fisher Springs is a unique sloped wetland that provides habitat for *Primula incana*. The West Fork of the Pahsimeroi Headwaterers includes a shrubland dominated by the

plant species of concern *Salix farriae*. This is one of only three viable populations of Farr's willow in Idaho.

REFERENCE SITES

The Reference Sites identified in the survey area include areas with natural barriers in place that have maintained habitat, areas where management activities have improved habitat, and high quality examples of relatively common habitat. Six high elevation wetlands, Bear Valley Creek, Kenney Creek, Lake Creek, Meadow Canyon, Mill Lake, and Trail Creek, have been established as USFS or BLM Research Natural Areas and/or Areas of Critical Environmental Concern. Lake Creek RNA/ACEC is within the Herd Creek watershed which has been recommended as an ACEC in the proposed Resource Management Plan for the Challis Resource area (U. S. Department of Interior, Bureau of Land Management 1998). In addition to Lake Creek RNA/ACEC the watershed includes a one-mile reach of Herd Creek that has been fenced since 1980. Herd Creek was not surveyed as part of this project and should be high priority for future inventory efforts. Rock Creek Cirque is a high elevation site that provides habitat for several species of concern and contains small wetlands. This site is currently unprotected and designation as Special Interest Area-Botanical is appropriate.

Three Reference Sites are at low elevations and are isolated by steep slopes or occur as islands. Cronks Canyon and East Fork Salmon River Bench are designated as Research Natural Areas and include narrow bands of riparian vegetation with barriers created by steep slopes. Alison Creek Island is located on the Salmon River. Protection of Allison Creek Island is complicated by landownership. It is unclear if the island is below the annual high watermark and owned by the state or if the island is higher and owned by the BLM. The island is a small area of very high quality habitat that is of rare occurrence on major low elevation rivers. Three Reference Sites include rather common wetland types in high quality condition. Dense willow shrublands are present along Eighteenmile Creek (particularly in upper reaches) and at Jimmy Smith Lake. Jimmy Smith Lake is partially managed by IDFG. Working with private landowners at Eighteenmile Creek to develop appropriate grazing strategies should be the goal. Badger Creek is an example of a high gradient perennial stream on alluvial fans that includes a unique riparian community co-dominated by limber pine. It is recommended that portions of Badger Creek managed by the BLM be established as Research Natural Area/Area of Critical Environmental Concern. A recent exclosure at Alkali Springs was also surveyed. The goal here should be to maintain the boundary fence.

HABITAT SITES

The Habitat Sites include grazed meadows, playas, an area of the Salmon River that has been impacted by land slides, and several river corridors. Canyon Creek, Mud Creek, and The Swamps are wetland meadows that support native species, but are grazed throughout the growing season. Appropriate grazing management which maintains or restores streambank vegetation should be the goal at these and other similar meadow systems. The Big Lost River Sinks is an extensive

wetland on the Snake River Plain owned by the Department of Energy as part of the Idaho National Engineering and Environmental Laboratory (INEEL). The sinks are recognized as an important area for waterfowl and additional surveys are being conducted on acquatic invertebrates at the site. The area is currently grazed with permits being managed by the BLM. Deadwater is an area of slack water on the Salmon River that developed due to landslides created by human causes. The result is accumulation of sediments that have created extensive mud flats providing habitat for waterfowl and development of dense stands of shrublands on areas of higher ground. Several of the habitat sites, including the Big Lost River, Birch Creek Valley, Lemhi River, Pahsimeroi Valley, and Salmon River Bottoms include extensive river corridors where intact habitat is fragmented by agricultural activities or diversion. These river corridors as well as the other Habitat Sites have potential for restoration or enhancement due to past land use and/or alterations of hydrologic regimes. Restoration may be as simple as fencing and allowing native vegetation to recover. Revegetation, channel stabilization, weed control, and hydrologic restoration may be necessary and should be evaluated on a site-by-site basis.

OTHER SITES AND PRIORITIES FOR CONSERVATION

A number of wetlands in east-central Idaho are unsurveyed and not summarized in this document and additional wetlands are present representing common vegetation types with important functions. Regulatory protection for jurisdictional wetlands is provided by the Clean Water Act; however, wetlands that do not meet the regulatory criteria are vulnerable. Only a small percentatge of the wetlands in the survey area are fully or partially managed or protected to maintain wetland functions. Fully protected wetlands are within USFS and BLM RNAs or ACECs. The USFS Research Natural Areas mostly represent subalpine and alpine wetlands where mineral extraction, grazing, and recreation are the greatest threats to the quality and long-term existence of wetlands. The BLM RNA/ACECs include two low elevation reaches of high order streams. Several wetlands in the east-central valleys are partially protected and include three fens and four low elevation riparian corridors. Projects in the survey area promoting the conservation of all intact, high quality wetland habitats should be of high priority. Emphasis may be placed on those types which are unprotected (or under-protected), declining, or rare.

Emergent wetlands are possibly the most extensive type of wetlands in the survey area with several large occurrences of common community types and partial protection of less common community types represented in protected areas. The common emergent plant communities *Carex aquatilis*, *Carex simulata*, *Carex utriculata*, and *Juncus balicus* are present as large occurrences in multiple (3 or more) protected areas. Common emergent community types that are unprotected or underprotected include *Calamagrostis canadensis, Carex nebrascensis, Eleocharis palustris,* and *Deschampsia cespitosa.* Several less common community types are poorly represented in protected areas and include naturally rare small patch (usually associated with fens) communities and declining communities. The small patch communities include those dominated by *Eleocharis pauciflora*, *Muhlenbergia richardsonis*, and *Spartina gracilis*. Declining communities that are unprotected include stands of *Agropyron smithii* and *Elymus cinereus.* Calcareous fens in the east-central valleys are largely dominated by emergent wetland species and complete protection at

all the fens should be sought due to rarity.

Subalpine forested and scrub-shrub wetlands are well protected in several Research Natural Areas in the survey area. Scrub-shrub wetlands associated with calcareous fens dominated by *Betula glandulosa, Potentilla fruticosa,* and *Sarcobatus vermiculatus* are partially protected at multiple sites in the east-central valleys. However, due to rarity, full protection of all the calcareous fens should be pursued. Mid- to low-elevation forested and scrub-shrub wetlands are poorly represented in protected areas. The areas that are protected include river reaches where reduction or removal of stresses which inhibit woody regeneration is resulting in significant gains in habitat and functions; however, hydrologic processes may continue to be significantly altered. High quality mosaics of forested and scrub-shrub habitat dominated by *Populus tremuloides, Populus trichocarpa, Alnus incana, Betula occidentalis, Crataegus douglasii, Salix boothii, S. drummondiana,* or *S. geyeriana* should be of high priority for protection.

Numerous programs provide opportunities for wetlands protection and restoration on private as well as publicly owned lands. Technical and restoration assistance for privately owned wetlands is available through the USFWS Partners for Wildlife program, IDFG Habitat Improvement Program (HIP), and the NRCS Wetland Reserve Program. Projects involving multiple cooperators are generally given higher priority. The HIP also provides assistance for projects on federal lands such as fencing and restoring wetlands and riparian areas. The information presented here can help to identify key areas for habitat restoration and baseline areas for comparison. Technical assistance and assistance to secure project funds on lands with mixed ownership may be provided by Bring Back the Natives and Intermountain Joint Ventures. Special designation such as RNA, ACEC, or SIA is a conservation approach for ecologically significant wetlands on federal lands. With the majority of wetlands in the survey area in private ownership, the long-term goal of increasing the quality and quantity of wetlands will only be accomplished through continued cooperation between private landowners, federal, state, and local agencies and concerned citizens.

(Not in cluded in CDC homepage version)

Figure 1. Location of wetland sites in east-central Idaho. Site numbers correspond to those used in Table 5.

Table 5. Wetland sites in east-central Idaho. Management categories are defined in the text. Ownership: USFS=United States Forest Service, BLM=Bureau of Land Management, BIA=Bureau of Indian Affairs, IDFG = Idaho Department of Fish and Game, IDL=Idaho Department of Lands, IDOT=Idaho Department of Transportation, TNC=The Nature Conservancy, DOE=Department of Energy, and PVT=private. Protection status: +=Full protection (e.g., Designated Research Natural Area or Special Interest Area, Nature Conservancy Preserve, Wildlife Management Area or Refuge), p=Partial protection (e.g., Potential Research Natural or Special Interest Area recognized in the Forest Plan, partially within a Wildlife Management Area, privately owned with conservation easement in place), and -=Currently no protection.

Wetland Site	Category	Protection status	Ownership	Latitude/Longitude	County
1. Birch Creek Fen	Class I	p	USFS,BLM,IDFG TNC,PVT	441430N 1125841W	Lemhi, Clark
2. Kane Lake Cirque	Class I	-	USFS	434702N 1140921W	Custer
3. Smiley Mountain	Class I	+	USFS	434407N 1134839W	Custer
4. Summit Creek	Class I	p	BLM,IDOL,TNC,PVT	441640N 1132800W	Custer, Butte
5. Surprise Valley	Class I	+	USFS	434831N 1140118W	Custer
6. Texas Creek	Class I	-	BLM,PVT	442930N 1131610W	Lemhi
7. The Pines	Class I	-	BLM,PVT	442530N 1134533W	Custer
8. Chilly Slough	Class II	p	BLM,IDFG,PVT	440644N 1135347W	Custer
9. Fisher Springs	Class II	-	USFS	435955N 1142845W	Custer
10. Iron Bog	Class II	+	USFS	433837N 1134538W	Custer
11. Merriam Lake Basin	Class II	+	USFS	440649N 1134555W	Custer
12. W. Fk. Pahsimeroi River Headwaters	Class II	-	USFS	440530N 1134423W	Custer
13. Alkali Spring Exclosure	Reference	-	BLM	441738N 1141725W	Custer
14. Allison Creek Island	Reference	-	BLM?,IDOL?	444638N 1135944W	Lemhi
15. Badger Creek	Reference	-	BLM	440445N 1131105W	Butte
16. Bear Valley Creek	Reference	+	USFS	444725N 1134750W	Lemhi
17. Cronks Canyon	Reference	+	BLM	444420N 1140045W	Lemhi
18. East Fork Salmon River Bench	Reference	+	BLM	441554N 1141856W	Custer
19. Eighteenmile Creek	Reference	-	BLM,PVT	443025N 1131230W	Lemhi
20. Jimmy Smith Lake	Reference	-	IDFG,BLM	441015N 1142415W	Custer
21. Kenney Creek	Reference	+	USFS	450655N 1133045W	Lemhi
22. Lake Creek	Reference	+	BLM	440403N 1140731W	Custer
23. Meadow Canyon	Reference	+	USFS	441437N 1130948W	Lemhi, Butte
24. Mill Lake	Reference	+	USFS	443937N 1133940W	Lemhi
25. Rock Creek Cirque	Reference	-	USFS	440844N 1134651W	Custer
26. Trail Creek, Lemhi County	Reference	p	BLM,USFS	445115N 1135105W	Lemhi
27. Big Lost River	Habitat	p	PVT,IDFG	435700N 1133953W	Custer, Butte
28. Big Lost River Sinks	Habitat	-	DOE	434630N 1125135W	Butte
29. Birch Creek Valley	Habitat	-	BLM, USFS,IDFG,PVT	440830N 1125410W	Lemhi, Clark
30. Canyon Creek, Lemhi County	Habitat	-	PVT,USFS	444612N 1131455W	Lemhi
31. Deadwater	Habitat	-	USFS	452338N 1140200W	Lemhi
32. Lemhi River	Habitat	p	PVT	445045N 1133700W	Lemhi
33. Mud Creek	Habitat	-	BLM	442322N 1130635W	Lemhi
34. Pahsimeroi Valley	Habitat	p	BLM.PVT	443430N 1135510W	Lemhi, Custer
35. Salmon River Bottoms	Habitat	-	PVT,BLM,IDFG	451207N 1135247W	Lemhi
36. The Swamps	Habitat	-	USFS	434745N 1134750W	Custer

HOW TO REQUEST ADDITIONAL INFORMATION

Only part of the information on wetlands in east-central Idaho has been summarized in this document. Additional data available for watershed-wide or site-specific projects are housed at Idaho Department of Fish and Game Headquarters. Table 6 summarizes the available data and methods of accessing the data.

Table 6. Accessing wetlands-related data housed at Idaho Department of Fish and Game. BCD=Biological and Conservation Database. Geographic Information System (GIS) data is available in ARCVIEW format.

DATA	FORMAT	WHAT IS AVAILABLE?	HOW DATA IS ACCESSED?
BCD	GIS	, Rare plant and animal distributions , Conservation site locations , Managed area locations	IDFG CDC Information Manager
BCD	ANALOG/ DISK	, Occurrence data for rare plant and animal species and plant communities , Location and biological significance of currently managed wetland areas , Location and biological significance of wetland conservation sites in need of protection , Community abstracts	IDFG CDC Information Manager

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Appendix A

Key to wetland plant communities in east-central Idaho

Instructions for use of this key.

Locate a sample plot which represents the stand as a whole. Avoid ecotones between communities and microsites which represent small scale disturbances. Recommended plot size for forested and scrub-shrub communities is 250 m^2 (25x10), and emergent communities 100 m^2 (10x10).

While in the plot identify the communty type by following the key. In sites that have been heavily impacted by anthropogenic factors (such as grazing), search for remnants of native vegetation. The cover values in the key may be reduced for disturbed sites.

Record canopy cover for all species in the plot. Validate the key by comparing plot data with written descriptions (included for high ranking plant communities in Appendix B) and stand tables to check for the presence of constant and characteristic species (Cooper 1995, Hansen et al. 1995, Padgett et al. 1989, Youngblood et al. 1985, Mutz and Queiroz 1983, Tuhy and Jensen 1982, and Tuhy 1981).

The community types are from sites sampled by CDC and a summary of agency surveys in the east-central valleys of Idaho. This work encompasses wide variation in environmental factors affecting the distribution of wetland community types. However, the key may not contain all wetland community types in the basin.

Key to overstory dominance groups

1.	Picea engelmannii, Abies lasiocarpa, Pinus contorta, Pinus flexilus, Pseudotsuga menziesii, or Juniperus scopulorum with at least 25% cover or dominating the overstory.	Needle-leaved evergreen forest types
1.	Not as above.	2
	2. Populus angustifolia, P. trichocarpa, or P. tremuloides present with a canopy cover of at least 15% and not representing a sere to conifer or shrub dominated types.	Broad-leaved deciduous forest types
	2. Trees absent or if present with less than 10% cover or restricted to microsites.	3
3.	Shrubs present with a canopy cover of at least 10%.	Scrub-shrub types
3.	Not as above shrubs and trees contributing minor amounts to composition or restricted to microsites. Herbaceous species with a combined cover of at least 15% or emergent herbaceous species with at least 5% cover.	Emergent types

Key to needle-leaved evergreen forest types

1.	Abies lasiocarpa or Picea engelmanii with at least 25% cover and successfully reproducing. Stands dominated by Pinus contorta are also included here.	2
1.	Pseudotsuga menziesii, Pinus contorta, Pinus flexilus, or Juniperus scopulorum dominate the overstory.	6
	2. Cornus sericea with at least 25% cover.	Picea engelmannii/Cornus sericea

	2. Not as above.	3
3.	Calamagrostis canadensis with at least 25% cover.	Abies lasiocarpa/Calamagrostis canadensis
	a. Ledum glandulosum with at least 5% cover. b. Not as above.	Ledum glandulosum phase Calamagrostis canadensis phase
3.	Not as above.	4
	4. Carex disperma with at least 10% cover.	Picea engelmannii/Carex disperma
	4. Not as above.	5
5.	Streptopus amplexifolius, Aconitum columbianum, Senecio triangularis, Mertensia spp., or Saxifriga odontoloma with at least 10% cover individually or in combination.	Abies lasiocarpa/Streptopus amplexifolius
5.	Not as above.	12
	6. Pseudotsuga menziesii with at least 25% cover and successfully reproducing.	7
	6. Not as above.	8
7.	Cornus sericea alone or in combination with willows, Equisetum arvense, or Actaea rubra with at least 10% cover.	Pseudotsuga menziesii/Cornus sericea
7.	Not as above.	12
	8. Juniperus scopulorum with at least 10% cover and successfully reproducing.	9
	8. Not as above.	10
9.	Cornus sericea and/or Elymus glaucus contribute at least 10% cover.	Juniperus scopulorum/Cornus sericea
9.	Not as above.	12
	10. Pinus flexilus dominating the overstory with at least 10% cover11	
	10. Not as above.	12
11.	Potentilla fruticosa along with Distichlis spicata and other alkali tolerant herbaceous species dominating the understory.	Pinus flexilus/Potentilla fruticosa/Distichlis spicata
11.	Not as above.	12
	12. Site with wetland characteristics including hydric soils, hydrophytic vegetation, or wetland hydrology.	13

	12. Site without wetland characteristics.	Upland site
13.	Overstory and understory dominated by native plant species.	Unclassified or undocumented palustrine needle-leaved evergreen forest community type
13.	Overstory or understory dominated by exotic plant species.	Human induced palustrine needle-leaved evergreen forest

Key to broad-leaved deciduous forest types

1.	Populus tremuloides with greater than 15% cover.	2
1.	Populus angustifolia alone or Populus trichocarpa with at least 15% cover.	4
	2. Cornus sericea with at least 25% cover.	Populus tremuloides/Cornus sericea
	2. Not as above.	3
3.	Calamagrostis canadensis with at least 25% cover.	Populus tremuloides /Calamagrostis canadensis
3.	Not as above.	15
	4. Populus angustifolia alone or in combination with P. acuminata with at least 25% cover.	5
	4. Not as above.	7
5.	Cornus sericea with at least 25% cover.	Populus angustifolia/Cornus sericea
5.	Not as above.	6
	6. Betula occidentalis with at least 25% cover.	Populus angustifolia/Betula occidentalis
	6. Not as above.	15
7.	Populus trichocarpa alone or in combination with P.acuminata with at least 25% cover.	8
7.	Not as above.	15
	8. Seedlings or saplings of Populus trichocarpa dominate the site on a recently deposited alluvial bar or island.	Populus trichocarpa/Recent Alluvial Bar
	8. Not as above.	9
9.	Alnus incana with at least 25% cover or the dominant understory shrub.	Populus trichocarpa/Alnus

		incana
9.	Not as above.	10
	10. Salix lutea alone or in combination with Salix lasiandra with at least 25% cover.	Populus trichocarpa/Salix lutea
	10. Not as above.	11
11.	Symphoricarpos albus with at least 15% cover or the dominant understory shrub.	Populus trichocarpa/ Symphoricarpos albus
11.	Not as above.	12
	12. Cornus sericea with at least 25% cover or the dominant understory shrub.	Populus trichocarpa/Cornus sericea
	12. Not as above.	13
13.	Rosa woodsii with at least 15% cover or the dominant understory shrub.	Populus trichocarpa/Rosa woodsii
13.	Shrubs with low cover. Native herbaceous species dominate the understory.	14
	14. Mesic graminoids including Carex lanuginosa, Calamagrostis canadensis, and Juncus balticus dominate the understory with at least 15% cover.	Populus trichocarpa/Mesic graminoid
	14. Not as above.	15
15.	Site with wetland characteristics including hydric soils, hydrophytic vegetation, or wetland hydrology.	16
15.	Site without wetland characteristics.	Upland Site
	16. Overstory and understory dominated by native plant species.	Unclassified or undocumented palustrine broad-leaved deciduous forest community type
	16. Overstory or understory dominated by exotic plant species.	Human induced palustrine broad-leaved deciduous forest community type

Key to scrub-shrub types

1.	Willows with at least 25% cover.	2
1.	Willows absent or with less than 25% cover.	Mixed scrub-shrub dominated community types
	2. Tall willow species including Salix lutea, S. lasiandra, S.	

	exigua, S. boothii, S. geyeriana, S. drummondiana, or S. bebbiana alone or in combination with at least 25% cover.	Tall willow community types
	2. Low willow species including Salix arctica, Salix nivalis, Salix wolfii, S. brachycarpa, S. planifolia var. monica, Salix farriae alone or in combination with at least 25% cover.	Low willow community types

Key to mixed scrub-shrub types

1.	Low shrubs including Potentilla fruticosa, Betula glandulosa, Artemisia cana, Artemisia tridentata tridentata, Sarcobatus vermiculatus, alone or in combination with at least 15% cover. Tall shrubs absent or contributing less than 5% cover.	3
1.	Not as above.	2
	2. Tall shrubs including Alnus incana, Betula occidentalis, Cornus sericea, Crataegus douglasii, or Rosa woodsii dominant.	15
	2. Not as above.	28
3.	Potentilla fruticosa or Betula glandulosa with at least 10% cover.	4
3.	Not as above.	8
	4. Carex simulata with at least 25% cover.	Betula glandulosa/Carex simulata
	4. Not as above.	5
5.	Carex utriculata (rostrata) and/or C. aquatilis with at least 25% cover.	Betula glandulosa/Carex utriculata
5.	Not as above.	6
	6. Deschampsia cespitosa with at least 5% cover.	Potentilla fruticosa/Deschampsia cespitosa
	6. Not as above.	7
7.	Distichlis spicata, Carex parryana, Carex scirpoidea, Muhlenbergia richardsonis, Spartina gracilis, or other alkali tolerant graminoids with at least 25% cover.	Potentilla fruticosa/Alkali graminoid
7,	Not as above.	28
	8. Sarcobatus vermiculatus with at least 10% cover (in low quality stands Chrysothamnus nauseousus may be present with high cover).	9
	8. Not as above.	11

9.	Elymus cinereus with at least 5% cover.	Sarcobatus vermiculatus/Elymus cinereus
9.	Not as above.	10
	10. Distichlis stricta with at least 10% cover.	Sarcobatus vermiculatus/Distichlis stricta
	10. Not as above.	28
11.	Artemisia cana with at least 10% cover.	12
11.	Not as above.	13
	12. Festuca idahoensis with at least 5% cover.	Artemisia cana/Festuca idahoensis
	12. Not as above.	28
13.	Artemisia tridentata tridentata with at least 10% cover.	14
13.	Not as above.	28
	14. Elymus cinereus with at least 5% cover.	Artemisia tridentata tridentata/Elymus cinereus
	14. Not as above.	28
15.	Alnus incana with at least 25% cover.	16
15.	Not as above.	18
	16. Mesic forbs including Mertensia sp., Heracleum lanatum, Aconitum columbianum, Smilacina stellata, Hydrophyllum fendleri alone or in combination with at least 25% cover.	Alnus incana/Mesic forb
	16. Not as above.	17
17.	Graminoids, shrubs, or bare ground dominates the understory.	Alnus incana cover type
17.	Not as above.	28
	18. Cornus sericea with at least 25% cover.	Cornus sericea
	18. Not as above.	19
19.	Crataegus douglasii with at least 25% cover.	20
19.	Not as above.	22
	20. Symphoricarpos albus with at least 15% cover.	Crataegus douglasii/ Symphoricarpos albus
	20. Not as above.	21

21.	Rosa woodsii with at least 15% cover.	Crataegus douglasii/Rosa woodsii
21.	Not as above	22
	22. Betula occidentalis the dominant shrub with at least 15% cover.	23
	22. Not as above.	27
23.	Cornus sericea with at least 10% cover.	Betula occidentalis/Cornus sericea
23.	Not as above.	24
	24. Potentilla fruticosa with at least 5% cover. Stands occur on alkaline substrates.	Betula occidentalis/Potentilla fruticosa
	24. Not as above.	25
25.	Mesic forbs including Mertensia sp., Heracleum lanatum, Aconitum columbianum, Smilacina stellata, Hydrophyllum fendleri alone or in combination with at least 25% cover.	Betula occidentalis/Mesic forb
25.	Not as above.	26
	26. Other species than those listed above are understory dominants.	Betula occidentalis cover type
	26. Not as above.	28
27.	Rosa woodsii the dominant shrub with at least 40% cover.	Rosa woodsii cover type
27.	Not as above.	28
	28. Site with wetland characteristics including hydric soils, hydrophytic vegetation, or wetland hydrology.	29
	28. Site without wetland characteristics.	Upland Site
29.	Overstory and understory dominated by native plant species.	Unclassified or undocumented palustrine scrub-shrub type
29.	Overstory or understory dominated by exotic plant species.	Human induced palustrine scrub-shrub vegetation

Key to tall willow types

1.	Salix lutea, S. lasiandra, S. exigua, S. bebbiana alone or in combination with at least 25% cover	2
1.	Not as above.	12

	2. Salix exigua with greater cover than any of the other tall willow species.	3
	2. Not as above.	7
3.	Understory poorly developed or barren due to annual scouring or recent colonization by S. exigua.	Salix exigua/Barren
3.	Not as above.	4
	4. Rosa woodsii with at least 10% cover.	Salix exigua/Rosa woodsii
	4. Not as above.	5
5.	Mesic forbs including Heracleum lanatum, Senecio triangularis, Smilacina stellata, and Mertensia sp. alone or in combination contribute at least 10% cover to the understory.	Salix exigua/Mesic forb
5.	Not as above.	6
	6. Mesic graminoids including C. lanuginosa, Juncus balticus, and Glyceria striata with at least 25% cover.	Salix exigua/Mesic graminoid
	6. Not as above.	26
7.	Salix lasiandra the dominant willow and alone or in combination with other shrubs with at least 25% cover.	8
7.	Not as above.	9
	8. Mesic forbs including Smilacina stellata, Actaea rubra, Aconitum columbianum and other forb species with at least 25% cover.	Salix lasiandra/Mesic forb
	8. Not as above.	26
9.	Salix lutea the dominant willow and alone or in combination with other shrubs with at least 15% cover.	10
9.	Not as above.	12
	10. Carex utriculata (rostrata) with at least 10% cover.	Salix lutea/Carex utriculata
	10. Not as above.	11
11.	Other species dominate the understory.	Salix lutea cover type
11.	Not as above.	26
	12. Salix bebbiana with at least 25% cover.	Salix bebbiana cover type
	12. Not as above.	13
13.	Salix boothii the dominant willow, alone or in combination with S. geyeriana, or S. drummondiana, with at least 25% cover.	14

13.	Not as above.	19
	14. Carex utriculata (rostrata) with at least 25% cover.	Salix boothii/ Carex utriculata
	14. Not as above.	15
15.	Carex aquatilis with at least 25% cover.	Salix boothii/Carex aquatilis
15.	Not as above.	16
	16. Carex nebrascensis with at least 25% cover.	Salix boothii/Carex nebrascensis
	16. Not as above.	17
17.	Other mesic graminoids including Carex lanuginosa, Juncus balticus or Glyceria striata alone or in combination with 25% cover.	Salix boothii/Mesic graminoid
17.	Not as above.	18
	18. Mesic forbs including Mertensia sp., Heracleum lanatum, Aconitum columbianum, Hydrophyllum fendleri alone or in combination with at least 25% cover.	Salix boothii/Mesic forb
	18. Not as above.	19
19.	Salix drummondiana the dominant willow with at least 30% cover.	20
19.	Not as above.	21
	20. Carex utriculata (rostrata) with at least 25% cover.	Salix drummondiana/Carex utriculata
	20. Not as above.	26
21.	Salix geyeriana the dominant willow contributing up to 25% cover to the somewhat open shrub layer (Salix boothii absent or present in minor amounts).	22
21.	Not as above.	26
	22. Carex aquatilis the dominant graminoid with at least 25% cover.	Salix geyeriana/Carex aquatilis
	22. Not as above.	23
23.	Carex utriculata (rostrata) the dominant graminoid with at least 25% cover.	Salix geyeriana/Carex utriculata
23.	Not as above.	24
	24. Deschampsia cespitosa the dominant graminoid with at least 5% cover.	Salix geyeriana/ Deschampsia cespitosa

	24. Not as above.	25
25.	Calamagrostis canadensis with at least 10% cover.	Salix geyeriana/ Calamagrostis canadensis
25.	Not as above.	26
	26. Site with wetland characteristics including hydric soils, hydrophytic vegetation, or wetland hydrology.	27
	26. Site without wetland characteristics.	Upland Site
27.	Overstory and understory dominated by native plant species.	Unclassified or undocumented palustrine scrub-shrub community type
27.	Overstory or understory dominated by exotic plant species.	Human induced palustrine scrub-shrub vegetation

Key to low willow types

1.	The low alpine willow species Salix artica alone or in combination with Salix nivalis with at least 50% cover.	2
1.	Not as above.	3
	2. Carex subnigricans present with at least 5% cover.	Salix arctica/Carex subnigricans
	2. Not as above.	10
3.	Salix planifolia and/or Salix farriae with at least 25% cover.	4
3.	Not as above.	7
	4. Carex utriculata present and alone or in combination with other sedge species with at least 25% cover.	Salix planifolia/Carex utriculata
	4. Not as above.	5
5.	Carex aquatilis the dominant understory species with at least 25% cover.	Salix planifolia/Carex aquatilis
5.	Not as above.	6
	6. Carex scopulorum the dominant understory species with at least 25% cover.	Salix planifolia/Carex scopulorum
	6. Not as above.	7
7.	Other species dominate the understory.	Salix planifolia cover type
7.	Not as above	10

	8. Salix brachycarpa with at least 25% cover or the dominant overstory willow.	9
	8. Not as above.	10
9.	Carex elynoides with at least 10% cover or the dominant understory species.	Salix brachycarpa/Carex elynoides
9.	Not as above.	10
	10. Site with wetland characteristics including hydric soils, hydrophytic vegetation, or wetland hydrology.	11
	10. Site without wetland characteristics.	Upland Site
11.	Overstory and understory dominated by native plant species.	Unclassified or undocumented palustrine scrub-shrub community type
11.	Overstory or understory dominated by exotic plant species.	Human induced palustrine scrub-shrub vegetation

Key to emergent vegetation types

1.	Carex species dominant.	Sedge types
1.	Not as above or grass or forb species dominant.	Non-sedge types

Key to sedge types

1.	Carex utriculata (rostrata) with at least 50% cover or the dominant species.	Carex utriculata
1.	Not as above.	2
	2. Carex aquatilis with at least 50% cover or the dominant species.	Carex aquatilis
	2. Not as above.	3
3.	Carex praegricilis with at least 25% cover or the dominant species.	Carex praegricilis
3.	Not as above.	4
	4. Carex simulata with at least 25% cover or the dominant species.	Carex simulata
	4. Not as above.	5
5.	Carex nebrascensis with at least 25% cover or the dominant species.	Carex nebrascensis

5.	Not as above.	6
	6. Carex limosa with at least 10% cover or the dominant species.	Carex limosa
	6. Not as above.	7
7.	Carex nova with at least 10% cover. Stands are in the alpine zone and associated with seeps and snowmelt areas.	Carex nova
7.	Not as above.	8
	8. Carex subnigricans with at least 25% cover. Stands are in the alpine zone and associated with seeps and snowmelt areas.	Carex subnigricans
	8. Not as above.	9
9.	Site with wetland characteristics including hydric soils, hydrophytic vegetation, or wetland hydrology.	10
9.	Site without wetland characteristics.	Upland Site
	10. Community dominated by native plant species.	Unclassified or undocumented palustrine emergent community type
	10. Native species replaced or nearly replaced by exotic plant species.	Human induced palustrine emergent vegetation

Key to non-sedge types

1.	Graminoids dominant.	2
1.	Forbs dominant.	17
	2. Calamagrostis canadensis with at least 25% cover or the dominant species.	Calamagrostis canadensis
	2. Not as above.	3
3.	Deschampsia cespitosa with at least 5% cover.	Deschampsia cespitosa
	a. Alpine/subalpine stands of Deschampsia cespitosa with Caltha leptosepala, Polygonum bistortoides, Pedicularis groenlandica and other mesic forbs present.	Caltha leptosepala-Deschampsia cespitosa
3.	Not as above.	4
	4. Agropyron smithii with at least 25% cover and the dominant species.	Agropyron smithii
	4. Not as above.	5
5.	Elymus cinereus with at least 10% cover and the dominant species.	Elymus cinereus

5.	Not as above.	6
	6. Muhlenbergia richardsonis with at least 10% cover and the dominant species.	Muhlenbergia richardsonis
	6. Not as above.	7
7.	Spartina gracilis with at least 10% cover and the dominant species.	Spartina gracilis
7.	Not as above.	8
	8. Poa juncifolia present with at least 5% cover. Grassland is a mix of alkali tolerant graminoids with none of the previous species clearly dominant.	Poa juncifolia
	8. Not as above.	9
9.	Phalaris arundinacea with at least 25% cover or the dominant species.	Phalaris arundinacea
9.	Not as above.	10
	10. Scirpus acutus with at least 25% cover or the dominant species.	Scirpus acutus
	10. Not as above.	11
11.	Scirpus validus with at least 25% cover or the dominant species.	Scirpus validus
11.	Not as above.	12
	12. Scirpus americanus with at least 10% cover or the dominant species.	Scirpus americanus
	12. Not as above.	13
13.	Eleocharis palustris with at least 25% cover or the dominant species.	Eleocharis palustris
13.	Not as above.	14
	14. Eleocharis rostellata with at least 25% cover or the dominant species.	Eleocharis rostellata
	14. Not as above.	15
15.	Eleocharis pauciflora the dominant species with at least 10% cover. Areas of open water or unvegetatated marl substrates often present.	Eleocharis pauciflora
15.	Not as above.	16
	16. Juncus balticus with at least 25% cover or the dominant species.	Juncus balticus
	16. Not as above.	17
17.	Typha latifolia and/or Typha angustifolia alone or in combination with	

	at least 50% cover.	Typha latifolia
17.	Not as above.	18
	18. Arnica longifolia with at least 10% cover and the dominant species on spring seeps often at the base of rock talus.	Arnica longifolia
	18. Not as above.	19
19.	Site with wetland characteristics including hydric soils, hydrophytic vegetation, or wetland hydrology.	20
19.	Site without wetland characteristics.	Upland Site
	20. Community dominated by native plant species.	Unclassified or undocumented palustrine emergent community type
	20. Native species replaced or nearly replaced by exotic plant species.	Human induced palustrine emergent vegetation

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Appendix B

Characterization abstracts for selected wetland plant communities in east-central Idaho.

PICEA ENGELMANNII/CAREX DISPERMA

COMMON NAME ENGELMANN'S SPRUCE/SOFTLEAF SEDGE

PHYSIOGNOMIC TYPE Forest

SIMILAR COMMUNITIES Hansen et al. 1995 may have included stands of the Picea engelmannii/Carex disperma habitat type in the Picea/Galium triflorum habitat type. Steele et al. (1983) indicates that the Picea englemannii/Carex disperma h.t. is similar to the Picea engelmannii/Equisetum arvense h.t. and has many of the same mesic herbs and shrubs.

RANGE This habitat type occurs in east-central Idaho, east into the Centennial Mountains, and in the Beartooth, Absaroka, and Wind River ranges of Wyoming. The community is purported in Montana.

ENVIRONMENTAL DESCRIPTION Soils are saturated for most of the year and have an organic layer of at least ten inches. The pH ranges from 4.9 to 6.2 (Steele et al. 1981). Surfaces are permanently flooded, semi-permanently flooded, or saturated.

MOST ABUNDANT SPECIES

Strata	Species
Tree canopy	Picea engelmannii
Herbaceous	Carex disperma
Non-vascular	Aulocomnium palustre, Amblystegium juratzkanum, Tetraphis pellucida

VEGETATION DESCRIPTION Picea engelmannii dominates both seral and climax stands. Lesser amounts of Pinus contorta or Pinus albicaulis may be present as seral components. Abies lasiocarpa may become codominant, but is usually short-lived except on raised microsites. The understory has a thick carpet of Carex disperma and bryophytes. Characteristic mosses are Aulocomnium palustre, Amblystegium juratzkanum, and Tetraphis pellucida. Many mesic shrubs and herbaceous species may be present including Ribes lacustre, Equisetum arvense, Actaea rubra, Galium triflorum, Pyrola asarifolia, and Pyrola secunda. None of the associated species have more than 15 percent cover (Steele et al. 1981, Steele et al. 1983).

WILDLIFE VALUES Native ungulates (moose, deer, and elk) use this type for grazing and bedding. Elk, moose, and black bear use these sites for wallows. Steele et al. (1981) reports that stands of Picea engelmannii/Carex disperma provide important nesting sites for the MacGillivray's warbler, American robin, and warbling vireo.

ADJACENT COMMUNITIES Adjacent communities may include the Abies lasiocarpa/Calamagrostis canadensis or Abies lasiocarpa/Vaccinium scoparium h.t. Uplands are typically forested and include stands of Pseudotsuga menziesii, Abies lasiocarpa, Pinus albicaulis, and Pinus contorta.

CONSERVATION RANK G2 S2

SUCCESSION AND MANAGEMENT The type is considered stable and represents a climax sere. These areas are small in size, but should be recognized when planning access to and activities within adjacent habitat types. Undisturbed stands are rare due to trampling by livestock that use areas for resting and bedding. Livestock and machinery can easily destroy the sedge and moss mat and make stands prone to erosion. Partial cutting in adjacent stands may subject remaining trees to windthrow (Steele et al. 1981, 1983).

CLASSIFICATION COMMENTS Classification based on data from eleven stands in Idaho and western Wyoming.

EDITION 98-07-07

AUTHOR M. Jankovsky-Jones

PICEA ENGELMANNII/CORNUS SERICEA

COMMON NAME ENGELMANN'S SPRUCE/REDOSIER DOGWOOD

PHYSIOGNOMIC TYPE Forest

SIMILAR COMMUNITIES Conifer/Cornus sericea is a broad classification for communities dominated by Pseudotsuga menziesii, Abies lasiocarpa, and occasionally Picea species. A similar Picea pungens/Cornus sericea community type has also been described for the southern Rocky Mountains (Padgett et al. 1989). Within Picea glauca stands on bog lakeshores of Henry's Lake, Idaho, Hall and Hansen (1997) reported Picea glauca/Cornus sericea (in spite of the low cover of Cornus sericea observed there). In eastern Idaho, the Cornus sericea/Galium triflorum and Populus angustifolia/Cornus sericea community types have similar forb understories and possible successional relationships to Picea/Cornus sericea. The same applies to the Picea engelmannii/Galium triflorum habitat type which has a similar understory except for the lack of Cornus sericea (Hansen et al. 1995, Youngblood et al. 1985). Picea engelmannii is also occasionally present in similar communities such as Alnus incana-Cornus sericea, Populus trichocarpa/Alnus incana-Cornus sericea, Populus trichocarpa/Cornus sericea, and Populus tremuloides/Cornus sericea, and other Cornus sericea types (Crowe and Clausnitzer 1997, Hansen et al. 1995, Kovalchik 1993).

RANGE The Picea engelmannii/Cornus sericea type (included in Picea/Cornus sericea) is a major type known from eastern Idaho, western Wyoming, northeastern Washington (Okanogan Highlands; Kovalchik 1993), northeastern Oregon (Blue Mountains; Crowe and Clausnitzer 1997), Montana, Utah, and possibly Colorado. In Idaho, stands are known from the Centennial, Caribou, Grays, and Teton ranges (Jankovsky-Jones 1997b, Youngblood et al. 1985). In Wyoming, stands were sampled in the Snake River Range and Greys River Range (Youngblood et al. 1985).

ENVIRONMENTAL DESCRIPTION The Picea engelmannii/Cornus sericea (including Picea/Cornus sericea) community type is found at elevations ranging from as low as 820 m in Montana (Hansen et al. 1995), to around 1400 to 1700 m in Oregon (Crowe and Clausnitzer 1997) to as high as 2300 m elsewhere. In eastern Idaho this community is typically found between 1850 m and 2040 m (Hall and Hansen 1997, Jankovsky-Jones 1997b, Youngblood et al. 1985). Though it is the driest of the riparian Picea types, it is restricted to alluvial terraces, benches, or moist toe slopes immediately adjacent to high gradient streams in narrow V or trough-shaped valleys. The topography ranges from flat to 5 percent slopes and may be undulating (Crowe and Clausnitzer 1997, Hall and Hansen 1997, Hansen et al. 1995, Youngblood et al. 1985). In narrow valleys, this community may occupy the whole floodplain (Jankovsky-Jones 1997b). The water table is usually shallow (50 to 100 cm deep) and stands are often affected by seasonal high water (Hansen et al. 1995, Youngblood et al. 1985). The soils are derived from alluvium with coarse rock fragments (to 35 percent) and sometimes decaying woody debris (Hall and Hansen 1997, Youngblood et al. 1985). Soils are coarse loamy, loamy silts, sandy, or clayey. They are gleyed and mottled, up to 60 cm deep, and have moderate available water capacity. Soil sub-groups are usually Cryoborolls (Aquic and Cumulic) and Cryaquolls (Cumulic, Histic, and Typic) but sometimes Cryofluvents and Cryorthents (Hansen et al. 1995, Youngblood et al. 1985). Such soils are susceptible to compaction and damage by logging machinery and livestock (Hansen et al. 1995).

MOST ABUNDANT SPECIES

Strata	Species
Tree canopy	Picea spp., Picea engelmannii, Abies lasiocarpa, Pseudotsuga menziesii
Tall shrub	Cornus sericea, Alnus incana, Salix boothii
Short shrub	Ribes lacustre
Herbaceous	Actaea rubra, Thalictrum occidentale, Smilacina stellata, Elymus glaucus, Galium triflorum

VEGETATION DESCRIPTION The Picea engelmannii/Cornus sericea (including Picea/Cornus sericea) community type has a partially closed overstory dominated by mature Picea. Picea (mostly P. engelmannii) constancy ranges from 86 to 100 percent with cover from 23 to 50 percent (Crowe and Clausnitzer 1997, Hall and Hansen 1997, Hansen et al. 1995, Kovalchik 1993, Youngblood et al. 1985). Mixed conifer species are common in both the overstory and the sub-canopy/tree understory resulting in high structural diversity (Youngblood et al. 1985). Snags and high levels of woody debris may be present (Crowe and Clausnitzer 1997, Jankovsky-Jones 1997b). However, within the mixed conifer component, the species cover of mature, sapling, and seedlings is usually less than 25 percent. Species vary across the communities range, though Abies lasiocarpa and Pseudotsuga menziesii are most commonly encountered throughout. Other trees sometimes present, especially outside Idaho, are Pinus contorta, Larix occidentalis, Abies grandis, and Populus species. (Crowe and Clausnitzer 1997, Hansen et al. 1995, Kovalchik 1993). There is a dense shrub layer with high cover of mixed species. Usually the dominant species, Cornus sericea constancy ranges from 67 to 100 percent with 10 to 58 percent cover (though Hall and Hansen (1997) found less than 3 percent cover) (Crowe and Clausnitzer 1997, Hansen et al. 1995, Kovalchik 1993, and Youngblood et al. 1985).

Co-dominant shrubs, often with high constancy but lower cover than Cornus sericea, are Alnus incana, Salix boothii, and Ribes lacustre. Salix drummondiana, Symphoricarpos albus, Linnaea borealis, Rubus parviflora, and Lonicera involucrata are occasionally prominent. Graminoid cover is usually less than 50 percent with Elymus glaucus (29 to 38 percent constancy; 3 to 30 percent cover) the most common species. Calamagrostis species (usually C. canadensis), Carex species, Bromus species, and Cinna latifolia are all sometimes present with low cover. Forb species richness is high but cover is low. Common forbs, all with less than 10 percent cover, though sometimes constancy greater than 50 percent, are Actaea rubra, Thalictrum occidentale, Smilacina stellata, and Galium triflorum. Other commonly associated forbs are Fragaria virginiana, Aster species, Equisetum arvense, Osmorhiza species, and Senecio triangularis (Crowe and Clausnitzer 1997, Hall and Hansen 1997, Hansen et al. 1995, Jankovsky-Jones 1997b, Kovalchik 1993, Youngblood et al. 1985).

WILDLIFE VALUES The Picea engelmannii/Cornus sericea community type provides good winter thermal cover for deer (especially white-tailed deer), bear, and elk (Crowe and Clausnitzer 1997, Hansen et al. 1995, Hansen et al. 1988). In addition, moose, elk, and other wildlife browse this community as Cornus sericea is a desired forage. Cornus sericea also overhangs streams forming hiding and thermal cover for fish. The diverse forest structure provides habitat and food for small mammals and birds (Crowe and Clausnitzer 1997, Youngblood et al. 1995).

OTHER NOTEWORTHY SPECIES Exotic species are only occasionally present and have low cover. Exotic graminoid species include: Agropyron repens, Agrostis stolonifera, Bromus inermis, Phleum pratense, Poa palustris, and Poa pratensis. Exotic forbs include: Cirsium arvense, Taraxacum officinale, and Tragopogon dubius (Hansen et al. 1995).

SUCCESSION AND MANAGEMENT Overall, the successional dynamics of this community are poorly known. Based on ecological similarities, Youngblood et al. (1985) hypothesize that Picea/Cornus sericea is a persistent successional intermediate between Cornus sericea/Galium triflorum and Picea/Galium triflorum. Alternatively, Picea engelmannii (or other Picea) may be a late seral invader of many different related communities including: Populus angustifolia or P. trichocarpa or P. tremuloides/Cornus sericea, Populus trichocarpa/Alnus incana-Cornus sericea, Alnus incana-Cornus sericea, Pseudotsuga menziesii stands, Salix species communities, or other Cornus sericea community types (Crowe and Clausnitzer 1997, Hall and Hansen 1997, Hansen et al. 1995, Kovalchik 1993, Youngblood et al. 1985). Succession is probably multiple pathed, the result of interacting soil, site moisture, disturbance, and micro-climate factors. For example, Picea engelmannii quickly re-establishes after fire or other disturbance. However, it is slow in dominating stands which explains the remnant conifer and deciduous trees in the overstory. Though located in cold-air draining valleys, which are not fire prone, disturbance has a role in late seral Picea engelmannii/Cornus sericea dynamics. Picea engelmannii is easily killed by fire and susceptible to windfall and spruce beetle or spruce budworm infestation. These disturbances may help maintain Picea dominance by promoting reproduction (Crowe and Clausnitzer 1997, Hall and Hansen 1997).

ADJACENT COMMUNITIES Adjacent communities may be other Picea types such as the wetter Picea/Equisetum arvense or the drier Picea engelmannii/Galium triflorum (Hall and Hansen

1997, Kovalchik 1993). Other adjacent wet communities are dominated by Alnus incana, Populus species, Salix species (e.g. Salix exigua), Carex species, or other Cornus sericea types (Crowe and Clausnitzer 1997, Hall and Hansen 1997, Hansen et al. 1995, Youngblood et al. 1985). Adjacent uplands are often dominated by Pseudotsuga menziesii, Pinus contorta, or Abies lasiocarpa and occasionally Abies grandis (Crowe and Clausnitzer 1997, Hall and Hansen 1997, Hansen et al. 1995, Youngblood et al. 1985).

CONSERVATION RANK G3 S2

SUCCESSION AND MANAGEMENT Due to easily compacted soils, high water tables, and stream side locations, many activities are usually incompatible. Road, structure, and recreation construction are not recommended (Hansen et al. 1995, Hansen et al. 1988). Timber harvest leads to problems with windthrow and rising water tables. Partial cutting does favor dominance by Picea while clear cutting promotes mixed conifer regeneration (Hall and Hansen 1997). Livestock grazing is also not recommended because of fragile soils and low forage amounts. Picea engelmannii provides good erosion control but is easily killed by fire. However, it quickly re-establishes on disturbed ground but not in areas of thick shrub, herbaceous, or duff cover. Also, its slow growth makes it a moderate revegetation option only in the long-term. By contrast, Cornus sericea provides excellent, long-term erosion control by stabilizing banks and recruiting debris. It also readily re-sprouts after fire (Hansen et al. 1995, Hansen et al. 1988).

CLASSIFICATION COMMENTS The Picea engelmannii/Cornus sericea community type is often treated as Picea/Cornus stolonifera [syn. Cornus sericea]. In Montana and Idaho, Picea glauca and Picea engelmannii hybrids are common; thus, lumping both species together is practical (Hall and Hansen 1997, Hansen et al. 1995). However, pure stands of Picea glauca are of conservation concern in Idaho and should be treated within the Picea glauca alliance. In Utah (and Wyoming, southeastern Idaho, and elsewhere) either Picea pungens or Picea engelmannii (or hybrids) may dominate, with similar understory composition. This also facilitates lumping under Picea/Cornus sericea or Conifer/Cornus sericea (Padgett et al. 1989). The Picea engelmannii/Cornus sericea type is possibly a successional intermediate between Cornus sericea/Galium triflorum and the climax Picea/Galium triflorum (Youngblood et al. 1985).

Classification of Picea engelmannii/Cornus sericea and Picea/Cornus sericea is based on seven stands in eastern Idaho (Hall and Hansen 1997, Jankovsky-Jones 1997b), 5 stands in western Wyoming (Youngblood et al. 1985), 2 stands in northeastern Oregon (Crowe and Clausnitzer 1997), 4 stands in northeastern Washington (Kovalchik 1993), 32 stands in Montana (Hansen et al. 1995), and an unknown number of stands in Utah. The Idaho Conservation Data Center has two field records of this community in Idaho: one at the Game Creek Research Natural Area and the other at Gravel Creek in the Grays Range (Jankovsky-Jones 1997b).

EDITION 98-11-16

AUTHOR C. Murphy

PINUS FLEXILUS/POTENTILLA FRUTICOSA/DISTICHLIS SPICATA

COMMON NAME Limber pine/Shrubby cinquefoil/Inland saltgrass

PHYSIOGNOMIC TYPE Woodland

SIMILAR COMMUNITIES Understory vegetation composition and soils are similar to the Potentilla fruticosa/Alkaline graminoid shrubland community.

RANGE Restricted to one known location.

ENVIRONMENTAL DESCRIPTION The wetlands are located in broad fault-block valleys surrounded by alluvial fans. Perennial drainages leaving the mountains typically do not flow through the alluvial fans, but sink into the alluvium. Runoff in fault-block valleys moves through the porous gravels into wetlands. Relative porosity of the fill materials within the wetland sites allows upwelling in a complex of numerous seeps.

The hydrograph in the wetland is relatively stable with two pulses. A peak flow in the early spring occurs due to local snow melt. The flows level off and may pulse again in the fall due to lag time in percolation from the mountains and underflow from the ground watershed.

The limber pine community occurs on gently sloping terraces and benches that are elevated up to one meter above spring creeks in alkaline fens. The terraces are subirrigated and represent the highest wetlands above the water table. Seeps are present at the base of terraces indicating subsurface water storage that may contribute to maintenance of groundwater flow.

MOST ABUNDANT SPECIES

Strata	Species
Tree canopy	Pinus flexilis
Short shrub	Potentilla fruticosa
Herbaceous	Distichlis spicata, Carex parryana, Carex scirpoidea, Muhlenbergia richardsonis, Phlox kelseyi, Solidago nana, Crepis runcinata

VEGETATION DESCRIPTION The woodland occurs on subirrigated alkaline terraces and benches and supports a sparse (10 to 20 percent cover) overstory of Pinus flexilus with uniform cover of Potentilla fruticosa in the understory. The low graminoids Carex parryanana, C. scirpoidea, Distichlis spicata, and Muhlenbergia richardsonis along with the forbs Solidago nana, Crepis runcinata, and Phlox kelseyi form a continuous (30 percent and greater) herbaceous cover. Small patches of bare, sparsely vegetated ground is sometimes present with salts at the surface. Localized patches of Leymus cinereus are also present.

WILDLIFE VALUES Song birds and small mammals are reported to eat the seeds of shrubby cinquefoil (Crowe and Clausnitzer 1997). Northern harriers have been observed foraging in stands. Elk and mountain lion have been reported to use the limber pine stands in the Pahsimeroi Valley, Idaho.

OTHER NOTEWORTHY SPECIES Information not available.

ADJACENT COMMUNITIES Terraces and elevated benches are a mosaic of the Pinus flexilis/Potentilla fruticosa/Distichlis spicata and Potentilla fruticosa/Alkaline graminoid communities. Springs emerge at the toe slopes of terraces and support Carex simulata and Eleocharis pauciflora alkaline fens. Spring creeks flowing through benches are lined with the Betula occidentalis/Potentilla fruticosa and Potentilla fruticosa/Deschampsia cespitosa communities.

CONSERVATION RANK G1 S1

SUCCESSION AND MANAGEMENT Little is known about the successional dynamics of this community. The community appears to be a long-lived, stable type. The one sampled stand in Idaho has been grazed for decades. Areas under limber pine trees are preferred by livestock due to the presence of shade, and trampling has resulted in patches of bare ground. Areas of bare ground may provide a substrate for establishment of weedy non native species. Additionally, an increase in less palatable species may occur. Heavy grazing may also inhibit the success of limber pine seedlings and saplings leading to an eventual loss of the tree from the site. The condition of the known stand could be improved by implementing a grazing plan which allows impacted areas to rest.

CLASSIFICATION COMMENTS The Pinus flexilus/Potentilla fruticosa/Distichlis spicata community is only known from one location in Custer County, Idaho. A similar community exists in Caribou County, Idaho, but plot data is not available to determine if this is the same association. Phreatophytic limber pine communities are restricted to areas that may be located in local cold air sinks. Extensive wetland inventory efforts have taken place in Idaho and it is unlikely that additional stands will be located.

Description is based on data from one stand in Idaho. Plot data needs to be collected from the Pinus flexilus community at Soda Springs Natural Scenic Area to determine if this is the same association.

EDITION 98-03-20

AUTHOR M. Jankovsky-Jones

PSEUDOTSUGA MENZIESII/CORNUS SERICEA

COMMON NAME DOUGLAS-FIR/RED-OSIER DOGWOOD

PHYSIOGNOMIC TYPE Forest

SIMILAR COMMUNITIES This community has been thoroughly sampled and described In Idaho and Montana. Padgett et al. (1989) describe a much broader Conifer/Cornus sericea

community that includes the one described here, in addition to ones dominated by other conifers, such as Abies lasiocarpa and Picea engelmannii

RANGE This association in known from Montana (Hansen et al. 1995), Idaho (Hall and Hansen 1997), and Utah, where it is sometimes included in the Conifer/Cornus sericea community of Padgett et al. (1989).

ENVIRONMENTAL DESCRIPTION This type occurs in mountains and the edges of high valleys. Elevations range from 3,600 to 7,400 feet. It occurs on alluvial benches and terraces of major streams and rivers and along small streams and creeks, usually in narrow, V-shaped valleys.

The overlying litter layer is variable and may be moderately extensive or practically non-existent depending on the particular site. The texture of soils in the upper layers range from fine sands to silts and clays. The underlying substrate is generally alluvium, composed of coarse sands, gravels, and cobbles. Large rocks may be present where this type occupies locations at the base of scree slopes. Sites tend to be well-drained due to this unconsolidated layer (Hall and Hansen 1997).

MOST ABUNDANT SPECIES

Strata	Species
Tree Canopy	Pseudotsuga menziesii
Tall Shrub	Acer glabrum, Cornus sericea, Prunus virginiana, Amelanchier alnifolia
Short Shrub	Rosa woodsii, Symphoricarpos albus
Herbaceous	Circea alpina, Smilacina stellata, Osmorhiza chilensis, Geranium viscosissimum

VEGETATION DESCRIPTION Stands are characterized by a Pseudotsuga menziesii overstory with Populus tremuloides, Populus trichocarpa, Pinus ponderosa, and Juniperus scopulorum occasionally associated as minor components. Where Pseudotsuga menziesii forms a dense canopy the understory is relatively sparse, and visa versa. The shrub layer is characterized by Acer glabrum and Cornus sericea as consistent members, with Rosa woodsii and Prunus virginiana also being common. The herbaceous layer is dominated by a diverse assemblage of low-growing plants, all with relatively low cover, probably due to shading by the tree and shrub canopy (Hall and Hansen 1997).

WILDLIFE VALUES This community provides valuable hiding cover and shade to a variety of species. Big game use may be high, depending upon the time of year. White-tail deer may use this type year-round as cover, while other big game species may use this type as cover only in the winter. Cornus sericea is favored by moose and beaver (Hall and Hansen 1997).

OTHER NOTEWORTHY SPECIES Information not available.

ADJACENT COMMUNITIES Adjacent riparian communities include Populus trichocarpa, Salix spp., Betula occidentalis, Alnus incana, and Populus tremuloides types. Adjacent uplands support sagebrush-steppe, Pseudotsuga menziesii, and Pinus ponderosa types.

CONSERVATION RANK G4 S4

SUCCESSION AND MANAGEMENT Stands of Populus tremuloides and a variety of shrub-dominated communities, typically Salix spp. and Alnus incana, represent seral stages of this type. Pseudotsuga menziesii will probably be present and successfully reproducing in these stands, although usually in the understory. Heavy, persistent livestock grazing may result in a loss of shrubs or change in shrub composition.

Cornus sericea, Prunus virginiana, and Acer glabrum are preferentially browsed by livestock and wild ungulates and may decrease as grazing intensifies, leaving disturbance tolerant shrubs, such as Symphoricarpos albus and Rosa woodsii in high cover. Continued heavy grazing may cause a loss of shrubs altogether, leaving a depauperate understory of Poa pratensis (Hall and Hansen 1997). The stream side position of this community makes it important in providing thermal cover, debris recruitment, and streambank stability. Cornus sericea is an excellent shrub for controlling erosion along streambanks. This is especially important because this community is often along steep-gradient streams, sometimes at their headwaters.

CLASSIFICATION COMMENTS Many plots have been sampled by Hansen et al. (1995) in Montana, Hall and Hansen (1997) in eastern Idaho, by Moseley in southwestern Idaho, and an undetermined number by Padgett et al. (1989) in Utah.

EDITION 98-12-01

AUTHOR B. Moseley

POPULUS ANGUSTIFOLIA/CORNUS SERICEA

COMMON NAME NARROWLEAF COTTONWOOD/RED-OSIER DOGWOOD

PHYSIOGNOMIC TYPE Forest

SIMILAR COMMUNITIES Not identified.

RANGE The Populus angustifolia/Cornus sericea community type occurs in Colorado, Idaho, Montana, New Mexico, Nevada, Utah, and Wyoming.

ENVIRONMENTAL DESCRIPTION Occurs on recently deposited alluvial flats or benches of streams and rivers, and around lakes and ponds. Soil textures vary from loam to coarse sand, and are generally well drained with a low to moderate available water holding capacity. These sites are often flooded in the spring with water tables lowering to three or more feet below the soil surface at the end of summer; upper soil profiles remain moist due to capillary action. Coarse textured soils, moderate stream gradients, and high coarse fragment contents throughout the soil profile provide an environment that produces a rapid movement of highly aerated groundwater. Redox concentrations (mottles) are common as evidence of a fluctuating water table (Hansen et al. 1995, Youngblood et al. 1985, Padgett et al. 1989).

MOST ABUNDANT SPECIES

Strata	Species
Tree canopy	Populus angustifolia
Tall shrub	Cornus sericea

VEGETATION DESCRIPTION The Populus angustifolia/Cornus sericea community type is characterized by an overstory dominated by Populus angustifolia (20-70 percent cover) with Acer negundo occasionally codominant. The dense shrub layer is diverse and dominated by Cornus sericea (20-90 percent cover). Prunus virginiana, Amelanchier alnifolia, Symphoricarpos spp., Alnus incana, Betula occidentalis, Rosa woodsii, Salix exigua, and other Salix species are often present. The herbaceous understory is highly variable with cover ranging from absent to abundant. Maianthemum stellatum and Equisetum arvense are often present.

WILDLIFE VALUES Populus angustifolia and Cornus sericea are browsed by white-tail deer and moose, and used by beaver for food and building materials. Understory species provide food and cover for a variety of waterfowl, songbirds, and small mammals. The stream side location of this community type is very important in providing thermal cover, debris recruitment, and streambank stability for fish habitat (Hansen et al. 1995).

OTHER NOTEWORTHY SPECIES Information not available.

ADJACENT COMMUNITIES Adjacent wetter communities may be dominated by the Salix exigua, S. amygdaloides, and S. lasiandra. Adjacent disturbed sites may be dominated by the Populus angustifolia/Herbaceous community type or the Populus angustifolia/Symphoricarpos occidentalis community type. Nearby uplands are dominated by Artemisia tridentata, Agropyron spicatum, and Poa pratensis.

CONSERVATION RANK G4 S1

SUCCESSION AND MANAGEMENT The erosional and depositional pattern, and meandering of a river affects the distribution of plant communities. The rate of meandering determines the seral stage of the communities. Where the river meanders frequently, few stands progress to later successional stages. Near the outer edges of the floodplain, the effect of the river is less pronounced, allowing later successional stages to develop. In the absence of fluvial disturbance and sediment deposition, succession continues from the Populus angustifolia/Cornus sericea community type to the Conifer/Cornus sericea habitat type. In the foothills of Montana, succession continues to the Fraxinus pennsylvanica/Prunus virginiana, Acer negundo/Prunus virginana, or the Juniperus scopulorum/Cornus sericea habitat type. In other instances, this community type may be successional to the Salix geyeriana/Calamagrostis canadensis habitat type or the Salix lutea/Calamagrostis canadensis habitat type, depending upon elevation.

On sites that are relatively undisturbed, the understory of the Populus angustifolia community will contain a diverse, dense shrub layer. With moderate levels of grazing or browsing, there will be an increase in Symphoricarpos spp. and Rosa spp., with a decrease in other shrubs. If grazing or

browsing pressures continue and disturbance is severe enough, all shrubs can be eliminated and the understory will be converted to Populus angustifolia/Herbaceous community type dominated by species such as Poa pratensis, Phleum pratense, Bromus inermis, and Centaurea maculosa. Once the stand has converted from a shrub-dominated understory to one that is dominated by herbaceous species, the ability to return the site to its former state is very difficult (Hansen et al. 1995, Padgett et al. 1989, and Youngblood et al. 1985).

Because of the close proximity to streams and rivers and the flat topography, recreational developments and transportation corridors are common within this type and care must be taken when locating structures in order to avoid damage by flooding. Management should emphasize the importance of the understory shrub layer in streambank stabilization; a buffer strip of the Populus trichocarpa dominated community types should be maintained adjacent to rivers and streams. Under certain conditions, fire may be used as a tool to extend the life span or rehabilitate a stand. The presence of native shrubs and forbs is indicative of the site's potential. Once this native component is eliminated, the success of rehabilitation efforts is questionable (Hansen et al. 1995).

CLASSIFICATION COMMENTS Classification based on ten stands in Montana, ten stands in Utah, ten stands in Colorado, and ten stands in Idaho.

EDITION 95-09-20

AUTHOR L. Williams

POPULUS TREMULOIDES/CORNUS SERICEA

COMMON NAME QUAKING ASPEN/RED-OSIER DOGWOOD

PHYSIOGNOMIC TYPE Forest

SIMILAR COMMUNITIES Populus tremuloides/Cornus sericea is similar to many other communities where Cornus sericea is the dominant shrub and Populus tremuloides is usually present but not dominant. These communities include Populus species (Populus trichocarpa, P. angustifolia, P. deltoides)/Cornus sericea, Populus trichocarpa/Alnus incana-Cornus sericea, and Alnus incana/Cornus sericea (Kovalchik 1993, Hansen et al. 1995, Manning and Padgett 1995, Crowe and Clausnitzer 1997, Hall and Hansen 1997). They are usually on sites less favorable to Populus tremuloides dominance such as lower elevations or cobble bars. Conifer species (e.g. Abies lasiocarpa, Picea species, Pinus ponderosa, Pseudotsuga menziesii)/Cornus sericea communities often have noticeable Populus tremuloides cover, indicating its possible prior dominance (Kovalchik 1993, Hansen et al. 1995, Manning and Padgett 1995, Crowe and Clausnitzer 1997, Hall and Hansen 1997). Other communities maybe successionally related to Populus tremuloides/Cornus sericea including Populus tremuloides/Betula occidentalis, Betula occidentalis/Cornus sericea, and Alnus incana-Cornus sericea/Mesic forb (Manning and Padgett 1995, Crowe and Clausnitzer 1997). Similarly, overgrazing may promote the disclimax Populus tremuloides/Poa pratensis community type (Hansen et al. 1995, Hall and Hansen 1997).

RANGE The Populus tremuloides/Cornus sericea community is a major type known from eastern and southern Idaho, east-central Nevada, Montana, and the Okanogan Highlands of northeastern Washington (Kovalchik 1993, Hansen et al. 1995, Manning and Padgett 1995, Hall and Hansen 1997). It may also be present in eastern Oregon, being lumped with stands of Populus tremuloides/Alnus incana-Cornus sericea (Crowe and Clausnitzer 1997). In Idaho it is known from the Salmon River, Teton River, Henry's Fork, Silver Creek, Portneuf River, and Boise River drainages (Collins 1979, Jankovsky-Jones 1996, Jankovsky-Jones 1997b).

ENVIRONMENTAL DESCRIPTION Populus tremuloides/Cornus sericea is found from low foothills and floodplains to high mountain valleys throughout its range. Elevations are as low as 730 m in Montana, 945 m in northeast Washington, and 940 m in the Boise River area of Idaho (Kovalchik 1993, Hansen et al. 1995, Moseley 1998). Mid-elevation sites are along mountain rivers, ranging from 1085 m on the Salmon River to 1470 m on the Henry's Fork in Idaho (Collins 1979, Jankovsky-Jones 1996). Elevations are as high as 2100 m in Montana, 2200 m in eastern Idaho, and 2300 m in Nevada (Hansen et al. 1995, Manning and Padgett 1995, Hall and Hansen 1997). Populus tremuloides/Cornus sericea is typically in narrow to broad U or V-shaped valleys, canyons, and floodplains which are seasonally flooded (Hansen et al. 1995, Hall and Hansen 1997). It is often along stable, low to moderate gradient streams (less than 3 percent to 8 percent slope) on alluvial terraces or canyon colluvium, but can also be near seeps and springs (Kovalchik 1993, Manning and Padgett 1995, Jankovsky-Jones 1996, Moseley 1998). The community is sometimes found away from streams but usually in moist areas (such as depressions or old channels). These areas typically have a near-surface water table in the spring which drops up to 2 m by late summer.

Populus tremuloides/Cornus sericea is usually on Mollisol soils (Aquolls, Borolls, Haploxerolls) but also sometimes Entisols (shallow Fluvents, Aquic Xerofluvents) (Hansen et al. 1995, Manning and Padgett 1995). These Mollisol soils may have a surface muck layer derived from leaf litter and occasionally have enough organic matter to be Sapric Histisols (Kovalchik 1993, Hall and Hansen 1997). Soils are usually derived from coarse to fine alluvium (occasionally colluvium or ash) overlying river gravels and cobbles. Soil textures are sandy-skeletal, loamy skeletal, fine-loamy, silty loam, or organic loam which have low to high water holding capacity (Kovalchik 1993, Hansen et al. 1995, Manning and Padgett 1995, Hall and Hansen 1997).

MOST ABUNDANT SPECIES

Strata	Species
Tree canopy	Populus tremuloides
Tall shrub	Cornus sericea
Short shrub	Symphoricarpos spp., Rosa spp
Herbaceous	Equisetum spp., Actaea rubra, Smilacina species

VEGETATION DESCRIPTION Due to its broad geographical range, Populus tremuloides/Cornus sericea has variable vegetation. The dominant species are Populus tremuloides with cover 30 to 85 percent (100 percent constancy) and Cornus sericea cover 15 to 84 percent (constancy 67 to 100 percent) (Collins 1979, Kovalchik 1993, Hansen et al. 1995, Manning and Padgett 1995, Jankovsky-Jones 1996, Hall and Hansen 1997, Moseley 1998). In

northern areas, sub-dominant trees include Populus trichocarpa and Betula papyrifera while conifers, such as Picea engelmannii or Abies species, may be present elsewhere. Other tall shrubs, sometimes mixed with Cornus sericea (all with cover less than 40 percent and constancy less than 50 percent), include Salix species (usually Salix bebbiana), Betula occidentalis, Alnus incana, Prunus virginiana, and Crataegus douglasii. The low shrub understory is typically dominated by Rosa woodsii (or other Rosa species) (up to 20 percent cover and 100 percent constancy) and Symphoricarpos albus (sometimes Symphoricarpos occidentalis) (up to 20 percent cover and 83 percent constancy) (Collins 1979, Kovalchik 1993, Jankovsky-Jones 1996, Hall and Hansen 1997, Jankovsky-Jones 1997c). The herbaceous understory is dominated by forbs which vary from low to moderate cover depending on the density of Cornus sericea. The most common species, all with cover less than 15 percent but sometimes high constancy, are Equisetum species (Equisetum arvense and E. hyemale), Actaea rubra, Smilacina species, Galium species (Galium triflorum and G. aparine), and Urtica dioica. Other forbs which are sometimes encountered include Viola species, Taraxacum officinale, Osmorhiza chilensis, Geum macrophyllum, and Thalictrum species (Collins 1979, Kovalchik 1993, Hansen et al. 1995, Manning and Padgett 1995, Jankovsky-Jones 1996, Hall and Hansen 1997, Jankovsky-Jones 1997c, Moseley 1998). The graminoid layer has sparse cover, low diversity, and is dominated by exotic species. The common exotic grasses are Bromus species (usually Bromus inermis with up to 10 percent cover), Agrostis stolonifera, and Poa pratensis. Even less common are native graminoids including Calamagrostis canadensis, Bromus ciliatus, Carex species, and Elymus glaucus. The ground cover is predominantly litter (thickest where not flooded) with less than 5 percent cover of rocks (Kovalchik 1993, Manning and Padgett 1995, Moseley 1998).

WILDLIFE VALUES Populus tremuloides/Cornus sericea has high wildlife cover and forage value during most of year. Populus tremuloides suckers, buds, and bark are often heavily browsed by beaver, rabbits, moose, deer, small mammals, and elk (Hansen et al. 1995, Manning and Padgett 1995, Crowe and Clausnitzer 1997, Hall and Hansen 1997, Ogle 1997). Moose also utilize Cornus sericea though its density may reduce use. Numerous bird species nest and feed in aspen including grouse, flickers, red-breasted nuthatches, chickadees, sapsuckers, grosbeaks, crossbills, and woodpeckers (Hansen et al. 1995, Crowe and Clausnitzer 1997, Hall and Hansen 1997). The roots and vegetation of this community often overhang streams providing excellent fish cover.

OTHER NOTEWORTHY SPECIES Exotic species can be common in this community, possibly due to historic livestock grazing, recreation impacts, or flooding disturbance. Commonly encountered species include Poa pratensis, Taraxacum officinale, Agrostis stolonifera, Phleum pratense, Cirsium arvense, Bromus inermis, Phalaris arundinacea, Agropyron repens, Dactylis glomerata, Poa palustris, Arctium minus, and Rumex crispus (Collins 1979, Kovalchik 1993, Hansen et al. 1995, Manning and Padgett 1995, Jankovsky-Jones 1996, Hall and Hansen 1997, Moseley 1998).

ADJACENT COMMUNITIES Communities with similar moisture adjacent to Populus tremuloides/Cornus sericea include other Populus tremuloides, Alnus incana, Salix species, or Populus species dominated communities with Rosa woodsii, Salix lutea, Cornus sericea, Prunus virginiana, and Crataegus douglasii in the understory (Jankovsky-Jones 1996, Manning and

Padgett 1995, Hall and Hansen 1997). Wetter sites range from saturated Typha species, Scirpus species, Eleocharis palustris, Carex utriculata, and Phalaris arundinacea communities to Populus tremuloides/Carex lanuginosa, Alnus incana, Cornus sericea, Salix exigua, or Spiraea douglasii communities (Kovalchik 1993, Hansen et al. 1995, Hall and Hansen 1997). Adjacent drier riparian sites include Populus tremuloides/Symphoricarpos albus or Pseudotsuga menziesii/Symphoricarpos albus (Kovalchik 1993). Neighboring upland communities include pinyon-juniper, Abies concolor, Pseudotsuga menziesii, Picea engelmannii, Pinus contorta, and Artemisia tridentata shrub-steppe communities (Hansen et al. 1995, Manning and Padgett 1995, Moseley 1998).

CONSERVATION RANK G4 S4

SUCCESSION AND MANAGEMENT Several shrub communities appear to be early seral or transitional to Populus tremuloides/Cornus sericea. These communities, which colonize sites with less developed soils and recently deposited alluvium, include Alnus incana, Betula occidentalis, Salix species, and Populus trichocarpa or Populus angustifolia dominated types often with a Cornus sericea understory (Hansen et al. 1995, Hall and Hansen 1997). Similarly, the loss of Betula occidentalis from the early seral Populus tremuloides/Betula occidentalis community would likely result in a Populus tremuloides/Cornus sericea community (Collins 1979, Manning and Padgett 1995). Though Populus tremuloides/Cornus sericea is on sites too wet for conifer dominance, changes in hydrology would result in movement toward conifer species (e.g. Abies lasiocarpa, Picea species, Picea engelmannii, Pinus ponderosa, Pseudotsuga menziesii) dominance (Kovalchik 1993, Hansen et al. 1995, Manning and Padgett 1995, Crowe and Clausnitzer 1997, Hall and Hansen 1997). For example, overgrazing by livestock and wildlife may reduce Populus tremuloides and shrubs, thus, promoting weedy herbaceous species and resulting in the disclimax Populus tremuloides/Poa pratensis type (Hansen et al. 1995, Hall and Hansen 1997). Populus tremuloides/Cornus sericea provides low to moderate livestock forage due to shading by overstory shrubs. However, livestock will bed in the shade of this community causing trampling, soil compaction, and weed invasion. Livestock also browse both Populus tremuloides root suckers and Cornus sericea. Overgrazing will lower their vigor, eventually eliminating them from the site (Hansen et al. 1995, Hall and Hansen 1997, Ogle 1997). Populus tremuloides is intolerant of shade and reproduces mainly by clonal root suckers, but also by seeds germinating on moist mineral soil (Crowe and Clausnitzer 1997). Cornus sericea also reproduces from root resprouting. Populus tremuloides suckers grow best and proliferate after moderate intensity fire or overstory tree removal, though, high intensity fires kill the roots. Fires are rare in this moist community, but most young trees die after a fire (though older trees resist some fires). Trunk fire damage, however, allows insect or fungal species into trees which can eventually kill them (Hansen et al. 1995, Crowe and Clausnitzer 1997, Hall and Hansen 1997). In order for the community to recover after fire or logging, livestock grazing of root suckers must be eliminated for at least three years (Ogle 1997). Though beneficial for Populus tremuloides reproduction, logging for the limited lumber, fenceposts, or fuel wood is often not compatible with wet, compactible soil (Hansen et al. 1995, Hall and Hansen 1997, Ogle 1997). Similarly, recreation values are high but development is not compatible due to site wetness. Both Populus tremuloides and Cornus sericea reduce erosion by slowing overland flow, providing woody debris, and stabilizing streambanks (Manning and Padgett 1995). They are also good for long-term

revegetation. Moreover, decomposition of their leaf litter improves soil nitrogen, organic matter, and fertility (Kovalchik 1993).

CLASSIFICATION COMMENTS Populus tremuloides/Cornus sericea is an accepted community with a large amount of supporting data throughout its range. However, Crowe and Clausnitzer (1997) described Populus tremuloides/Alnus incana-Cornus stolonifera [syn. Cornus sericea]. This community appears to be a variation of the Alnus incana-Cornus sericea/Mesic forb and possibly includes Populus tremuloides/Cornus sericea stands. Many other studies recognize similar communities which sometimes have Populus tremuloides as a co-dominant species. These communities are dominated by Betula occidentalis, various Populus or conifer species, or Alnus incana with a shrub layer dominated by Cornus sericea (Kovalchik 1993, Hansen et al. 1995, Manning and Padgett 1995, Crowe and Clausnitzer 1997, Hall and Hansen 1997). These communities are successionally related to Populus tremuloides/Cornus sericea and complicate classification. Classification of Populus tremuloides/Cornus sericea is based on 15 stands in Idaho (Collins 1979, Jankovsky-Jones 1996, Hall and Hansen 1997, Moseley 1998), 75 stands in Montana (Hansen et al. 1995), 6 stands in northeastern Washington (Kovalchik 1993), and 6 stands in Nevada (Manning and Padgett 1995). There are six records of the community tracked by Idaho Conservation Data Center (three with plot data), four of which are in protected areas (Cartier Slough Wildlife Management Area on Henry's Fork River, The Nature Conservancy's Silver Creek Preserve, Boise River Wildlife Management Area, and Portneuf Wildlife Management Area) (Collins 1979, Jankovsky-Jones 1996, Jankovsky-Jones 1997c, Moseley 1998).

EDITION 98-12-08

AUTHOR C. Murphy

POPULUS TREMULOIDES/CALAMAGROSTIS CANADENSIS

COMMON NAME QUAKING ASPEN/BLUEJOINT REEDGRASS

PHYSIOGNOMIC TYPE Forest

SIMILAR COMMUNITIES Similar communities are either structurally or successionally related to Populus tremuloides/Calamagrostis canadensis. They include: Alnus incana/Calamagrostis canadensis, Populus tremuloides/Alnus incana-Symphoricarpos albus, Populus tremuloides/Symphoricarpos albus, or communities dominated by conifer or Salix species with Calamagrostis canandensis understories (Crowe and Clausnitzer 1997). Calamagrostis canadensis is also nearly co-dominant in the Populus tremuloides/Carex lanuginosa community described by Kovalchik (1993) in eastern Washington and the Populus tremuloides/Carex aquatils community (Crowe and Clausnitzer 1997). Populus tremuloides/Calamagrostis canadensis is also related to the grazing disclimax Populus tremuloides/Poa pratensis (Hansen et al. 1995, Hall and Hansen 1997).

RANGE The Populus tremuloides/Calamagrostis canadensis community is an incidental type

known from eastern Idaho (Hall and Hansen 1997), Montana (Hansen et al. 1995), northeastern Oregon, (Crowe and Clausnitzer 1997), and apparently Colorado and Wyoming. The conservation status of this community, especially in the northern Rockies, is not well known.

ENVIRONMENTAL DESCRIPTION The Populus tremuloides/Calamagrostis canadensis community is found as low as 850 m in Montana (Hansen et al. 1995), but is generally a higher elevation type ranging from 1525 m in northeastern Oregon (Crowe and Clausnitzer 1997) to over 1965 m in Montana and eastern Idaho (Hall and Hansen 1997). It is found in wet basins and on alluvial terraces adjacent to moderate gradient streams and rivers. The community is on fine to coarse textured alluvial soils with many coarse fragments which allow water to stay aerated as it moves easily through the soil (Hansen et al. 1995, Hall and Hansen 1997). Soils include silt and clay loams and may be Entisols (Fluvents) or Mollisols (Borolls) (Hansen et al. 1995, Crowe and Clausnitzer 1997, Hall and Hansen 1997). Based on vegetation composition, this community is a relatively moist Populus tremuloides type. Sites have surface water tables in spring which may drop to over 1 m deep by mid-summer.

MOST ABUNDANT SPECIES

Strata	Species
Tree canopy	Populus tremuloides
Short shrub	Symphoricarpos albus, Rosa woodsii
Herbaceous	Calamagrostis canadensis, Equisetum arvense

VEGETATION DESCRIPTION The Populus tremuloides/Calamagrostis canadensis community is dominated by an overstory of Populus tremuloides with 52 to 63 percent cover and 100 percent constancy (Hansen et al. 1995, Crowe and Clausnitzer 1997, Hall and Hansen 1997). There are sometimes understory trees, mainly Populus tremuloides (34 percent cover), but also Pinus contorta, Picea engelmannii, Abies lasiocarpa, and Abies grandis (Crowe and Clausnitzer). Occasionally, the tall shrub Alnus incana (1 to 20 percent cover and 33 percent constancy) is present. The low shrub layer varies from low to high cover. It is dominated by Symphoricarpos albus (1 to 30 percent cover, 33 percent constancy) and sometimes Rosa woodsii with 20 percent cover (Hansen et al. 1995, Crowe and Clausnitzer 1997, Hall and Hansen 1997). The herbaceous layer is a lush mix of mesic forbs and graminoids, the most common species being Calamagrostis canadensis with 60 to 64 percent cover and 100 percent constancy. Phleum pratense and Deschampsia cespitosa may have constancy up to 67 percent but cover under 20 percent (Hansen et al. 1995, Crowe and Clausnitzer 1997, Hall and Hansen 1997). Other important graminoids, all with about 10 percent cover, include Trisetum canescens, Carex scopulorum, Carex lenticularis, and Carex utriculata. Carex athrostachya, Trisetum wolfii, and Bromus ciliatus may also be present with low cover. The most common forbs are Equisetum arvense with 15 to 20 percent cover and Aster species (Aster foliaceus or A. occidentalis) with 7 to 11 percent cover (Hansen et al. 1995, Crowe and Clausnitzer 1997, Hall and Hansen 1997). Other forbs with low cover but high constancy include Aconitum columbianum and Fragaria virginiana. Forbs which sometimes have high cover (over 20 percent) with low constancy include Senecio foetidus, Actaea rubra, and Heracleum lanatum. Other forbs with low cover and constancy are Ranunculus uncinatus, Trautvettaria caroliniensis, Smilacina stellata, Angelica arguta, and Geranium species (Hansen et al. 1995, Crowe and Clausnitzer 1997, Hall and Hansen 1997).

WILDLIFE VALUES Populus tremuloides/Calamagrostis canadensis has high value as wildlife cover and forage, especially during spring, fall, and winter. Populus tremuloides suckers, buds, leaves, and bark are often heavily browsed by beaver, rabbits, moose, deer, porcupines, small mammals, and elk (Hansen et al. 1995, Crowe and Clausnitzer 1997, Hall and Hansen 1997). In addition, elk commonly utilize Calamagrostis canadensis in the summer (Hansen et al. 1995). Numerous bird species nest and feed in aspen including grouse, flickers, red-breasted nuthatches, chickadees, sapsuckers, grosbeaks, crossbills, and woodpeckers (Hansen et al. 1995, Crowe and Clausnitzer 1997, Hall and Hansen 1997). Excellent fish habitat is found in this community because its roots stabilize undercut streambanks and the vegetation overhangs streams.

OTHER NOTEWORTHY SPECIES Exotic species known from the Populus tremuloides/Calamagrostis canadensis community include: Phleum pratense, Poa palustris, Poa pratensis, and Taraxacum officinale (Hansen et al. 1995, Crowe and Clausnitzer 1997, Hall and Hansen 1997).

SUCCESSION AND MANAGEMENT Populus tremuloides/Calamagrostis canadensis is a stable, self-perpetuating community type unlikely to be seral to conifer dominated communities with Calamagrostis canadensis understories (Crowe and Clausnitzer 1997). It may originate from a moister community, such as Salix species/Calamagrostis canadensis or Alnus incana/Calamagrostis canadensis, which has become slightly drier through hydrologic alteration (Hansen et al. 1995, Crowe and Clausnitzer 1997, Hall and Hansen 1997). Heavy, sustained grazing will decrease cover and reproduction of both Populus tremuloides and Calamagrostis canadensis, thus, converting the community to the grazing disclimax Populus tremuloides/Poa pratensis (Hansen et al. 1995, Hall and Hansen 1997). If site conditions dry, due to grazing-induced stream downcutting or natural hydrologic changes, the community may move toward Populus tremuloides/Symphoricarpos albus and eventually a conifer-dominated community (Crowe and Clausnitzer 1997).

ADJACENT COMMUNITIES Wetter communities adjacent to Populus tremuloides/Calamagrostis canadensis may include Alnus incana, Salix drummondiana, Carex utriculata, and Populus trichocarpa types (Hansen et al. 1995, Hall and Hansen 1997). Adjacent upland communities are dominated by conifers such as Abies grandis (Crowe and Clausnitzer 1997), Abies lasiocarpa, Picea engelmannii, or Pseudotsuga menziesii (Hansen et al. 1995, Hall and Hansen 1997).

CONSERVATION RANK G3 S4

SUCCESSION AND MANAGEMENT Populus tremuloides/Calamagrostis canadensis usually provides minor livestock forage; however, livestock will bed in the shade of this community causing trampling, soil compaction, and weed invasion (Hansen et al. 1988). Calamagrostis canadensis is moderately to highly palatable to livestock, especially in the spring (Hansen et al. 1995, Hall and Hansen 1997). Livestock also browse Populus tremuloides root suckers. However, spring grazing, when conditions are moist and plants are reproducing, should

be avoided to prevent soil damage and decreases in both Populus tremuloides and Calamagrostis canadensis. Sustained grazing pressure decreases Calamagrostis canadensis vigor, reproduction, and competitive ability, thus promoting Poa pratensis, other exotics, and grazing tolerant forbs (Hansen et al. 1988, Hansen et al. 1995, Hall and Hansen 1997). Populus tremuloides is intolerant of shade and though mainly reproducing by clonal root suckers, also produces seeds which germinate on moist mineral soil (Crowe and Clausnitzer 1997). Populus tremuloides suckers grow best and proliferate after moderate intensity fire or overstory tree removal, though, high intensity fires kill the roots. Most young trees die after a fire, though older trees resist some fires. Fire damage to trunks, however, allows insect or fungal species into trees, sometimes eventually killing them (Crowe and Clausnitzer 1997). Calamagrostis canadensis is also an effective colonizer of moist, burned sites due to both seed and rhizome reproduction mechanisms (Hansen et al. 1988, Hansen et al. 1995, Hall and Hansen 1997). In order for the community to recover after fire or logging, livestock grazing of root suckers must be eliminated until trees can withstand grazing. Though beneficial for Populus tremuloides reproduction, logging for the limited lumber or fuel wood is often not compatible with wet, compactible soils (Hansen et al. 1995, Hall and Hansen 1997). Recreation values are high but development is not compatible due to site wetness. Both Populus tremuloides and Calamagrostis canadensis reduce erosion by slowing overland flow and stabilizing streambanks with roots. They are also good for long-term revegetation (Hansen et al. 1988, Hansen et al. 1995, Hall and Hansen 1997).

CLASSIFICATION COMMENTS Populus tremuloides/Calamagrostis canadensis is not easily confused with other communities unless stands are disturbed or in successional transition. For example, overgrazing by livestock will increase Poa pratensis and move the community toward Populus tremuloides/Poa pratensis (Hansen et al. 1995, Hall and Hansen 1997). If environmental conditions are changing, cover of shrubs or other graminoids may increase in the Populus tremuloides/Calamagrostis canadensis community. Resulting transitional stands may be confused with similar communities such as: Alnus incana/Calamagrostis canadensis, Populus tremuloides/Carex lanuginosa, Populus tremuloides/Carex aquatilis, Populus tremuloides/Symphoricarpos albus, Populus tremuloides/Alnus incana-Symphoricarpos albus, or those dominated by conifer or Salix species with Calamagrostis canandensis understories (Crowe and Clausnitzer 1997).

Populus tremuloides/Calamagrositis canadensis is based on three plots in northeastern Oregon (Crowe and Clausnitzer 1997) and six stands in Montana (Hansen et al. 1995). It has been observed in eastern Idaho but plot data is limited (Hall and Hansen 1997). Unknown numbers of stands have been sampled in Colorado or elsewhere.

EDITION 99-01-12

AUTHOR C. Murphy

POPULUS TRICHOCARPA/CORNUS SERICEA

COMMON NAME BLACK COTTONWOOD/RED-OSIER DOGWOOD

PHYSIOGNOMIC TYPE Forest

SIMILAR COMMUNITIES May be the same as Populus trichocarpa/Cornus sericea-Salix in Oregon.

RANGE The Populus trichocarpa/Cornus sericea community type occurs in Montana, Washington, Idaho, and Oregon.

ENVIRONMENTAL DESCRIPTION The community occurs on point bars, side bars, mid-channel bars, delta bars, and islands. Soil textures vary from loam to coarse sand and are generally well drained with a low available water holding capacity. These sites are often flooded in the spring with water tables lowering to three or more feet below the soil surface at the end of summer; upper soil profiles remain moist due to capillary action. Coarse textured soils, moderate stream gradients, and high coarse fragment contents throughout the soil profile provide an environment that produces a rapid movement of highly aerated groundwater. Redox concentrations (mottles) are common as evidence of a fluctuating water table (Kovalchik et al. 1993, Hansen et al. 1995).

MOST ABUNDANT SPECIES

Strata	Species
Tree canopy	Populus trichocarpa
Tall shrub	Cornus sericea
Short shrub	Rosa spp., Symphoricarpos spp.
Herbaceous	Smilacina stellata, Equisetum spp.

VEGETATION DESCRIPTION Populus trichocarpa/Cornus sericea community type is characterized by an overstory dominated by Populus trichocarpa (25-85 percent cover) with Populus angustifolia and Populus balsamifera sometimes occurring as subordinates in the eastern portion of the range and Betula papyrifera and Populus tremuloides occurring as subordinates in the western portion of the range. The dense shrub layer is diverse and dominated by Cornus sericea (20-90 percent cover). Amelanchier alnifolia, Symphoricarpos oreophilus, Alnus incana, Rosa woodsii, Salix exigua and other Salix species are often present. Smilacina stellata and Equisetum arvense are often present along with graminoids, none of which have high constancy.

WILDLIFE VALUES This community type provides valuable cover, shade, and food for a variety of species. Big game use may be high, depending upon the time of year. The spreading crown of Populus trichocarpa provides nesting sites for Haliaeetus leucocephalus (bald eagles), Pandion haliaetus (osprey), and Ardea herodias (great blue heron). Woodpeckers, great horned owls, wood ducks, and raccoons nest in trunk cavities. Beaver use both the cottonwood and dogwood vegetation for food and building material. Understory species provide food and cover for a variety of waterfowl, small birds, and mammals. The stream side location of this community type is very important in providing thermal cover, debris recruitment, and streambank stability for fish habitat (Hansen et al. 1995).

OTHER NOTEWORTHY SPECIES Information not available.

ADJACENT COMMUNITIES Adjacent wetter communities may be dominated by Salix exigua, S. lasiandra, S. drummondiana, S. geyeriana, Carex utriculata, C. buxbaumii, or a variety of Alnus incana or Typha latifolia dominated community types. Adjacent drier communities may be dominated by Populus trichocarpa types, or habitat types from the Pseudotsuga menziesii, Pinus ponderosa, Thuja plicata, and Juniperus scopulorum alliances (Hansen et al. 1995, Kovalchik et al. 1993, Boggs et al. 1990).

CONSERVATION RANK G3 S3

SUCCESSION AND MANAGEMENT In the absence of fluvial disturbance, succession continues to a variety of conifer dominated habitat types such as Pinus ponderosa, Pseudotsuga menziesii, Abies grandis, Picea spp., Thuja plicata, Tsuga heterophylla, Abies lasiocarpa, or Juniperus scopulorum. If conifers are absent, shrubs and herbaceous species that formed the former undergrowth may persist. Stands in moister regions are successional to habitat types from the Populus tremuloides, Thuja plicata series, and the Picea/Cornus sericea habitat types. In other instances, this community type may be successional to the Salix geyeriana/Calamagrostis canadensis habitat type or the Salix lutea/Calamagrostis canadensis habitat type, depending upon elevation. If disturbance is severe enough, all shrubs can be eliminated and the understory will be converted to a herbaceous one dominated by species such as Poa pratensis, Phleum pratensis, Bromus inermis, and Centaurea maculosa (Hansen et al. 1995).

Because of the close proximity to streams and rivers and the flat topography, recreational developments and transportation corridors are common within this type; care must be taken when locating structures in the floodplain to avoid damage by floods or loss. Management should emphasize the importance of the understory shrub layer in streambank stabilization; a buffer strip of the Populus trichocarpa dominated community types should be maintained adjacent to rivers and streams. Under certain conditions, fire may be used as a tool to extend the life span or rehabilitate a stand (Hansen et al. 1995, Boggs et al. 1990).

CLASSIFICATION COMMENTS Classification is based on 60 stands in Montana, 8 stands in Oregon, and an unknown number of stands in Idaho.

EDITION 95-08-07

AUTHOR L. Williams

POPULUS TRICHOCARPA/RECENT ALLUVIAL BAR

COMMON NAME BLACK COTTONWOOD/RECENT ALLUVIAL BAR

PHYSIOGNOMIC TYPE Forest

SIMILAR COMMUNITIES Populus trichocarpa/Recent Alluvial Bar is very similar to other frequently flooded communities such as Populus/Stream Bar (Manning and Padgett et al. 1995), Populus angustifolia/Bar (Padgett et al. 1989), and Populus (either Populus deltoides or P.

angustifolia)/Recent Alluvial Bar (Hansen et al. 1995, Hall and Hansen 1997). Slightly higher terraces that have less frequent flooding may quickly develop shrubby understories under young Populus trees. These early understories are often damaged by floods or ice resulting in stands resembling Populus trichocarpa/Recent Alluvial Bar. These early and mid-seral stands include Populus trichocarpa/Rhamnus species, Populus trichocarpa/Symphoricarpos albus (or Symphoricarpos occidentalis), Populus trichocarpa/Cornus sericea, Populus/Salix species, and other analagous types dominated by Populus angustifolia or P. deltoides (Moseley and Bursik 1994, Hansen et al. 1995, Weixelman et al. 1996, Hall and Hansen 1997).

RANGE Populus trichocarpa/Recent Alluvial Bar is a major community type described from throughout Idaho and western Montana (Hansen et al. 1995, Hall and Hansen 1997). In Idaho the community is known from larger rivers with intact hydrologic processes such as the Kootenai, Big and Little Wood, St. Joe, Salmon, Coeur D'Alene, Big Lost, and St. Maries rivers (Moseley and Bursik 1994, Jankovsky-Jones 1997a, 1997b, 1997c, Jankovsky-Jones 1998b, 1998c). The very similar Populus/Stream Bar community type, containing stands dominated by Populus trichocarpa, is described in Nevada (Manning and Padgett 1995). Populus trichocarpa/Recent Alluvial Bar is probably found throughout the tree species range along larger naturally functioning rivers in Washington, Oregon, California, British Columbia, Alaska, and elsewhere hydrologic processes which produce recent alluvial bars essential for Populus trichocarpa reproduction. This community was historically common but is now much rarer because many rivers have been dammed, diverted, channelized, diked, rip-rapped, dredged, or otherwise altered to prevent frequent flooding, channel migration, and alluvial deposition. When these hydrologic processes are curtailed the community is less likely to persist (Moseley and Bursik 1994, Jankovsky-Jones 1997c, Jankovsky-Jones 1998c). In addition, many older Populus trichocarpa stands have been logged for wood products or conversion of bars and islands to pasture or agriculture.

ENVIRONMENTAL DESCRIPTION Populus trichocarpa/Recent Alluvial Bar is found on narrow to broad valley floodplains of major streams (often meandering, with low to high gradients) at low to mid-elevations. It is found from 550 to 850 m elevation in northern Idaho and western Montana (Moseley and Bursik 1994, Hansen et al. 1995, Jankovsky-Jones 1997a, Jankovsky-Jones 1998c); at 1120 m on Salmon River (Jankovsky-Jones 1998b; and from 1460 m to over 2100 m in Montana, Nevada, and south and east Idaho (Hansen et al. 1995, Manning and Padgett 1995, Hall and Hansen 1997, Jankovsky-Jones 1997a and 1997c). Populus trichocarpa/Recent Alluvial Bar is found within floodplains and channels on point bars, side bars, mid-channel bars, deltas, and islands where frequent flooding (nearly every year) deposits fresh alluvium (Moseley and Bursik 1994, Manning and Padgett 1995, Hansen et al. 1995, Hall and Hansen 1997, Jankovsky-Jones 1998c). Soils, thus, range from coarse loamy or sandy-skeletal (Manning and Padgett 1995, Hansen et al. 1995, Hall and Hansen 1997) to predominantly river cobble and gravel with fines removed by scouring (Moseley and Bursik 1994, Jankovsky-Jones 1998c). Soils are shallow, well-drained Entisols (Fluvents) overlying gravel and cobble with the water table at the surface during spring flood, dropping 50 cm by late summer (Manning and Padgett 1995, Hansen et al. 1995, Hall and Hansen 1997).

MOST ABUNDANT SPECIES

Strata	Species

Tree canopy	Populus trichocarpa
Tall shrub	Alnus incana, Salix spp.
Herbaceous	Phalaris arundinacea, Agrostis stolonifera, Tanacetum vulgare, Chrysanthemum leucanthemum, Centaurea maculosa, Equisetum arvense

VEGETATION DESCRIPTION Populus trichocarpa/Recent Alluvial Bar is an early seral community dominated by Populus trichocarpa. Stands are mostly even-aged with cohorts ranging from seedling and sapling thickets (less than 5 cm dbh, 2 to 3 m tall) to older, pole size tree woodlands (about 30 cm dbh, up to 20 m tall) (Moseley and Bursik 1994, Hansen et al. 1995, Manning and Padgett 1995, Hall and Hansen 1997, Jankovsky-Jones 1998c). Populus trichocarpa cover ranges from 40 to 98 percent with constancy over 50 percent. Other trees, such as Populus angustifolia, Populus deltoides, Populus hybrids, and conifers, are occasionally present with low cover. There is a sparse and patchy tall-shrub layer composed of Salix exigua (or other Salix species) and Alnus incana (each usually less than 10 percent cover) with occasional Amelenchier alnifolia and Cornus sericea. A few low shrubs, such as Rosa woodsii and Symphoricarpos albus, may also be present (usually with low cover and constancy) (Moseley and Bursik 1994, Hansen et al. 1995, Manning and Padgett 1995, Hall and Hansen 1997, Jankovsky-Jones 1998c). The herbaceous understory usually has low cover. Instead, rock cover is typically over 30 percent with bare soil and gravel over 20 percent cover combined. The understory is dominated by exotic, weedy forbs and grasses which are usually rhizomatous perennials or biennials able to withstand, and thrive with, annual flooding disturbance. Common exotic forbs, all with 10 percent or less cover, include: Centaurea maculosa, Chrysanthemum leucanthemum, Hypericum perforatum, Medicago species, Melilotus species, Prunella vulgaris, Tanacetum vulgare, Taraxacum officinale, Trifolium species, Verbascum species, and Vicia americana (Moseley and Bursik 1994, Hansen et al. 1995, Manning and Padgett 1995, Hall and Hansen 1997, Jankovsky-Jones 1998c). Native forbs, all usually with low cover and constancy, often include Achillea millefolium, Artemisia ludoviciana, Aster species, Castilleja miniata, Epilobium species, Equisetum arvense, Fragaria vesca, Heracleum lanatum, Smilacina stellata, Solidago canadensis, and Thalictrum occidentale. Exotic grass species include Agrostis stolonifera, Phalaris arundinacea (in some locations forming a dense and tall mat with over 90 percent cover), Phleum pratense, Poa palustris, and Poa pratensis (Moseley and Bursik 1994, Hansen et al. 1995, Manning and Padgett 1995, Hall and Hansen 1997, Jankovsky-Jones 1998c). Native grasses have even less cover and include Calamagrostis canadensis, Carex species, Elymus glaucus, and Muhlenbergia richardsonis. Moss is occasionally present.

WILDLIFE VALUES Populus trichocarpa/Recent Alluvial Bar is used for cover, shade, and food by numerous species of small mammals and ungulates such as deer (Hansen et al. 1995, Hall and Hansen 1997, Jankovsky-Jones 1998c). Beaver, especially, utilize Populus trichocarpa for food and building. Waterfowl may nest on bars and neo-tropical migrant songbirds (and other birds) utilize Populus trichocarpa and understory shrubs for nesting and foraging (Hansen et al. 1995, Hall and Hansen 1997).

OTHER NOTEWORTHY SPECIES Exotic species are relatively common on flood disturbed alluvial bars, though usually with low cover and constancy. They are usually perennial or biennial and include numerous nitrogen-fixing, leguminous species. Exotic species include:

Agropyron repens, Agrostis stolonifera, Centaurea maculosa, Chrysanthemum leucanthemum, Cirsium arvense, Euphorbia esula, Hypericum perforatum, Medicago species, Melilotus species, Phalaris arundinacea, Phleum pratense, Poa palustris, Poa pratensis, Prunella vulgaris, Tanacetum vulgare, Taraxacum officinale, Trifolium species, Verbascum species, and Vicia americana (Moseley and Bursik 1994, Hansen et al. 1995, Hall and Hansen 1997, Jankovsky-Jones 1997c, Jankovsky-Jones 1998c).

ADJACENT COMMUNITIES Populus trichocarpa/Recent Alluvial Bar is located between bare cobble/gravel shorelines and other alluvial bar communities such as Salix exigua/Barren, Agropyron smithii (on drier, sandy areas bars), and Alnus incana patches (Manning and Padgett 1995, Jankovsky-Jones 1997c, Jankovsky-Jones 1998c). Wetter communities, such as Carex (e.g. Carex nebrascensis or C. utriculata), Juncus balticus, Typha species, Eleocharis species, or Salix dominated types (e.g. Salix lutea, S. exigua, S. boothii, or S. geyeriana), may be adjacent in backwater areas, overflow channels, or sloughs (Hall and Hansen 1997, Jankovsky-Jones 1997c, Jankovsky-Jones 1998c). The neighboring higher alluvial bars, terraces, and islands support drier mid-seral Populus trichocarpa floodplain communities with understories dominated by a Cornus sericea, Rhamnus species, Symphoricarpos albus (or Symphoricarpos occidentalis), Salix species, Rosa woodsii, Poa pratensis, and mesic graminoid or forbs (Moseley and Bursik 1994, Hansen et al. 1995, Manning and Padgett 1995, Weixelman et al. 1996, Hall and Hansen 1997, Jankovsky-Jones 1997c, Jankovsky-Jones 1998c). Other floodplain communities, such as Betula occidentalis, Populus tremuloides, and Sarcobatus vermiculatus (on alkaline benches) types, may also be adjacent. In addition, many adjacent floodplain terraces, benches, and islands have been diked and converted to pasture grasses, agriculture, or weedy forb old fields (Jankovsky-Jones 1997c, Jankovsky-Jones 1998c). Adjacent uplands are often mixed conifer forests dominated by a variety of species such as Tsuga heterophylla, Thuja plicata, Pinus ponderosa (Pinus jeffreyi in western Nevada), Pseudotsuga menziesii, Abies grandis, Picea species, Abies lasiocarpa, Juniperus scopulorum, and pinyon-juniper (Moseley and Bursik 1994, Hansen et al. 1995, Manning and Padgett 1995, Hall and Hansen 1997). Artemisia tridentata steppe or Cercocarpus ledifolius communities may also be adjacent.

CONSERVATION RANK G? S3?

SUCCESSION AND MANAGEMENT The Populus trichocarpa/Recent Alluvial Bar community originates from, and is maintained by, frequent flooding (and ice flow damage) which removes understory vegetation and promotes Populus trichocarpa reproduction. Lateral migration (meandering) of stream channels, especially during floods, erodes banks and deposits fresh alluvium on point bars, side bars, and islands. Populus trichocarpa produces many reproductive suckers after flood damage on these bars. Moreover, its seeds germinate on the sunny, moist, and barren alluvium forming the early seral Populus trichocarpa/Recent Alluvial Bar community. The resulting pattern is one of even-aged stands which are progressively older (later seral states) as you go from active alluvial bars to higher bars further away on the floodplain (Moseley and Bursik 1994, Manning and Padgett 1995, Hansen et al. 1995, Hall and Hansen 1997). These older stands, on drier bars, terraces, and islands, are mid-seral Populus trichocarpa communities with understories dominated by Cornus sericea, Rhamnus species, or Salix species (Moseley and Bursik 1994, Hansen et al. 1995, Manning and Padgett 1995, Weixelman et al.

1996, Hall and Hansen 1997, Jankovsky-Jones 1997c, Jankovsky-Jones 1998c). With further disturbance, by livestock grazing or floods, secondary succession will produce Populus trichocarpa types with understories of Symphoricarpos albus (or Symphoricarpos occidentalis), Rosa woodsii, Poa pratensis, or mesic graminoids or forbs . If stream downcutting continues the community may become a drier conifer or shrub-steppe (e.g. Sarcobatus vermiculatus and Artemisia tridentata var. tridentata) type (Manning and Padgett 1995, Jankovsky-Jones 1997c). However, stream channel migration and large-scale floods may remove older communities and replace them with Populus trichocarpa/Recent Alluvial Bar (Moseley and Bursik 1994).

Early seral Populus trichocarpa/Recent Alluvial Bar communities are very important for reproduction and maintenance of floodplain Populus trichocarpa stands. This community does not produce large amounts of forage; however, livestock do browse Populus trichocarpa, especially when there is little else to eat. Though Populus trichocarpa produces many suckers and seedlings after flood damage, overgrazing of young stems and foliage will eventually eliminate Populus trichocarpa. Thus, post-flood stands should be protected from livestock (Hansen et al. 1995, Manning and Padgett 1995, Hall and Hansen 1997). Equally important is protection of the hydrologic processes which produce recent alluvial bars essential for Populus trichocarpa reproduction. This community only persists on natural, free-flowing rivers (e.g. not dammed or diverted) with unconfined banks (e.g. not channelized, rip-rapped, or diked) where frequent flooding and associated channel migration, erosion, and deposition still occur (Moseley and Bursik 1994, Jankovsky-Jones 1997c, Jankovsky-Jones 1998c). Likewise, other watershed activities, such as logging, road building, dredging, and development, can alter sediment inputs and the hydrologic system supporting this community. Elimination of these floodplain communities destabilizes the erodible streambanks and terrace soils because Populus trichocarpa effectively reduces flood erosion energy (Hansen et al. 1995, Hall and Hansen 1997). Populus trichocarpa communities, especially younger stands, are easily eliminated by wildfire (Moseley and Bursik 1994, Hansen et al. 1995, Hall and Hansen 1997). However, cuttings can be planted on recent alluvial bars for long-term revegetation. Though soils are not easily compacted, frequent flooding precludes any development in this community.

CLASSIFICATION COMMENTS Populus trichocarpa/Recent Alluvial Bar is sometimes lumped within the broader Populus/Stream Bar community dominated by either Populus trichocarpa or Populus angustifolia (Manning and Padgett 1995). In Montana and elsewhere, a similar situation exists where any one, or combination of, Populus species (Populus trichocarpa, P. angustifolia, and P. deltoides) may dominate stands. Though dominance is usually clear (species are generally separated by elevation and region), mixed Populus stands (or stands dominated by hybrids) are occasionally found, thus complicating community classification (Hansen et al. 1995, Hall and Hansen 1997). Populus trichocarpa/Recent Alluvial Bar is recognized by the lack of a well developed understory with consistent composition (the result of nearly annual flooding). However, identification is less clear when this community grades into other early or mid-seral stands (such as Populus trichocarpa/Rhamnus species, Populus trichocarpa/Symphoricarpos albus, or Populus trichocarpa/Cornus sericea) which have slightly less flooding frequency and more understory vegetation (Moseley and Bursik 1994, Hansen et al. 1995, Hall and Hansen 1997).

Classification of Populus trichocarpa/Recent Alluvial Bar is based on at least 4 stands with plot data in Idaho (Moseley and Bursik 1994, Jankovsky-Jones 1998c) and 21 stands in Montana (Hansen et al. 1995, Hall and Hansen 1997). Manning and Padgett (1995) sampled five stands of the very similar Populus/Stream Bar community (which includes Populus trichocarpa dominated stands) in central Nevada. In Idaho, eight locations (three with stand plot data) of Populus trichocarpa/Recent Alluvial Bar are on record at the Conservation Data Center. Three of these areas are protected (Hideaway Islands Research Natural Area, Spion Kop Research Natural Area, and St. Maries Wildlife Management Area) (Moseley and Bursik 1994, Jankovsky-Jones 1997b, Jankovsky-Jones 1998c).

EDITION 1999

AUTHOR C. Murphy

POPULUS TRICHOCARPA/ROSA WOODSII

COMMON NAME BLACK COTTONWOOD/WOOD'S ROSE

PHYSIOGNOMIC TYPE Forest

SIMILAR COMMUNITIES Padgett et al. (1989) described a Populus angustifolia/Rosa woodsii community from southern Utah, which appears similar to this. Hall and Hansen (1997) described a Populus trichocarpa/Symphoricarpos occidentalis community from eastern Idaho that has a relatively high cover of Rosa woodsii and may be related. Symphoricarpos spp. are not present or occur in low cover in the P. trichocarpa/Rosa woodsii type described here.

RANGE This type is known from northern Yellowstone NP, Wyoming, the lower Clearwater River canyon in north-central Idaho, and in scattered locations in southern and central Idaho.

ENVIRONMENTAL DESCRIPTION This type occurs on terraces and floodplains across a wide range of elevations, from below 1,000 feet in northern Idaho to above 6,000 feet in Wyoming and central Idaho. Stands can occur along small, steep-gradient streams, but are most common on larger streams and rivers with relatively low gradients. Valley bottoms range from narrow, V-shaped ones along small streams, to moderately wide bottoms in deep canyons, to broad floodplains in intermontane valleys.

In Wyoming, the soils have been described as being typically Cryofluvents composed of shallow to deep sand layers overlying river cobbles. Limited data there suggest that surface soils are moist in spring and early summer, and either remain moist or are dry by mid-summer (Chadde et al. 1988). In Idaho, the soils are similar sandy alluvial deposits overlying coarse cobbles (Asherin and Orme 1978).

MOST ABUNDANT SPECIES

Strata	Species

Tree canopy	Populus trichocarpa
Tall shrub	Rosa woodsii, Rhus rydbergii, Philadelphus lewisii, Crataegus douglasii
Herbaceous	Poa pratensis, Solidago gigantea, Equisetum arvense

VEGETATION DESCRIPTION Populus trichocarpa dominates the overstory tree layer. In Yellowstone NP, Picea engelmannii and Populus angustifolia were incidental, while in northern Idaho, Alnus rhombifolia was found occasionally in the overstory. Several shrubs, most notably Rosa woodsii, are present and form a dense understory layer. Rosa woodsii generally has greater than 15 percent cover, sometimes greater than 80 percent. Exceptions are some stands along narrow valley bottoms in canyons that are subject to frequent scouring by floods. All shrubs have low cover in these settings, and Rosa may have only 5 percent cover. The herb layer consists of a diversity of mesic-site forbs and grasses; most have low abundance values and many are exotic species.

WILDLIFE VALUES The Populus trichocarpa/Rosa woodsii community provides browse and forage for numerous mammals and bird species. Structural diversity is typically high due to multilayered vegetation, although can be only moderate in stands with low shrub cover. Rosehips are an important source of food for bears during the late summer and fall.

OTHER NOTEWORTHY SPECIES Information not available.

SUCCESSION AND MANAGEMENT The Populus trichocarpa/Rosa woodsii community has been considered a long-lived seral community, possibly resulting from heavy use by cattle (Asherin and Orme 1978) or native ungulates (Chadde et al. 1988). It is less clear that some stands sampled in southwestern Idaho resulted from heavy grazing. Asherin and Orme (1978) suggested that this may be a seral stage of Daubenmire's (1970) Populus trichocarpa/Cicuta douglasii habitat type. Chadde et al. (1988) suggest that conifers may form stable communities on sites in Yellowstone.

ADJACENT COMMUNITIES Adjacent upland sites support sagebrush-steppe and canyon grasslands. Adjacent riparian communities include other P. trichocarpa types, such as P. trichocarpa/Cornus sericea, Betula occidentalis, and various willow-dominated communities.

CONSERVATION RANK G4 S3

SUCCESSION AND MANAGEMENT Prolonged ungulate use results in a loss of some of the palatable shrubs and possibly an initial increase in Rosa. Continued use may result in an eventual conversion to structurally depauperate stands with few shrubs and high cover of Poa pratensis.

CLASSIFICATION COMMENTS Quantitatively defined by seven plots in Yellowstone NP (Chadde et al. 1988) and two plots in northern Idaho (Asherin and Orme 1978), supplemented with additional plots and observations from southern Idaho (e.g., Jankovsky-Jones 1997b).

EDITION 98-12-02

AUTHOR B. Moseley

POPULUS TRICHOCARPA/SALIX LUTEA

COMMON NAME BLACK COTTONWOOD/YELLOW WILLOW

PHYSIOGNOMIC TYPE Forest

SIMILAR COMMUNITIES Kaufman et al. (1985) describe a gravel bar/Salix spp./mixed forb community type from northeastern Oregon that has high cover of Populus trichocarpa saplings and Salix lutea. His stands may represent an early seral stage of the P. trichocarpa/Salix lutea community.

RANGE This type has been documented in central Nevada, northern Nevada and adjacent Idaho, and central Idaho. This type may also occur in northeastern Oregon.

ENVIRONMENTAL DESCRIPTION Stands of this community occupy stream bars and low benches that are generally flooded annually at high water in the spring. It can occur along small streams up to large rivers. Consequently, valley bottom widths range from narrow to broad (<50 yds to over 300 yds). Stream segments are classified as A1, A2, A3, B3, and C3. Elevations range from 5,000 to 7,400 feet.

Soils are young alluvial deposits, often with greater than 35 percent coarse fragments. The presence of Salix lutea, S. exigua, and Cornus sericea reflects high soil moisture, at least early in the growing season. These sites typically dry out as the stream level drops in the late summer (Manning and Padgett 1995).

MOST ABUNDANT SPECIES

Strata	Species
Tree canopy	Populus trichocarpa
Tall shrub	Salix lutea, Cornus sericea, Salix lasiandra, Prunus virginiana, Alnus incana
Short shrubs	Rosa woodsii, Ribes inerme, Ribes aureum
Herbaceous	Equisetum arvense, Elymus glaucus, Smilacina stellata, Solidago canadensis

VEGETATION DESCRIPTION Populus trichocarpa dominates the overstory, with Salix lutea dominating a structurally complex and usually dense understory layer. Other tall shrubs that occur in this layer include Salix lasiandra, Cornus sericea, Salix exigua, Salix geyeriana, Amelanchier alnifolia, Alnus incana, among others. Beneath the tall shrubs there is another diverse layer of shorter shrubs, including various Ribes spp. and Rosa woodsii. The herbaceous layer is sparse, probably because of the dense shade.

WILDLIFE VALUES This structurally diverse type provides habitat for wildlife and avian species.

OTHER NOTEWORTHY SPECIES Information not available.

SUCCESSION AND MANAGEMENT The successional dynamics in this community are unclear. Kaufman et al.'s (1985) gravel bar/Salix spp./mixed forb community type may represent an early seral stage of the P. trichocarpa/Salix lutea community.

ADJACENT COMMUNITIES Adjacent upland sites support sagebrush-steppe, Juniperus scopulorum woodlands, and pinyon-juniper woodlands. Adjacent riparian communities include other P. trichocarpa types and various willow-dominated communities.

CONSERVATION RANK G? S2

SUCCESSION AND MANAGEMENT The high shrub density typically limits livestock access, and they tend to only use narrow corridors through this community.

CLASSIFICATION COMMENTS Manning and Padgett (1995) describe a Populus/Salix community type from Nevada, which is dominated by either P. angustifolia or P. trichocarpa, depending on the geographic region of the state. Salix lutea is the shrub dominant in all but one stand. Their broad type includes the Populus trichocarpa/Salix lutea community described here. Four stands have been sampled in Idaho.

EDITION 98-12-02

AUTHOR B. Moseley

POPULUS TRICHOCARPA/SYMPHORICARPOS ALBUS

COMMON NAME BLACK COTTONWOOD/COMMON SNOWBERRY

PHYSIOGNOMIC TYPE Forest

SIMILAR COMMUNITIES The similar Populus trichocarpa/Symphoricarpos albus/Poa pratensis community type is described for central Oregon as successional to ponderosa pine (Kovalchik 1987).

RANGE This type has been described with plot data from the Blue and Wallowa mountains of northeastern Oregon and the Coeur d'Alene River drainage in northern Idaho (Moseley and Bursik 1994, Crowe and Clausnitzer 1997). One stand has been observed in west-central Idaho.

ENVIRONMENTAL DESCRIPTION This community type occurs on mid-elevation, gentle terraces along major rivers and streams in the mountains of central and northern Idaho and adjacent Oregon. Valley widths are usually broad (300-1,000 feet), but can be as narrow as 100

feet wide. Valleys are V-, flat- and trough-shaped with moderate gradients (2-5 percent) and often with steep sideslopes. Sites are on inactive floodplains and are infrequently flooded. The water table is generally deep. Mottling was evident on only one plot from Oregon. The community occupies deep alluvial soils of fine-textured surface horizons with sand, gravel, and rocks below (Moseley and Bursik 1994, Crowe and Clausnitzer 1997).

MOST ABUNDANT SPECIES

Strata	Species
Tree canopy	Populus trichocarpa
Tall shrub	Symphoricarpos albus, Crataegus douglasii
Herbaceous	Galium triflorum, Phalaris arundinacea, Elymus glaucus, Smilacina stellata, Poa pratensis

VEGETATION DESCRIPTION Populus trichocarpa dominates the overstory, with the potential for conifers to be present in all layers. Although irregular in occurrence, conifer species such as Pinus ponderosa, Abies grandis, Pseudotsuga menziesii, and Picea engelmannii, may indicate community potential on these terrace sites. The shrub component is dominated by Symphoricarpos albus with a diversity of other tall and medium shrubs scattered in the stands, the most prominent being Crataegus douglasii, Amelanchier alnifolia, Cornus sericea, and Philadelphus lewisii. The herbaceous layer is diverse, containing many forbs and perennial grasses, including both rhizomatous and caespitose species (Moseley and Bursik 1994, Crowe and Clausnitzer 1997).

WILDLIFE VALUES The shrub understory of this community type provides nesting habitat and food for both nongame and game birds while the overstory is used by woodpeckers, raptors, and other birds for foraging, nesting, and roosting (Crowe and Clausnitzer 1997).

OTHER NOTEWORTHY SPECIES Information not available.

ADJACENT COMMUNITIES Northern Idaho stands are adjacent to Tsuga heterophylla associations (Moseley and Bursik 1994), while Pseudotsuga menziesii and Purshia tridentata associations are adjacent to stands in west-central Idaho. Pseudotsuga menziesii, Pinus ponderosa, and Abies grandis association occur in the adjacent uplands in Oregon (Crowe and Clausnitzer 1997).

CONSERVATION RANK G3 S2

SUCCESSION AND MANAGEMENT The Populus trichocarpa/Symphoricarpos albus type usually occurs on inactive floodplains, which flood only episodically. This may result in eventual succession to a conifer type, although the terrace may get washed away from lateral movement of the channel before this happens (Moseley and Bursik 1994). Wildfire may also maintain this type, as has been documented from a 1931 fire in northern Idaho (Moseley and Bursik 1994) and a 1986 fire in west-central Idaho.

Understory cottonwood and shrubs are browsed by both domestic and wild ungulates.

Continuous and severe grazing results in a decline in the Symphoricarpos albus component, while Poa pratensis increases in abundance.

CLASSIFICATION COMMENTS Classification is based on 5 plots throughout the mountains of northeastern Oregon (Crowe and Clausnitzer 1997), 18 plots in Spion Kop RNA along the Coeur d'Alene River (Moseley and Bursik 1994), and 1 plot in Goodrich Creek RNA.

EDITION 97-12-31

AUTHOR B. Moseley

ALNUS INCANA/MESIC FORB

COMMON NAME MOUNTAIN ALDER/MESIC FORB SHRUBLAND

PHYSIOGNOMIC TYPE Shrubland

SIMILAR COMMUNITIES Kovalchik et al.'s (1993) Washington stands have shrub and tree composition similar to Idaho, Utah, and Nevada stands. The understory is somewhat distinct with Cinna latifolia, Streptopus amplexifolius, and Athyrium spp. having high constancy. Additionally, Kovalchik may have included some stands treated by Youngblood et al. (1989) as Alnus incana/Cornus sericea in the Alnus incana/Mesic forb type. Nevada stands are similar to Utah and southeastern Idaho stands (Manning and Padgett 1992). Hansen et al. (1995) treats all stands with Alnus incana as the dominant shrub as the Alnus incana dominance type.

RANGE Minor type in Montana, eastern Washington, Idaho, Nevada, Utah, Wyoming, and Colorado.

ENVIRONMENTAL DESCRIPTION The Alnus incana/Mesic forb community type occurs on terraces and floodplains adjacent to streams with bedloads of boulders, cobble, and gravel (Kovalchik 1993). Soils are generally shallow; surface textures range from sand to loamy sand. Mottling is typically present within 25 cm of the surface, indicating a seasonally high water table, and most sites remain somewhat moist and well-aerated through summer (Padgett et al. 1989, Kovalchik 1993).

MOST ABUNDANT SPECIES

Strata	Species
Tall shrub	Alnus incana
Herbaceous	Heracleum lanatum, Geranium richardsonii, Equisetum arvense, Aconitum columbianum, Galium triflorum,

VEGETATION DESCRIPTION Alnus incana clearly dominates the tall shrub overstory with over 40 percent cover. Conifers, including Abies lasiocarpa, Picea engelmannii and Pinus contorta, are sometimes present. The undergrowth is characterized by mixed forb cover of

Heracleum lanatum, Geranium richardsonii, Equisetum arvense, Mertensia spp., Aconitum columbianum, Galium triflorum, and Smilacina stellata with over 100 percent cover in combination. A somewhat sparse low shrub layer is often present and may include Lonicera involucrata, Ribes spp., and Rosa spp. The graminoids Glyceria elata, Agrostis stolonifera, Elymus glaucus, and Poa pratensis may contribute a combined cover of up to 50 percent.

WILDLIFE VALUES The high structural diversity provided by this type provides thermal and hiding cover for native ungulates including mule and white-tail deer. Numerous bird species make use of this type for food and nesting (Hansen et al. 1995).

OTHER NOTEWORTHY SPECIES Information not available.

ADJACENT COMMUNITIES Adjacent riparian community types may include the Populus angustifolia/Rosa woodsii, Populus/Grass, Conifer/Equisetum arvense, or Salix dominated types. Adjacent forested communities include those dominated by Picea engelmannii and Pseudotsuaga menziesii (Padgett et al. 1989, Hansen et al. 1995, Manning and Padgett 1992, Kovalchik 1993).

CONSERVATION RANK G3 G4 S1

SUCCESSION AND MANAGEMENT Some Alnus incana/Mesic forb sites may exist as stable seres, while others are successional to various tree- and shrub-dominated associations. Padgett et al. (1989) suggests a trend towards Abies lasiocarpa and Picea engelmanii types, or as sites become more xeric, Acer negundo types. In Montana, the Alnus incana community type is reported to become established after severe stream disturbance resulting from placer mining, annual ice jams, or historic tie drives. Hansen notes the Alnus incana community type may persist for a long time before finally being replaced by the Salix geyeriana or Salix lutea types, depending upon elevation. Other areas may see a gradual conversion to Pseudotsuga menziesii/Cornus sericea habitat type (Hansen et al. 1995). Grazing may result in the type being replaced by the Alnus incana/Mesic graminoid community type (Padgett et al. 1989).

Alnus incana is highly adapted to most forms of disturbance and may exist as a stable sere. Forage value for livestock is rated low to moderate; livestock grazing should be minimized to maintain these communities (Manning and Padgett 1992). Padgett et al. (1989) notes that because of typically open undergrowth, this community type is more likely to be impacted by livestock grazing. Alnus incana community types generally occur immediately adjacent to stream channels, and therefore, provide stability to streambanks and shade to the stream channel, as well as providing habitat for a variety of wildlife and avian species. Cool fires will not kill Alnus incana if the root crown does not burn and light fire can be used to rejuvenate older, decadent alder stands (Manning and Padgett 1992).

CLASSIFICATION COMMENTS Classification based on 50 stands in Colorado, 15 stands in Utah, 10 stands in Nevada, 22 stands in eastern Washington (may include some A. incana/Cornus sericea), and an unknown number of stands in Montana (classified as a dominance type).

EDITION 1996

AUTHOR L. Williams

ARTEMISIA CANA SSP. VISCIDULA/FESTUCA IDAHOENSIS

COMMON NAME SILVER SAGEBRUSH/IDAHO FESCUE

PHYSIOGNOMIC TYPE Shrubland

SIMILAR COMMUNITIES Manning and Padgett (1995) describe a broad type they called Artemisia cana/Dry graminoid that, in part, included a few stands from the Jarbidge Mountains area that fall into this type; the Artemisia cana/Festuca idahoensis. An Artemisia cana/Festuca ovina community described from Utah is similar in structure to this community but is restricted to elevations above 9,200 feet (Padgett et al. 1989).

RANGE This type occurs in central and southwestern Montana (Mueggler and Stewart 1980, Hansen et al. 1995), western Wyoming (Bramble-Brodahl 1978, Mutz and Graham 1982, Youngblood et al. 1985), central and eastern Idaho (Schlatterer 1972, Tuhy 1981, Tuhy and Jensen 1982, Hironaka et al. 1983, Mutz and Queiroz 1983, Youngblood et al. 1985, Jankovsky-Jones 1996, 1997b), and one site recently sampled in Owyhee County. This type may also extend into Colorado (Youngblood et al. 1985).

ENVIRONMENTAL DESCRIPTION This community type is tolerant of imperfect drainage, high water tables, and periodic flooding. Available water is moderate. Soils are silty to sandy loams, often with coarse fragments. Redox concentrations (mottles) are common and indicate a fluctuating water table. Soil reaction ranges from slightly acid to moderately alkaline (pH 6.0 to 8.0) (Youngblood et al. 1985, Hansen et al. 1995).

MOST ABUNDANT SPECIES

Strata	Species
Short shrub	Artemisia cana
Herbaceous	Festuca idahoensis, Poa pratensis

VEGETATION DESCRIPTION Throughout its distribution, this community type represents the driest extreme of the riparian zones, and not all Artemisia cana sites are considered wetlands. Artemisia cana is usually the only species in a conspicuous low shrub stratum. On the moist extreme, Potentilla fruticosa may grade into this type, while at the drier extreme, Artemisia tridentata ssp. vaseyana may occasionally occur. Festuca idahoensis is common in the undergrowth, which may also include Helenium hoopesii, Fragaria virginiana, Potentilla gracilis, Geum triflorum, Achillea millefolium, and Taraxacum officinale (Youngblood et al. 1985).

WILDLIFE VALUES Because of its productivity and proximity to wetter communities, this type is an important source of forage and cover for mammals, songbirds, and game birds. Deer, elk, and antelope browse this habitat type, especially in winter when snow covers low growing

vegetation. Sage grouse use this type for food and nesting cover (Hansen et al. 1995).

OTHER NOTEWORTHY SPECIES Information not available.

ADJACENT COMMUNITIES Adjacent wetter sites support communities dominated by Salix wolfii, S. boothii, and Potentilla fruticosa with a Deschampsia cespitosa or Carex sp. understory. Artemisia tridentata generally occupies drier, upland sites (Hansen et al. 1995).

CONSERVATION RANK G3 S2

SUCCESSION AND MANAGEMENT This community type represents stable conditions. With disturbance, Festuca idahoensis may be replaced by the graminoids Poa pratensis, P. bulbosa, or Bromus tectorum, and forbs such as Taraxacum officinale and Fragaria virginiana may increase (Youngblood et al. 1985, Hansen et al. 1995).

The accessibility of stands of this type may result in excessive use by livestock. Festuca idahoensis is moderately tolerant of grazing but can be injured by too intense early spring grazing. Mature plants are strongly competitive while seedlings are weakly competitive. Artemisia cana is a vigorous root sprouter following a burn; fire is not an effective method of decreasing shrub densities. Youngblood et al. (1985) states that herbicides have been effective in killing A. cana if applied when the plant is phenologically active. Use of mechanical equipment or trampling by livestock when soils are moist can cause soil compaction and increased bare ground (Hansen et al. 1995). Artemisia cana is used in seed mixtures for big game range restoration, highway stabilization and beautification, and in mine reclamation work.

CLASSIFICATION COMMENTS This is a well-defined community. The Artemisia cana/Festuca idahoensis community mentioned for Montana by Mueggler and Stewart (1980) is probably this subspecies, ssp. viscidula (Hansen et al. 1995). Artemisia cana ssp. cana, found mostly on the Great Plains, appears to have other understory unions. However, Cronquist (1994) offers an alternative taxonomic view of Artemisia cana by merging all infraspecific taxa, stating that there is no basis for splitting them.

This type has been quantitatively defined and described by several studies, supplemented with generalized descriptions and plots from several other studies.

EDITION 98-12-07

AUTHOR L. Williams

ARTEMISIA TRIDENTATA VAR. *TRIDENTATA/ELYMUS CINEREUS*

COMMON NAME BASIN BIG SAGEBRUSH/BASIN WILDRYE

PHYSIOGNOMIC TYPE Shrubland

SIMILAR COMMUNITIES The Artemisia tridentata var. vaseyana/Elymus cinereus (Hironaka et al. 1983) is a widespread type that is more often found in swales and other depressions in upland settings in the foothills and mountains. Occasionally it is found in drainage bottoms at the heads of mountain streams.

RANGE This type has been reported from Colorado, Wyoming, Nevada, Idaho, Oregon, and possibly Wyoming (Hironaka et al 1983, Bourgeron and Engelking 1994, Weixelman et al. 1996).

ENVIRONMENTAL DESCRIPTION This community is often in the transition zone between drier upland communities and the wetter riparian zone. Artemisia tridentata ver. tridentata is an indicator of deep soil. It is most often found in areas of deep alluvial deposition on the valley bottom, usually on stream terraces, but also has been observed on toe slopes. Seasonal flooding on these sites is rare. Occurrences are generally below 6,000 feet in the north (Idaho) and 8,000 feet in the south (Nevada).

The surface soil material is silty loam to sandy loam and can be very deep. Where coarse fragments occur in the soil profile, they are generally less than 60 percent by volume in any given horizon. In some stands surface soils are moist into late summer and depth to field capacity moisture is within a meter of the surface in the summer. On deep alluvial terraces along larger rivers, this depth may be as deep as 3 m and the surface soils are dry by late summer. Soils at higher elevation sites in Nevada have been classified as Cryoborolls, while at lower elevations in Idaho they are Haploxerolls (Weixelman et al. 1996).

MOST ABUNDANT SPECIES

Strata	Species
Tall shrub	Artemisia tridentata var. tridentata
Herbaceous	Elymus cinereus, Poa juncifolia

VEGETATION DESCRIPTION Artemisia tridentata var. tridentata dominates the shrub layer and a mixture of graminoids and forbs dominate the herbaceous layer in stands of high ecological condition; however, Elymus cinereus usually is the most abundant species, sometimes reaching near 100 percent cover. Basin big sagebrush generally has a canopy of 10-50 percent. It has a stout taproot which grows to a depth of 1 to 4 m and is able to tap moisture deep in the soil profile. Therefore, basin big sagebrush is considered to be a phreatophyte. Cover of Crysothamnus spp. is low in high quality stands. Total graminoid cover can be as high as 70 percent, with Elymus cinereus comprising most of this. Total forb cover is generally between 5 and 20 percent (Weixelman et al. 1996).

WILDLIFE VALUES Information not available.

OTHER NOTEWORTHY SPECIES Information not available.

SUCCESSION AND MANAGEMENT Indicators of disturbance in this community, such as heavy livestock grazing or fire, include high coverage of species such as Chrysothamnus spp., Iva axillaris, Iris missouriensis, and Bromus tectorum (Weixelman et al. 1996). At low elevations in

southwestern Idaho, Sarcobatus vermiculatus can occur in stands with canopy cover equal to the Artemisia. It is not known if this reflects a successional stage due to livestock grazing or not.

ADJACENT COMMUNITIES This community largely occurs in the sagebrush-steppe zone, with adjacent upland communities being dominated by various Artemisia tridentata varieties. Numerous riparian community types occur in the adjacent floodplain.

CONSERVATION RANK G2 S1

SUCCESSION AND MANAGEMENT Bromus tectorum and Chrysothamnus spp. dominate occurrences in poor ecological condition. Soil infiltration rates are lower due to compaction or lack of graminoid root growth. Rooting depth is also significantly shallower (Weixelman et al. 1996).

CLASSIFICATION COMMENTS Classification is based on 22 plots in central Nevada (Weixelman et al. 1996), 5 plots in Idaho, and an unknown number of plots in Oregon (Hironaka et al. 1983) and Colorado (Bourgeron and Engelking 1994).

EDITION 98-01-05

AUTHOR B. Moseley

BETULA GLANDULOSA/CAREX SIMULATA

COMMON NAME BOG BIRCH/SHORT BEAKED SEDGE

PHYSIOGNOMIC TYPE Shrubland

SIMILAR COMMUNITIES Potentilla fruticosa/Deschampsia cespitosa

RANGE Betula glandulosa/Carex simulata is described from eastern Idaho.

ENVIRONMENTAL DESCRIPTION The community occurs in broad spring-fed valleys and benches in moderate to wide-valley bottoms. Shrubs occur on what appear to be natural hummocks that may be the result of insect and rodent activity. Calcareous mineral soils are overlayed with a 10-50 cm. thick organic layer.

MOST ABUNDANT SPECIES

Strata	Species
Short shrub	Betula glandulosa, Potentilla fruticosa
Herbaceous	Carex simulata

VEGETATION DESCRIPTION Betula glandulosa contributes an average of 15-30 percent to the overstory. Potentilla fruticosa may codominate or dominate with up to 20 percent cover. Salix boothii, S. candida, and S. geyeriana are sometimes present in trace amounts. The canopy

cover provided by the various shrubs is sparse to moderate, but graminoid cover is high. Carex simulata clearly dominates (50 percent cover) the understory. Several other sedge species may be present in trace amounts including Carex aurea, C. oederi, C. canascens, C. lanuginosa, C. buxbaumii, and C. praegracilis (Jankovsky-Jones 1996).

WILDLIFE VALUES Moose and sandhill crane have been observed using this community type (Jankovsky-Jones 1996).

OTHER NOTEWORTHY SPECIES This community may provide habitat for several species of concern including Primula alcalina, Primula incana, Eriophorum viridicarinatum, and Carex buxbaumii.

ADJACENT COMMUNITIES Adjacent communities include the Potentilla fruticosa/Deschampsia cespitosa, Carex simulata, Carex utriculata, and Deschampsia cespitosa community types (Jankovsky-Jones 1996).

CONSERVATION RANK G2 S2

SUCCESSION AND MANAGEMENT Repeated browsing of shrubs can reduce vigor and result in eventual elimination. Grazing, primitive trail use, and other soil compacting activities may result in a shift to exotics and increasers such as Poa pratensis and Juncus balticus. Fencing and exclusion of domestic livestock is an effective management tool when shrubs are intact, native graminoids are present, and hydrologic regime is unaltered. (Jankovsky-Jones 1996).

CLASSIFICATION COMMENTS This community type was originally described by Moseley et al. (1991), and is based on reconnaissance plots from two stands in Idaho. Type description based on summary of community occurrences.

EDITION 95-10-03

AUTHOR L. Williams

BETULA GLANDULOSA/CAREX UTRICULATA

COMMON NAME BOG BIRCH/BLADDER SEDGE

PHYSIOGNOMIC TYPE Shrubland

SIMILAR COMMUNITIES The Betula glandulosa/Carex utriculata habitat type has not been previously described (Hansen et al. 1995). Stands dominated by Betula glandulosa are common throughout the Rocky Mountain region (Windell et al. 1986).

RANGE Betula glandulosa/Carex utriculata is a minor type at mid-elevations in western Montana (Hansen et al. 1995), and throughout Idaho (Moseley et al. 1991, Moseley and Bursik 1995).

ENVIRONMENTAL DESCRIPTION This community type occurs adjacent to beaver ponds, lakes, or marshes, and on seeps, swales, and wet alluvial terraces adjacent to low gradient meandering streams (Hansen et al. 1995).

Soils are commonly flooded until mid-summer and are saturated year-round on wetter sites. Redox concentrations are present in some mineral soils, redox depletions (gleyed soil) occur rarely. Organic matter accumulations may form floating, quaking mats as this type encroaches onto open water. Drier extremes have shallow organic horizons overlying deeper mineral soil (Hansen et al. 1995).

MOST ABUNDANT SPECIES

Strata	Species
Tall shrub	Betula glandulosa, Potentilla fruticosa
Herbaceous	Carex utriculata, Carex aquatilis

VEGETATION DESCRIPTION Betula glandulosa contributes an average of 35 percent to the overstory. Minor amounts of Potentilla fruticosa and Salix species are usually present. The canopy cover provided by the various shrubs is sparse to moderate, but the herbaceous layer cover is high. Associated shrubs include Rhamnus alnifolia and various willows. Understory species composition is dependent on water levels. The wettest sites support Carex utriculata and C. aquatilus. Geum macrophyllum and the graminoids Poa pratensis and Agrostis stolonifera are often present in drier micro-sites and/or disturbed sites (Hansen et al. 1995).

WILDLIFE VALUES Betula glandulosa is a valuable browse species for elk. Communities dominated by Betula glandulosa may function to stabilize channel banks (frequently creating overhanging banks) and provide shade creating quality fish habitat.

OTHER NOTEWORTHY SPECIES Information not available.

ADJACENT COMMUNITIES Adjacent wetter sites may be dominated by Salix drummondiana, S. geyeriana, Carex utriculata, or C. buxbaumii types. Drier wetland communities support Poa pratensis, Populus trichocarpa, and Potentilla fruticosa. At higher elevations, adjacent wetland forests are often dominated by Picea engelmannii or Abies lasiocarpa. Adjacent uplands support habitat types from the Abies lasicocarpa, Pseudotsuga menziesii, and Pinus ponderosa series, depending on elevation and aspect (Hansen et al. 1995).

CONSERVATION RANK G4? S3

SUCCESSION AND MANAGEMENT The Betula glandulosa/Carex utriculata community type represents a fairly stable type. Grazing my decrease the vigor of bog birch and increase the presence of species tolerant of grazing including Agrostis stolonifera, Poa pratensis, Poa palustris, and Juncus balticus.

Saturated soils are highly susceptible to soil compaction and streambank sloughing when used by livestock and heavy machinery. Overuse may result in reduced vigor or eventual elimination of

shrubs from the site. Burning of this type can temporarily increase productivity of Carex species. However, care should be taken when burning along streambanks because of the excellent erosion protection provided by Betula glandulosa/Carex utriculata habitat type (Hansen et al. 1995).

CLASSIFICATION COMMENTS This is a well described community based on 33 stands in Montana (Hansen et al. 1995). Additionally, nine stands are represented in the Idaho Conservation Data Center's Data Base.

EDITION 95-09-05

AUTHOR L. Williams

BETULA OCCIDENTALIS/CORNUS SERICEA

COMMON NAME WATER BIRCH/RED-OSIER DOGWOOD

PHYSIOGNOMIC TYPE Shrubland

SIMILAR COMMUNITIES From stand tables it appears as if some Betula occidentalis/Cornus sericea stands are included in Hansen et al's. (1995) Betula occidentalis dominance type.

RANGE The community is known from Montana and eastern Washington, south to Idaho, Utah and Nevada.

ENVIRONMENTAL DESCRIPTION Betula occidentalis/Cornus sericea is found at elevations ranging from 640 to 2280 m (2,100 to 7,500 feet). It occurs on gentle slopes of streambanks and terraces of moderate to high gradient mountain and foothill streams. The surface topography of sites is often undulating. Soils are formed in alluvium and textures are coarse to fine, ranging from loamy skeletal and fine-loamy over sandy-skeletal, to coarse-loamy. Water tables are typically below the depth of the soil pit. (Padgett et al. 1989, Manning and Padgett 1992).

MOST ABUNDANT SPECIES

Strata	Species
Tall shrub	Betula occidentalis, Cornus sericea
Herbaceous	Equisetum spp., Smilacina stellata

VEGETATION DESCRIPTION Betula occidentalis clearly dominates the tall shrub overstory with over 30 percent cover. The undergrowth is characterized by nearly impenetrable shrub undergrowth dominated by Cornus sericea (40 percent or greater cover). Rosa woodsii and tall Salix spp. are frequently present with up to 15 percent cover. The herbaceous layer varies inversely with the shrub layer. Herbaceous species which are consistently present include Smilacina stellata, Equisetum spp., Galium triflorum, and Poa pratensis.

WILDLIFE VALUES Information not available.

OTHER NOTEWORTHY SPECIES Information not available.

ADJACENT COMMUNITIES Adjacent upland communities include those dominated by Pseudotsuga menziesii, Pinus edulis, Juniperus osteosperma, Pinus ponderosa, Quercus gambellii, Artemisia tridentata, and/or Cercocarpos ledifolius. Adjacent riparian communities include those dominated by various Populus species (Manning and Padgett 1992, Padgett et al. 1989).

CONSERVATION RANK G2 G3 S1

SUCCESSION AND MANAGEMENT Pseudotsuga menziesii, Picea pungens, and Abies lasiocarpa are present in minor amounts in some communites, which may indicate the trend toward eventual replacement of this type by the Conifer/Cornus sericea community type. In some communities Populus tremuloides, P. angustifolia, or Acer negundo may indicate succession toward communities dominated by these species with an undergrowth of Cornus sericea (Manning and Padgett 1992, Padgett et al. 1989). Manning and Padgett (1992) note that overstory and undergrowth dominants are well adapted to sites in Nevada, and this may be a long-lived type which may survive until channel incision and/or lateral migration occurs.

This community type is important for streambank stabilization. Livestock use is typically impeded due to the dense shrub layer formed by Cornus sericea (Manning and Padgett 1992).

CLASSSIFICATION COMMENTS Classification is based on 9 stands in Nevada, 14 stands in Utah and southeastern Idaho, and an unknown number of stands in Montana and Washington.

EDITION 98-12-01

AUTHOR L. Williams

BETULA OCCIDENTALIS/MESIC FORB

COMMON NAME WATER BIRCH/MESIC FORB SHRUBLAND

PHYSIOGNOMIC TYPE Shrubland

SIMILAR COMMUNITIES Stands of this community may be included in Hansen et al's (1995) Betula occidentalis dominance type.

RANGE Stands occur in Colorado, Nevada, Idaho, and Utah.

ENVIRONMENTAL DESCRIPTION The Betula occidentalis/Mesic Forb community type occurs along terraces, seeps, and intermittent channels. A majority of the soils are formed in alluvium; mottles were common within 20 inches of the soil surface indicating a seasonally high water table (Padgett et al. 1989).

MOST ABUNDANT SPECIES

Strata	Species
Tall shrub	Betula occidentalis
Herbaceous	Heracleum lanatum, Geranium richardsonii, Equisetum arvense, Aconitum columbianum, Epilobium angustifolium, Smilacina stellata

VEGETATION DESCRIPTION Betula occidentalis clearly dominates the tall shrub overstory with over 30-50 percent cover. The undergrowth is characterized by mixed forb cover with Heracleum lanatum, Geranium richardsonii, Equisetum arvense, Aconitum columbianum, Epilobium angustifolium, Smilacina stellata, and other forbs with over 100 percent cover in combination. A somewhat sparse low shrub layer is often present and may include Rosa woodsii, Salix spp., or Cornus sericea. Graminoids may be absent or Carex microptera, Glyceria elata, Agrostis stolonifera, and Poa pratensis may contribute a combined cover of up to 25 percent.

WILDLIFE VALUES Betula occidentalis communities frequently occur as stringers along streams which provide migration routes, hiding cover, and shade for both large and small mammals. Water birch is not an important browse species, but use will occur if other woody species are not available. The structure of stands provides important habitat for birds (Hansen et al. 1995).

OTHER NOTEWORTHY SPECIES Information not available.

ADJACENT COMMUNITIES Adjacent upland communities include forests, dominated by Abies concolor, Pinus ponderosa, and Pinus edulis, Agropyron-Festuca grasslands, or Artemisia-steppe vegetation. Adjacent riparian communities include those dominated by Populus tremuloides, Rosa woodsii, and/or various tall willows (Manning and Padgett 1992, Padgett et al. 1989, Moseley 1998).

CONSERVATION RANK G3 S1

SUCCESSION AND MANAGEMENT The presence of Pinus ponderosa, Picea engelmannii, and Populus tremuloides, among others, indicates a possible successional trend toward coniferous tree-dominated communities (Padgett et al. 1989). Manning and Padgett (1992), suggest the Betula occidentalis/Mesic forb community type may represent good ecological condition, particularly when species such as Aconitum columbianum or Smilacina stellata are undergrowth dominants. Through heavy grazing, however, the type may be replaced by the Betula occidentalis/Poa pratensis community type (Moseley 1998).

This community type is open and lacks a dense low shrub layer. Livestock are likely to use these communities for forage and shade. Early season grazing should be avoided to increase vigor of the dominant shrub. The coarse textured soils are generally erodible and livestock use should be managed to avoid streambank damage. Shoots of water birch are killed by fire, but plants will resprout from uninjured basal buds (Youngblood et al. 1985, Hansen et al. 1995).

CLASSIFICATION COMMENTS This community has been recognized in several studies from throughout the Intermountain and Rocky Mountain area. Classification based on seven stands in Nevada, five stands in Utah and southeastern Idaho, three stands in southwestern Idaho, and ten stands in Colorado.

EDITION 98-12-01

AUTHOR L. Williams

BETULA OCCIDENTALIS/POTENTILLA FRUTICOSA

COMMON NAME WATER BIRCH/SHRUBBY CINQUEFOIL

PHYSIOGNOMIC TYPE Shrubland

SIMILAR COMMUNITIES No similar communities have been identified. This community is unique in both plant species composition and soil type.

RANGE Occurs in perennial wetlands along the eastern Front Range of Teton and possibly Pondera counties, Montana, and Custer County, Idaho.

ENVIRONMENTAL DESCRIPTION The Betula occidentalis-Potentilla fruticosa association occurs between 4,500 and 5,500 feet elevation in an area of palustrine alkaline wetlands in the middle and northern Rocky Mountains.

The wetlands are located in the headwaters of low elevation, low gradient reaches of perennial rivers in glacial and fault-block valleys. In Montana the landscape is characterized by glacial outwash plains associated with small terminal moraines at canyon mouths. These glacial outwash materials are tightly compacted and overlay older deposits of highly porous Pliocene gravels, which in turn overlie relatively impermeable Cretaceous rock. In Idaho, the wetlands are in broad fault block valleys surrounded by alluvial fans. Perennial drainages leaving the mountains typically do not flow across the alluvial fans, but sink into the alluvium. Runoff in both the glacial valleys and fault block valleys moves through the porous Pliocene gravels into wetlands. Relative porosity of the fill materials within the wetland sites allows upwelling in a complex of numerous seeps. The Betula occidentalis-Potentilla fruticosa association occurs along spring creeks flowing from the seeps.

Soils within the wetlands are variable, but those associated with the Betula/Potentilla community are characterized by some development of an organic horizon over the glacial deposits. They are very wet, somewhat poorly-drained and saturated throughout the profile, with clay texture (locally called "gumbo"). Water is moving through the sites, as there are actively upwelling seeps and anastomosing channels. The surface has a hummocky microtopography with rills providing temporary storage of surface water.

MOST ABUNDANT SPECIES

Strata	Species
Tall shrub	Betula occidentalis
Short shrub	Potentilla fruticosa, Salix candida
Herbaceous	Carex scirpoidea, Carex utriculata, Deschampsia cespitosa, Muhlenbergia richardsonis, Glaux maritima, Phlox kelseyi, Primula alcalina

VEGETATION DESCRIPTION The vegetation of this type is poorly described. It is dominated by the tall (10 m), broad-leaved deciduous shrub Betula occidentalis and the lower (0.5 m), deciduous shrub Potentilla fruticosa. Other deciduous shrubs include several species of Salix including Salix candida, Salix pseudomonticola, Cornus sericea, and Rosa woodsii. The herbaceous layer is dominated by perennial graminoids including Carex laeviculmis, C. scirpoidea, C. simulata, C. utriculata, Deschampsia cespitosa, Juncus balticus, and Muhlenbergia richardsonis.

WILDLIFE VALUES These wetlands were studied for their importance as grizzly bear habitat in Montana (Lee and Jonkel 1980), and the plant association is one of the wetland types utilized by grizzlies. Elk are reported to utilize habitat in Idaho stands.

OTHER NOTEWORTHY SPECIES Primula alcalina, a globally rare plant species, is common (5 percent cover) in Betula occidentalis/Potentilla fruticosa stands in Idaho.

ADJACENT COMMUNITIES Adjacent wetter communities in Idaho are dominated by Carex simulata. Drier areas support Patentilla fruticosa with alkali tolerant graminoids in the understory.

CONSERVATION RANK G2 S1

SUCCESSION AND MANAGEMENT Information not available.

CLASSIFICATION COMMENTS The community is described based on a few pots in Idaho and Montana.

EDITION 98-04-01

AUTHOR M. Reid, M. Jankovsky-Jones

CORNUS SERICEA

COMMON NAME RED-OSIER DOGWOOD

PHYSIOGNOMIC TYPE Shrubland

SIMILAR COMMUNITIES Cornus sericea is a community dominant in several associations.

This community, however, lacks the structural diversity of the other types; for example, the Alnus incana/Cornus sericea and Cornus sericea-Salix sp. types from Nevada (Manning and Padgett 1995). The relationship of this community with the Cornus sericea/Heracleum lanatum and C. sericea/Galium triflorum types from Utah and eastern Idaho (Youngblood et al. 1985, Padgett et al. 1989) is unclear.

RANGE This is a widespread type known from Washington, Oregon, Idaho, Nevada, and Montana.

ENVIRONMENTAL DESCRIPTION This type is typically adjacent to stream and river channels, but it can occupy a diversity of landforms. It may appear as dense linear bands on alluvial benches in narrow canyons or broad thickets on islands and floodplains of major streams and rivers. Most occurrences have evidence of annual or near-annual flooding (Manning and Padgett 1995, Hall and Hansen 1997).

Soils of this community are classified as Inceptisols, Entisols, or Mollisols. Where sites are located outside of the active floodplain, a litter/duff layer two inches or more thick may accumulate. Surface horizons are comprised of a wide range of alluvial materials with textures ranging from silty clays to sandy loams. These layers may be relatively shallow or as deep as five feet. Underlying layers are typically coarse sands, gravels, and cobbles that facilitate the movement of aerated groundwater through the subsurface layers which may be important for the longevity of stands. Water availability ranges from high, where this type occupies floodplains immediately adjacent to active channels, to low on upper, remote floodplain sites. Mottled and gleyed soils may occur (Manning and Padgett 1995, Hall and Hansen 1997, Crowe and Clausnitzer 1997).

MOST ABUNDANT SPECIES

Strata	Species
Tall shrub	Cornus sericea, Rosa woodsii

VEGETATION DESCRIPTION Cornus sericea forms a dense, closed canopy, often excluding understory shrub and herbaceous species. Cornus sericea is usually the only species with high cover values. Associated species vary with geography and elevation, but constant shrubs include Rosa woodsii, Ribes hudsonianum, Acer glabrum, Salix exigua, S. lutea, and Clematis ligusticifolia. Because of its wide range, a great diversity of herbaceous species are associated with this community, usually in low cover (Manning and Padgett 1995, Hansen et al. 1995, Hall and Hansen 1997, Crowe and Clausnitzer 1997).

WILDLIFE VALUES Red-osier dogwood provides food and cover for mule deer, moose, elk, mountain goats, cottontail rabbits, snowshoe hares, and many birds. The fruits are an important black bear food and are also eaten by songbirds, grouse, quail, partridge, cutthroat trout, ducks, crows, mice, and other mammals. The young stems and bark are eaten by deer mice, meadow voles, and other small rodents. Red-osier dogwood often grows in dense thickets because of its layering ability. These thickets provide good mule-deer fawning and rearing areas and nesting habitat for many songbirds (Hansen et al. 1995, Crowe and Clausnitzer 1997).

OTHER NOTEWORTHY SPECIES Information not available.

ADJACENT COMMUNITIES Because of the wide geographic range for this type, communities of adjacent uplands can be coniferous forest, aspen, sagebrush-steppe, and pinyon-juniper types.

CONSERVATION RANK G4 S3

SUCCESSION AND MANAGEMENT This is considered an early seral community, typically colonizing sites adjacent to streams. The herbaceous cover is often sparse, probably due to the dense overstory canopy and regular flooding, scouring, and deposition. The latter factor is probably responsible for maintaining this as a persistent community type on the landscape. The presence of tall shrubs or trees in some stands may represent succession toward Alnus incana, Populus trichocarpa, P. tremuloides, P. angustifolia, Picea engelmannii, Pseudotsuga menziesii, or other communities.

The herbaceous biomass varies widely and is largely dependent on the density of the dogwood canopy (Crowe and Clausnitzer 1997). Ratings for red-osier dogwood palatability for livestock range from low (Manning and Padgett 1995, Crowe and Clausnitzer 1997) to "ice cream" (Hansen et al. 1995, Hall and Hansen 1997), but the stands are often so dense that they limit grazing in many cases. This community functions in a variety of ways to promote stream health. Red-osier dogwood forms dense root networks that stabilize streambanks against lateral cutting and erosion, provides cover in the form of overhanging branches and banks, and shades channels, effectively moderating extreme summer temperature fluctuations (Hall and Hansen 1997). Dogwood sprouts vigorously after a fire and germination of its seed-bank is stimulated by fire (Crowe and Clausnitzer 1997).

CLASSIFICATION COMMENTS Stands of this community type have been sampled in Washington, Oregon, Idaho, Nevada, and Montana.

EDITION 98-12-01

AUTHOR B. Moseley

CRATAEGUS DOUGLASII-ROSA WOODSII

COMMON NAME BLACK HAWTHORN-WOODS ROSE SHRUBLAND

PHYSIOGNOMIC TYPE Shrubland

SIMILAR COMMUNITIES Stands of Crataegus douglasii-Rosa woodsii are often lumped within broad Crataegus douglasii or Crataegus succulenta dominance types. Other similar hawthorne-dominated stands are dominated by various understory shrubs or herbaceous species and may have noticeable Rosa cover and constancy (though other shrub species are dominant). They include: Crataegus douglasii-Symphoricarpos albus/Smilacina stellata, Crataegus

douglasii-Prunus virginiana, Crataegus douglasii-Philadelphus lewisii, Crataegus douglasii/Heracleum lanatum, or Crataegus douglasii/Elymus cinereus associations (Daubenmire 1970, Evans 1989, Hansen et al. 1995, Hall and Hansen 1997, Moseley 1998).

RANGE Riparian vegetation dominated by Crataegus douglasii was formerly widespread in the Pacific Northwest, particularly in the Columbia Basin and the Blue Mountains of southeastern Washington, northeastern Oregon, and west-central Idaho. Now stands occur as just a few scattered occurrences in this range.

ENVIRONMENTAL DESCRIPTION The Crataegus douglasii-Rosa woodsii community type occurs in association with small sometimes ephemeral drainages as well as on the floodplains of larger rivers at low elevations. These sites are flooded seasonally, but due to the low gradients are rarely scoured. Soils are typically deep, and fine-textured.

MOST ABUNDANT SPECIES

Strata	Species
Tall shrub	Crataegus douglasii
Short shrub	Rosa woodsii
Herbaceous	Elymus cinereus

VEGETATION DESCRIPTION This association is poorly described, without data for canopy cover or detailed species composition. It is composed of a partially closed canopy of the broad-leaved, deciduous tall shrub Crataegus douglasii, which is typically 3 to 6 meters tall. Occasional individuals of the broad-leaved deciduous trees Populus tremuloides, P. trichocarpa, Betula occidentalis, or Alnus incana may occur, but they never dominate the stand. A broad-leaved, deciduous short shrub layer is present, with varying amounts of cover. Common species include Rosa woodsii, Salix exigua, and Amelanchier alnifolia. The herbaceous layer is composed of perennial grasses, such as Elymus cinereus, Deschampsia cespitosa, and Elymus glaucus. Some Carex species do occur.

WILDLIFE VALUES Mule and white-tail deer, moose, elk, small mammals, and black bear utilize Crataegus for such resources as thermal cover, nesting or bedding, and forage (e.g. twigs, leaves, and fruit) (Hansen et al. 1995, Hall and Hansen 1997, Crowe and Clausnitzer 1997, Jankovsky-Jones 1998b). Communities often have numerous trails and bedding evidence under thick, seemingly impenetrable Crataegus patches. Birds also utilize Crataegus douglasii for food, cover, and nesting. Fruits of both Crataegus and Rosa are eaten by blue and sharp-tailed grouse and other birds. Black-billed magpies, thrushes, long-eared owls, and other species nest in Crataegus communities, utilizing its high structural diversity (Daubenmire 1970, Crowe and Clausnitzer 1997).

OTHER NOTEWORTHY SPECIES Many weedy introduced grasses are common in the understories of most Crataegus stands. These can include Phleum pratense, Poa pratensis, Bromus tectorum, Bromus inermis, and Festuca arundinacea.

ADJACENT COMMUNITIES Adjacent riparian communities may include those dominated

by Populus spp. (both cottonwood and aspen) and Salix spp. Uplands are sagebrush steppe or may include Ponderosa pine wooodlands in northern Idaho and adjacent Washington.

CONSERVATION RANK G2 S1

SUCCESSION AND MANAGEMENT Very little information is available on the successional dynamics of Crataegus douglasii-Rosa woodsii. Crataegus spp. dominated communities are often considered mid-seral and disturbance-induced (e.g. grazing) based on their patchy nature, exotic species cover, and impenetrable thorn thickets which prevent intense livestock grazing pressure (Crowe and Clausnitzer 1997, Hall and Hansen 1997). It is suggested that disturbance might promote Rosa woodsii and Poa pratensis shifting other Crataegus douglasii dominated communities towards Crataegus douglasii/Rosa woodsii or Crataegus douglasii/Poa pratensis (Hansen et al. 1995). Stands may be a seral stage for other riparian forest or shrub types including Populus tremuloides, Salix lutea, or Cornus sericea dominated associations. Likewise, Crataegus douglasii-Rosa woodsii may be successionally related to other Crataegus douglasii types such as Crataegus douglasii-Symphoricarpos albus/Smilacina stellata, Crataegus douglasii-Prunus virginiana, Crataegus douglasii-Philadelphus lewisii, or Crataegus douglasii/Heracleum lanatum (Daubenmire 1970, Evans 1989, Hansen et al. 1995, Hall and Hansen 1997, Jankovsky-Jones 1998a, Moseley 1998). If the site becomes drier due to hydrologic changes, Crataegus douglasii stands may become conifer dominated (e.g. Pinus ponderosa/Prunus virginiana, Pinus ponderosa/Symphoricarpos albus) (Crowe and Clausnitzer 1997, Hall and Hansen 1997).

Due to the formation of thorn thickets and low forage production, the Crataegus douglasii communities do not receive heavy livestock use. However, Crataegus douglasii foliage is eaten by livestock (Crowe and Clausnitzer 1997). Crataegus douglasii thorns usually protect it from grazing, though hedging or umbrella-shaped shrubs may result (Hansen et al. 1995). Cattle also bed under the canopy's shade causing significant soil exposure and compaction. Crataegus douglasii is killed to the ground by low intensity fires but often re-sprouts from its root crown after fire or other disturbance. Prescribed fire is used to reduce its extent. Crataegus re-sprouts vigorously from its rhizomes after all but the most severe fires (Crowe and Clausnitzer 1997). This community is not compatible with recreation development but does form a good barrier to human movement.

CLASSIFICATION COMMENTS Riparian vegetation dominated by C. douglasii has been reported from throughout the Pacific Northwest in Washington, Oregon, Idaho, and Montana. In all instances, it is reported to be rare or no longer common, due to impacts of livestock grazing and agricultural activities.

EDITION 98-03-10

AUTHOR M. Reid, M. Jankovsky-Jones

CRATAEGUS DOUGLASII-SYMPHORICARPOS ALBUS/SMILACINA STELLATA

COMMON NAME BLACK HAWTHORN-COMMON SNOWBERRY/STARRY SOLOMON'S-SEAL

PHYSIOGNOMIC TYPE Shrubland

SIMILAR COMMUNITIES Stands of Crataegus douglasii-Symphoricarpos albus/Smilacina stellata are often lumped within broad Crataegus douglasii or Crataegus succulenta types (Jankovsky-Jones 1998a, Crowe and Clausnitzer 1997, Hall and Hansen 1997, Hansen et al. 1995, Evans 1989, Kovalchik 1987). This association also shares diagnostic species with Daubenmire's (1970) mesic upland Crataegus douglasii-Symphoricarpos albus (Populus tremuloides) plant association, but is at the wet end of a moisture gradient (Jankovsky-Jones 1998a). On drier sites it may grade into similar conifer/Symphoricarpos albus (often Pinus ponderosa) or conifer/Crataegus douglasii associations (Crowe and Clausnitzer 1997). Other similar hawthorne dominated stands are dominated by various understory shrubs or herbaceous species but may have noticeable Symphoricarpos species cover and constancy. They include: Crataegus douglasii-Rosa woodsii, Crataegus douglasii-Prunus virginiana, Crataegus douglasii-Philadelphus lewisii, Crataegus douglasii/Heracleum lanatum, or Crataegus douglasii/Elymus cinereus associations (Daubenmire 1970, Evans 1989, Hansen et al. 1995, Hall and Hansen 1997, Moseley 1998).

RANGE The Crataegus douglasii-Symphoricarpos albus/Smilacina stellata community is known from Idaho, Oregon (Jankovsky-Jones 1998a), Washington (Evans 1989), Montana (Hansen et al. 1995), and California. It is found on a tributary to the Teton River in eastern Idaho, near Coeur D' Alene Lake in northern Idaho, and on Rocking Comfort Flat Research Natural Area near the Wildhorse River in southern Hells Canyon (unconfirmed) (Jankovsky-Jones 1996, Jankovsky-Jones 1998c). In Oregon, it is probably found on the Metolius River of central Oregon (Kovalchik 1987) and in the Blue Mountains of northeastern Oregon (Crowe and Clausnitzer 1997).

ENVIRONMENTAL DESCRIPTION The Crataegus douglasii-Symphoricarpos albus/Smilacina stellata association is found from about 700 m to 800 m elevation in northern Idaho (Jankovsky-Jones 1998c). In northeastern Oregon, and probably adjacent Idaho, this association and related Crataegus types are found from around 1000 to 1300 m (averaging 1100 m in the Blue Mountains) (Moseley 1998, Crowe and Clausnitzer 1997). In contrast, it is known in eastern Idaho at a high elevation of 1965 m (Jankovsky-Jones 1996). Analogous Crataegus communities are known in Montana, on similar landforms and soils, throughout this elevational range (Hansen et al. 1995, Hall and Hansen 1997). Crataegus douglasii-Symphoricarpos albus/Smilacina stellata is located in narrow to wide valley bottoms (flat-bottomed or V-shaped) on flat sites of floodplains, stream terraces, and basins (Jankovsky-Jones 1996, Crowe and Clausnitzer 1997, Jankovsky-Jones 1998c). This community and similar Crateagus douglasii types can be found along both large perennial streams and small ephemeral streams with low to moderate gradients (usually 3 percent or less). These communities are infrequently flooded but may be in wet sites on islands or banks along old channels or on drier, outer floodplains over 50 m

from water (Hall and Hansen 1997, Evans 1989). Crataegus douglasii-Symphoricarpos albus/Smilacina stellata occurs on a variety of soils including Mollisols, Andisols, Entisols, and Inceptisols over old stream bed materials. Soil textures vary from silt-loams and sandy-loams to loamy gravels. Soils often have large amounts of coarse fragments (gravel, cobble, or boulder) and are well drained, with a water table 1 m to 2 m below the surface by mid-summer (Crowe and Clausnitzer 1997).

MOST ABUNDANT SPECIES

Strata	Species
Tall shrub	Crataegus douglasii
Short shrub	Symphoricarpos albus, Rosa woodsii
Herbaceous	Smilacina stellata, Heracleum lanatum, Equisetum spp., Thalictrum spp., Urtica dioica, Galium spp., Osmorhiza chilensis

VEGETATION DESCRIPTION The Crataegus douglasii-Symphoricarpos albus/Smilacina stellata plant association (including broader Crataegus douglasii and Crataegus succulenta community types and cover types) is dominated by Crataegus douglasii with 20 to 70 percent cover and 75 to 100 percent constancy (Kovalchik 1987, Hansen et al. 1995, Jankovsky-Jones 1996, Crowe and Clausnitzer 1997, Jankovsky-Jones 1998c). Tree species, including Populus tremuloides, Populus trichocarpa, Pseudotsuga menziesii, Abies grandis, Picea engelmannii, and Pinus ponderosa, may be present with low cover. Other tall shrubs are rarely important, having less than 20 percent cover and low constancy. They include Amelenchier alnifolia, Cornus sericea, Crataegus succulenta, Prunus virginiana, and Philadelphus lewisii. The low shrub understory is dominated by Symphoricarpos albus with 10 to 50 percent cover and 32 to 78 percent constancy (Kovalchik 1987, Jankovsky-Jones 1996, Hansen et al. 1995, Crowe and Clausnitzer 1997, Jankovsky-Jones 1998c). Other understory shrubs, with low cover and constancy, include Rosa woodsii and Physocarpus malvaceus. The herbaceous understory is dominated by a diverse mix of mesic forbs, the most widespread being Smilacina stellata (2 to 40 percent cover, 27 to 50 percent constancy) and Osmorhiza chilensis or O. depauperata (Kovalchik 1987, Jankovsky-Jones 1996, Hansen et al. 1995, Crowe and Clausnitzer 1997, Jankovsky-Jones 1998c). Other common associated forbs, usually with less than 10 percent cover, include Heracleum lanatum, Equisetum arvense (sometimes higher cover), Thalictrum species, Urtica dioica, and Galium species. Aconitum columbianum and Actaea rubra are occasionally present. The graminoid layer is noticeably dominated by exotic species with total cover usually less than cover of forbs. Poa pratensis (1 to 31percent cover) and Bromus species (e.g. Bromus inermis, B. japonicus; 3 to 30 percent cover) are most important with Agrostis stolonifera and Phalaris arundinacea also sometimes present (Kovalchik 1987, Hansen et al. 1995, Jankovsky-Jones 1996, Crowe and Clausnitzer 1997, Jankovsky-Jones 1998c). The most common (though rarely important) native graminoid species are Elymus glaucus, Agropyron caninum, and Carex species. Moss and lichen cover is less than 20 percent and bare soil is often significant (30 to 50 percent of ground cover) (Jankovsky-Jones 1998c).

WILDLIFE VALUES The Crataegus douglasii-Symphoricarpos albus/Smilacina stellata association provides excellent cover and forage for a variety of species. Mule and white-tail deer, moose, elk, small mammals, and black bear utilize Crataegus for such resources as thermal

cover, nesting or bedding, and forage (e.g. twigs, leaves, and fruit) (Hansen et al. 1995, Hall and Hansen 1997, Crowe and Clausnitzer 1997, Jankovsky-Jones 1998c). Communities often have numerous trails and bedding evidence under thick, seemingly impenetrable Crataegus patches. Birds also utilize Crataegus douglasii for food, cover, and nesting. Fruits are eaten by blue and sharp-tailed grouse and other birds. Black-billed magpies, thrushes, long-eared owls, and other species nest in Crataegus communities, utilizing its high structural diversity (Daubenmire 1970, Crowe and Clausnitzer 1997). Symphoricarpos albus also provides nesting cover and food for grouse, quail, pheasants, wild turkeys, and songbirds (Crowe and Clausnitzer 1997).

OTHER NOTEWORTHY SPECIES Weedy exotic species are common in the Crataegus douglasii-Symphoricarpos albus/Smilacina stellata association (including broader Crataegus spp. cover and community types) (Hansen et al. 1995, Jankovsky-Jones 1996, Crowe and Clausnitzer 1997, Jankovsky-Jones 1998c). Exotic grasses include: Agropyron repens, Agrostis stolonifera, Bromus inermis, Bromus japonicus, Bromus tectorum, Dactylis glomerata, Hordeum jubatum, Phalaris arundinacea, Phleum pratense, Poa palustris, Poa pratensis, and Setaria viridis. Exotic forbs include: Centaurea maculosa, Cirsium arvense, Cirsium vulgare, Lactuca serriola, Medicago species, Nepeta cataria, Plantago species, Ranunculus repens, Rumex crispus, Solanum dulcamara, Taraxacum officinale, Tragopogon dubius, Trifolium repens, and Tanacetum vulgare.

ADJACENT COMMUNITIES Adjacent wetter to slightly wetter vegetation stands include those dominated by Typha species, Phalaris arundinacea, Spiraea douglasii, Alnus spp., Populus spp., Salix spp., and Cornus sericea (Hansen et al. 1995, Hall and Hansen 1997). Adjacent communities with similar moisture requirements are dominated by Physocarpus malvaceus, Betula occidentalis, and Rosa species (Hall and Hansen 1997, Jankovsky-Jones 1998c). Slightly drier communities may be on alluvial terraces and include Abies grandis/Acer glabrum or other conifer communities (Crowe and Clausnitzer 1997). Adjacent uplands are dominated by Pseudotsuga menziesii, Abies grandis, Pinus ponderosa, and Juniperus scopulorum forest types or Artemisia tridentata shrub-steppe (Crowe and Clausnitzer 1997, Hall and Hansen 1997).

CONSERVATION RANK G2 S2

SUCCESSION AND MANAGEMENT Very little information is available on the successional dynamics of Crataegus douglasii-Symphoricarpos albus/Smilacina stellata. Crataegus spp. dominated communities are often considered mid-seral and disturbance-induced (e.g. grazing) based on their patchy nature, exotic species cover, and impenetrable thorn thickets which prevent intense livestock grazing pressure (Crowe and Clausnitzer 1997, Hall and Hansen 1997). However, Crataegus douglasii-Symphoricarpos albus/Smilacina stellata may be a climax community in non-forested areas (Crowe and Clausnitzer 1997). Alternatively, it may be a seral stage for other riparian forest or shrub types including Populus tremuloides, Salix lutea, or Cornus sericea dominated associations. Likewise, Crataegus douglasii/Symphoricarpos albus/Smilacina stellata may be successionally related to other Crataegus douglasii types such as Crataegus douglasii/Rosa woodsii, Crataegus douglasii-Prunus virginiana, Crataegus douglasii-Philadelphus lewisii, or Crataegus douglasii/Heracleum lanatum (Daubenmire 1970, Evans 1989, Hansen et al. 1995, Hall and Hansen 1997, Jankovsky-Jones 1998a, Moseley 1998). For example, increased disturbance might promote Rosa woodsii and Poa pratensis shifting the community towards

Crataegus douglasii/Rosa woodsii or Crataegus douglasii/Poa pratensis (Hansen et al. 1995). If the site becomes drier due to hydrologic changes, Crataegus douglasii stands may become conifer dominated (e.g. Pinus ponderosa/Prunus virginiana, Pinus ponderosa/Symphoricarpos albus) (Crowe and Clausnitzer 1997, Hall and Hansen 1997).

Due to the formation of thorn thickets and low forage production, the Crataegus douglasii-Symphoricarpos albus/Smilacina stellata community does not receive heavy livestock use. However, Crataegus douglasii and Symphoricarpos albus foliage is eaten by livestock (Crowe and Clausnitzer 1997). Crataegus douglasii thorns usually protect it from grazing, though hedging or umbrella-shaped shrubs may result (Hansen et al. 1995). Cattle also bed under the canopy's shade causing significant soil exposure and compaction. Though Symphoricarpos albus sustains the least damage from spring grazing, it may decrease with grazing in other seasons (Crowe and Clausnitzer 1997). Overgrazing in this community will promote Rosa woodsii and Poa pratensis or other exotic species (Hansen et al. 1995, Hall and Hansen 1997). Crataegus douglasii is killed to the ground by low intensity fires but often re-sprouts from its root crown after fire or other disturbance. Prescribed fire is used to reduce its extent. Symphoricarpos albus also re-sprouts vigorously from its rhizomes after all but the most severe fires (Crowe and Clausnitzer 1997). A healthy Crataegus douglasii-Symphoricarpos albus/Smilacina stellata community is an excellent soil stabilizer and provides moderate erosion control. Both Crataegus douglasii and Symphoricarpos albus are moderately useful for long-term revegetation, though the latter is a better species due to its faster growth (Hansen et al. 1995, Hall and Hansen 1997). This community is not compatible with recreation development but does form a good barrier to human movement.

CLASSIFICATION COMMENTS The Crataegus douglasii-Symphoricarpos albus habitat type is recognized as an upland type. The habitat type sometimes has a Populus tremuloides overstory phase and shares a similar herbaceous understory with the Festuca idahoensis/Symphoricarpos albus association (Daubenmire 1970). In riparian zones, a broad Crataegus douglasii type has been described which includes stands that are also characterized by a Symphoricarpos albus dominated understory (Kovalchik 1987, Evans 1989, Crowe and Clausnitzer 1997). In Montana and eastern Idaho, a similar riparian Crataegus succulenta cover type has been described which is dominated by either Crataegus succulenta or Crataegus douglasii with Symphoricarpos species or Rosa woodsii as the dominant understory shrubs (Hansen et al. 1995, Hall and Hansen 1997). Based on consultation with Heritage ecologists from Washington and Oregon, it is recommended that a riparian Crataegus douglasii-Symphoricarpos albus association should be recognized (Jankovsky-Jones 1998a) and potentially named the Crataegus douglasii-Symphoricarpos albus/Smilacina stellata plant association. This name will be used for the purpose of this abstract. More riparian plot data is needed to increase confidence of the proposed name and to determine if there is another species that is less of a generalist that has high affinity with the association.

Classification of the Crataegus douglasii-Symphoricarpos albus/Smilacina stellata association is based on four plots from Idaho (three near Coeur D' Alene Lake, one near the Teton River; Jankovsky-Jones 1998c, Jankovsky-Jones 1996). Ten plots from eastern Oregon (Crowe and Clausnitzer 1997, Kovalchik 1987) and 22 stands from central Montana (Hansen et al. 1995),

which are lumped into broader Crataegus spp. cover and community types, are also used in this description based on similar species composition (it is possible, though, that some stands may fit better in other Crataegus douglasii associtions).

EDITION 98-12-24

AUTHOR C. Murphy, M. Jankovsky-Jones

POTENTILLA FRUTICOSA/ALKALINE GRAMINOID

COMMON NAME SHRUBBY CINQUEFOIL/ALKALINE GRAMINOID

PHYSIOGNOMIC TYPE Shrubland

SIMILAR COMMUNITIES This association has not been previously described. Other Potentilla fruticosa dominated associations have been described by Crowe and Klausnitzer (1997), Hall and Hansen (1997), Manning and Padgett (1995), Mutz and Queiroz (1983), Padgett et al. (1989), Tuhy (1981), Tuhy and Jensen (1982), Youngblood et al. (1985), and Walford and Jones (1997). Previously described associations include Potentilla fruticosa/Deschampsia cespitosa, Potentilla fruticosa/Festuca idahoensis, Potentilla fruticosa/Ligusticum grayi, and Potentilla fruticosa/Poa pratensis. Stand tables for these associations do not refer to the presence of alkaline tolerant graminoids or forbs. Carex scirpoidea, a diagnostic species of the Potentilla fruticosa/Alkaline graminoid association, was reported from one of Padgett et al's (1989) stands and one of Manning and Padgett's (1995) stands. Based on moisture regime, the Potentilla fruticosa/Alkaline graminoid association is most closely related to the Potentilla fruticosa/Festuca idahoensis association; however, few plant species are shared. The presence of an alkaline substrate and alkali tolerant herbaceous species separates the Potentilla fruticosa/Alkaline graminoid association from other shrubby cinquefoil types.

RANGE The Potentilla fruticosa/Alkaline graminoid community is a minor type in the Middle Rocky Mountains. The community has only been described from the east-central valleys of Idaho.

ENVIRONMENTAL DESCRIPTION The wetlands are located in broad fault-block valleys surrounded by alluvial fans. Perennial drainages leaving the mountains typically do not flow through the alluvial fans, but sink into the alluvium. Runoff in fault-block valleys moves through the porous gravels into wetlands. Relative porosity of the fill materials within the wetland sites allows upwelling in a complex of numerous seeps.

The hydrograph in the wetlands is relatively stable with two pulses. A peak flow in the early spring occurs due to local snow melt. The flows level off and may pulse again in the fall due to lag time in percolation from the mountains and underflow from the ground watershed.

The Potentilla fruticosa/Alkaline graminoid community occurs on gently sloping terraces and benches that are elevated up to 1 meter above spring creeks in alkaline fens. The terraces are subirrigated and represent the highest wetlands above the water table. Seeps are present at the

base of terraces indicating subsurface water storage which may contribute to the maintenance of groundwater flow.

MOST ABUNDANT SPECIES

Strata	Species
Short shrub	Potentilla fruticosa
Herbaceous	Distichlis spicata, Carex parryana, Carex scirpoidea, Muhlenbergia richardsonis, Spartina gracilis, Haplopappus uniflorus, Phlox kelseyi, Solidago nana

VEGETATION DESCRIPTION The shrubland occurs on subirrigated alkaline terraces and benches and supports up to 50 percent cover of Potentilla fruticosa. The only other shrub noted as being present is Rosa woodsii. A mix of alkali tolerant graminoids and forbs dominate the understory. The graminoids Carex parryana, C. scirpoidea, Distichlis spicata, Muhlenbergia richardsonis, Poa juncifolia, and Spartina gracilis are well represented contributing up to 40 percent cover in combination. Forbs present with low cover (10 percent in combination) include Haplopappus uniflorus, Erigeron lonchophyllus, Hedysarum boreale, Phlox kelseyi, and Solidago nana. Patches of bare akaline soil may contribute up to 50 percent cover.

WILDLIFE VALUES Song birds and small mammals are reported to eat the seeds of shrubby cinquefoil (Crowe and Clausnitzer 1997). Northern harrriers have been observed foraging in shrubby cinquefoil stands.

OTHER NOTEWORTHY SPECIES Information not available.

ADJACENT COMMUNITIES Adjacent communities on terraces and elevated benches may include grasslands dominated by alkali tolerant species or stands of greasewood. Springs emerge at the toe slopes of terraces and benches and support Carex simulata and Eleocharis pauciflora alkaline fens. Other moister communities may include Potentilla fruticosa/Deschampsia cespitosa, Deschampsia cespitosa, and Juncus balticus.

CONSERVATION RANK GU SU

SUCCESSION AND MANAGEMENT The Potentilla fruticosa/Alkaline graminoid association occurs on stable sites with fine textured soils that dry out as the growing season progresses. The association may represent a transitional zone between moister sites supporting Carex spp. and Potentilla fruticosa/Deschampsia cespitosa communities and uplands supporting Artemisia spp. The association may occur in areas where water tables have dropped naturally or due to hydrologic development, representing a dry variant of the Potentilla fruticosa/Deschampsia cespitosa association.

Shrubby cinquefoil stands dry out as the growing season progresses and may be subject to heavier grazing pressure than adjacent wetter communities. Shrubby cinquefoil has low palatibility and is reported to increase with light grazing. Under moderate to heavy grazing, cover may decrease especially during drought years (Hall and Hansen 1997). Heavy grazing may also decrease the

herbaceous understory cover resulting in patches of bare ground. Fire and planting may be used to restore degraded stands. Shrubby cinquefoil will readily resprout following fire and can be planted from nursery grown stock.

CLASSIFICATION COMMENTS Description is based on summary of field notes and plot forms completed by Jankovsky-Jones (1998b).

EDITION 98-04-02

AUTHOR M. Jankovsky-Jones

SALIX BOOTHII/CAREX AQUATILIS

COMMON NAME BOOTH'S WILLOW/LEAFY TUSSOCK SEDGE

PHYSIOGNOMIC TYPE Shrubland

SIMILAR COMMUNITIES The Salix drummondiana-Salix myrtillifolia/Carex utriculata-Carex aquatilis community type is similar to Salix boothii/Carex aquatilis except that either species of Salix or Carex may dominate (Mutz and Queiroz 1983). The Salix/Carex aquatilis community type is also similar in that Salix boothii is often the dominant willow with Salix geyeriana and Salix lemmonii also common (Kovalchik 1987, Crowe and Clausnitzer 1997). Salix boothii/Carex utriculata is similar, often having high cover of Carex aquatilis (Norton et al. 1981, Padgett et al. 1989, Hansen et al. 1995). Salix boothii sometimes has noticeable cover in Salix geyeriana/Carex utriculata-Carex aquatilis, Salix geyeriana/Carex aquatilis, and herbaceous Carex aquatilis, which all share similar ecological requirements (Mutz and Queiroz 1983, Padgett et al. 1989, Hansen et al. 1995). Salix boothii is sometimes present (though usually with low cover and constancy) in short willow communities such as Salix wolfii/Carex aquatilis and Salix planifolia/Carex aquatilis (Hansen et al. 1995, Walford et al. 1997).

RANGE The Salix boothii/Carex aquatilis community is a minor type in Utah and Idaho. It is also apparantly found in Oregon and California. In Idaho it is located in the Boulder/White Cloud Mountains, the White Knob/Pioneer Mountains, and the Bear River area (Jankovsky-Jones 1997b, Jankovsky-Jones 1998b). It is also known from the Wasatch Mountains of Utah and southeastern Idaho, the Uinta Mountains, and central Utah (Padgett et al. 1989). The very similar Salix/Carex aquatilis community type is found in central Oregon (Kovalchik 1987) and in the Blue Mountains of northeast Oregon (Crowe and Clausnitzer 1997). Likewise, the similar Salix drummondiana-Salix myrtillifolia/Carex utriculata-Carex aquatilis community is known from the Sawtooth Valley and Centennial Mountains of Idaho (Mutz and Queiroz 1983).

ENVIRONMENTAL DESCRIPTION The Salix boothii/Carex aquatilis community type is found on wet sites at elevations ranging from less than 1900 m to nearly 2700 m in southeastern Idaho and Utah (Padgett et al. 1989, Jankovsky-Jones 1997b). In central Idaho the community is

located at 2050 m to 2425 m (Jankovsky-Jones 1998b). The very similar Salix/Carex aquatilis is found at less than 1500 m to over 1900 m in eastern Oregon (Kovalchik 1987, Crowe and Clausnitzer 1997). Salix boothii/Carex aquatilis (including Salix/Carex aquatilis and Salix drummondiana-Salix myrtillifolia/Carex utriculata-Carex aquatilis) is located on seeps, springs, streambanks, and pond margins in moderate to broad, low-gradient valleys and headwater basins (Mutz and Queiroz 1983, Kovalchik 1987, Padgett et al. 1989, Crowe and Clausnitzer 1997, Jankovsky-Jones 1997c, Jankovsky-Jones 1998b). Such locations are often sub-irrigated with surface water tables (in the late spring and early summer) which drop to more than 60 cm deep by fall. The community is slightly drier than the herbaceous Carex aquatilis community and does not occur in perennially ponded areas (which promote Carex utriculata types) (Kovalchik 1987, Padgett et al. 1989, Crowe and Clausnitzer 1997). Soils are cool temperature Mollisols and Histosols with moderate to high available water capacity. Soil sub-groups include organic Fibrists, Hemists, and Saprists and mineral Endoquolls, Endoaquents, and Cumulic Cryaquolls (Mutz and Queiroz 1983, Padgett et al. 1989, Crowe and Clausnitzer 1997). Soil textures are derived from fine-textured alluvium with virtually no coarse fragments and include silty, sandy, or clayey loams (Kovalchik 1987, Padgett et al. 1989, Crowe and Clausnitzer 1997).

MOST ABUNDANT SPECIES

Strata	Species
Tall shrub	Salix boothii, Salix spp
Short shrub	Betula glandulosa, Lonicera involucrata
Herbaceous	Carex aquatilis, Carex microptera, Calamagrostis canadensis, Carex utriculata, Aconitum columbianum, Mentha spp.

VEGETATION DESCRIPTION The Salix boothii/Carex aquatilis community (including Salix/Carex aquatilis) is characterized by a tall willow canopy often co-dominated by different Salix species. It is usually dominated by Salix boothii (9 to 63 percent cover, 50 to 100 percent constancy) but may have significant amounts (up to 40 percent cover and 33 percent constancy) of Salix geyeriana, Salix drummondiana, Salix lemmonii, Salix lasiandra, or other species (Mutz and Queiroz 1983, Kovalchik 1987, Padgett et al. 1989, Crowe and Clausnitzer 1997, Jankovsky-Jones 1997b). Alnus incana and various conifers are occasionally present with low cover and constancy. There is a low shrub understory commonly composed of Betula glandulosa and Lonicera involucrata with Salix wolfii or Ribes species sometimes present. Though all low shrub species have constancy less than 40 percent, Salix wolfii and Betula glandulosa may have relatively high cover (to 73 percent) (Kovalchik 1987, Padgett et al. 1989, Crowe and Clausnitzer 1997). Carex aquatilis clearly dominates the herbaceous understory with cover ranging from 35 to 64 percent and constancy from 10 to 100 percent. Other Carex species are usually present with low constancy and less than 10 percent cover, including Carex utriculata and Carex microptera. Though they may sometimes be locally dominant, Calamagrostis canadensis, Juncus balticus, Scirpus microcarpus, and Deschampsia cespitosa are often present with low cover and constancy (Mutz and Queiroz 1983, Kovalchik 1987, Padgett et al. 1989, Crowe and Clausnitzer 1997, Jankovsky-Jones 1997b). Forbs are diverse in species but generally low in cover due to exclusion by willows and sedges. Common forbs, all with cover less than 15 percent, include Aconitum columbianum, Mentha species, Polemonium species, Geum macrophyllum, and Sidalcea oregana (Kovalchik 1987, Crowe and Clausnitzer 1997). Less common species (but

occasionally with high cover) include Caltha leptosepala and Geranium richardsonii (Padgett et al. 1989). Moss cover is often high (Mutz and Queiroz 1983, Padgett et al. 1989).

WILDLIFE VALUES Though not as good as other Salix species, Salix boothii does provide good forage for deer, elk, and beaver. Songbirds utilize the mixed Salix stands of the Salix boothii/Carex aquatilis community for cover and nesting (Hansen et al. 1988, Hansen et al. 1995). Betula glandulosa, a common understory species, provides food for snowshoe hares, grouse species, and songbirds (Crowe and Clausnitzer 1997). Salix boothii and Carex aquatilis root masses overhang streambanks forming excellent trout cover. Carex aquatilis provides only fair forage for ungulates and songbirds but waterfowl readily consume its seeds (Hansen et al. 1988, Hansen et al. 1995).

OTHER NOTEWORTHY SPECIES Few exotic species are known to occur in the Salix boothii/Carex aquatilis community. Exotic species include Poa pratensis, Taraxacum officinale, Poa palustris, and Phleum pratense, all with low cover and constancy (Kovalchik 1987, Padgett et al. 1989, Crowe and Clausnitzer 1997).

ADJACENT COMMUNITIES Wetter communities adjacent to Salix boothii/Carex aquatilis are usually herbaceous Carex aquatilis or Carex utriculata communities (Kovalchik 1987, Padgett et al. 1989, Crowe and Clausnitzer 1997) or other Salix/Carex utriculata types. Salix wolfii/Carex aquatilis, other Salix/Carex aquatilis types, or Pinus contorta/Carex aquatilis may occupy a similar moisture regime. Drier adjacent communities are either floodplain types (such as Salix boothii/Calamagrostis canadensis and Salix drummondiana/Calamagrostis canadensis), Deschampsia cespitosa meadows, or alluvial terrace communities (Kovalchik 1987, Padgett et al. 1989, Crowe and Clausnitzer 1997). Adjacent terrace communities include those dominated by, Artemisia tridentata, Artemisia cana, Pinus contorta, and Pinus ponderosa with Poa pratensis, Poa cusickii, and Deschampsia cespitosa understories. Adjacent uplands include Pinus contorta, Pinus ponderosa, Abies lasiocarpa, Picea engelmannii, and Populus tremuloides habitat types.

CONSERVATION RANK G3 S3?

SUCCESSION AND MANAGEMENT Little is known about the successional dynamics of the Salix boothii/Carex aquatilis community type. Two theories on the origin of this type exist. Mutz and Queiroz (1983) and Padgett et al. (1988) observe that Carex aquatilis communities are more often associated with sub-irrigated valley positions (e.g. spring slopes, streambanks) which have fine sediment and better drainage than areas ponded behind beaver ponds (where Carex utriculata is more common). These areas are also able to support invasion by Salix boothii (which can not tolerate constant flooding). In contrast, Youngblood et al. (1985) and Hansen et al. (1988) say that Carex aquatilis may invade on sediment in old beaver ponds and then progress to Salix domination as the ponds fill in and dry. The Salix boothii/Carex aquatilis community is stable unless overgrazing or other disturbance reduces willow and sedge cover allowing weeds, forbs, and less palatible graminoids to increase. As disturbance induced species, including Poa pratensis, invade, streambanks lose stability and streams downcut. The water table eventually lowers causing further changes in community composition toward drier types such as Pinus contorta/Carex aquatilis, Salix/Carex lanuginosa, Calamagrostis canadensis types, or Poa pratensis

types (Kovalchik 1987, Crowe and Clausnitzer 1997).

The Salix boothii/Carex aquatilis community has moderately high production of fair quality livestock forage. Grazing must be light and avoided until late summer to avoid compacting and damaging wet organic soils (Kovalchik 1987, Crowe and Clausnitzer 1997). Overgrazing reduces cover and vigor of both Salix boothii and Carex aquatilis and promotes other graminoids (Juncus species, Poa pratensis) and unpalatable mesic forbs. Overgrazing tramples and breaks the soil, reduces roots and rhizomes which anchor streambanks, and allows erosional downcutting or overwidening of streams (Kovalchik 1987, Crowe and Clausnitzer 1997). Salix boothii and Carex aquatilis growth can be rejuvenated with a rest from grazing and by burning with quick, moderate intensity fires in late summer and fall (Hansen et al. 1988). Both Salix boothii and Carex aquatilis readily re-sprout from roots and rhizomes; however, it takes about five years for the willow community to grow large enough to withstand grazing. These species also produce large amounts of seeds which allow quick colonization of fine and moist, disturbed mineral soil (Kovalchik 1987, Crowe and Clausnitzer 1997). These species are adapted to cold and flooding, though too much inundation or drought will kill them. This stresses the importance of maintaining high quality riparian vegetation with properly functioning hydrologic conditions. Likewise, both Salix boothii and Carex aquatilis provide high quality erosion control and are good for long-term revegetation (Hansen et al. 1995).

CLASSIFICATION COMMENTS Other researchers lump Salix boothii/Carex aquatilis within the broader Salix/Carex aquatilis community based on the lack of a dominant single Salix species (though Salix boothii cover is often high) (Kovalchik 1987, Crowe and Clausnitzer 1997). Similarly, Mutz and Queiroz (1983) did not separate Salix boothii/Carex aquatilis from Salix drummondiana-Salix myrtillifolia [syn. Salix boothii]/Carex rostrata [syn. Carex utriculata]-Carex aquatilis. Norton et al. (1981) and Youngblood et al. (1985) did not have enough data to support separating Salix boothii/Carex aquatilis from Salix boothii/Carex utriculata (Carex utriculata consistently has higher constancy and cover). Only one study positively describes Salix boothii/Carex aquatilis (Padgett et al. 1989).

Classification of Salix boothii/Carex aquatilis is based on data from at least one stand in southeast Idaho and seven stands in Utah (Padgett et al. 1989). There are three other records of the community in central and eastern Idaho, though none have associated plot data. Kovalchik (1987) and Crowe and Clausnitzer (1997) classified the similar Salix/Carex aquatilis community from a total of 24 stands in eastern Oregon. The similar Salix drummondiana-Salix myrtillifolia/Carex utriculata-Carex aquatilis community type was described from an unknown number of stands in the Centennial Mountains and Sawtooth Valley of Idaho (Mutz and Queiroz 1983).

EDITION 98-12-01

AUTHOR C. Murphy

SALIX DRUMMONDIANA/CAREX UTRICULATA

COMMON NAME DRUMMOND'S WILLOW/BLADDER SEDGE

PHYSIOGNOMIC TYPE Shrubland

SIMILAR COMMUNITIES The edaphic and hydrologic situations which allow Carex utriculata dominance also promote many different Salix species. However, dominance by any one Salix species is the result of factors such as elevation or grazing (Hall and Hansen 1997). Tall willow communities similar to Salix drummondiana/Carex utriculata (often with high cover and constancy of Salix drummondiana) include Salix drummondiana-Salix boothii/Carex utriculata-Carex aquatilis, Salix boothii/Carex utriculata, Salix geyeriana/Carex utriculata, and Salix lutea/Carex utriculata (Mutz and Queiroz 1983, Youngblood et al. 1985, Padgett et al. 1989, Hansen et al. 1995, Hall and Hansen 1997, Walford et al. 1997). Short willow species may dominate at higher elevations. Salix drummondiana is sometimes present in short willow communities such as: Salix candida/Carex utriculata; Salix farriae/Carex utriculata; and Salix wolfii/Carex utriculata (Youngblood et al. 1985, Padgett et al. 1989, Kovalchik 1993, Hansen et al. 1995, Walford et al. 1997). Other Carex species may be more common than Carex utriculata in similar communities due to variations in seral status or other factors. These include Salix boothii/Carex aquatilis, Salix geyeriana/Carex aquatilis, and Salix drummondiana/Carex scopulorum var. prionophylla (Youngblood et al. 1985, Padgett et al. 1989, Kovalchik 1993, Hansen et al. 1995, Hall and Hansen 1997).

RANGE The Salix drummondiana/Carex utriculata community type is known from Montana, Idaho, Washington, and probably western Wyoming. In Idaho, it is known from throughout the mountains of eastern Idaho (Hall and Hansen 1997), the Yellowstone Highlands (Jankovsky-Jones 1996), the Centennial Mountains (Mutz and Queiroz 1983, Jankovsky-Jones 1996), the Sawtooth Valley (Mutz and Queiroz 1983, Moseley et al. 1994), the Secesh River area (Moseley 1996), the North Fork St. Joe River area (Jankovsky-Jones 1998b), and the Priest River area (Jankovsky-Jones 1997a). It is common in northwestern Montana but a minor type in mid to high elevations of southern Montana (Hansen et al. 1995). The community is at moderate elevations throughout northeastern Washington and lower elevations on the eastside of the Cascade crest (Kovalchik 1993).

ENVIRONMENTAL DESCRIPTION The Salix drummondiana/Carex utriculata community type is found from 700 m to 1025 m elevation in north Idaho, northeastern Washington, and northwest Montana (Kovalchik 1993, Hansen et al. 1995, Jankovsky-Jones 1998b). Elevations in central Idaho average around 1900 m (Moseley et al. 1994, Moseley 1996) while in southwestern Montana and eastern Idaho, it is found as high as 2400 m (Hansen et al. 1995, Jankovsky-Jones 1996, Hall and Hansen 1997). The community is found in narrow to wide valleys on alluvial terraces adjacent to streams of low or moderate gradients (Mutz and Queiroz 1983, Hansen et al. 1995, Hall and Hansen 1997). These streams are often moderately entrenched, Rosgen C types (Kovalchik 1993). It is equally common adjacent to poorly drained or impounded areas such as beaver ponds, peatlands, lakes, marshes, seeps, springs, and road crossings (Kovalchik 1993, Moseley et al. 1994, Hansen et al. 1995). Though on mostly flat ground, the microtopography is characterized by channels and hummocks (Mutz and Queiroz 1983). As with landform settings, soils vary from Entisols and Histosols to Mollisols. Soils adjacent to moderate gradient streams

are often poorly developed, coarse textured, and sandy with high gravel and cobble content. These soils allow the water necessary to support Carex utriculata to easily pass through (Hansen et al. 1995). In wider valleys, clay and silt-loam or organic soils are more common. Gleying and mottling are often present, typical of a spring/summer surface water table followed by the water table dropping to 100 cm below the surface by late summer (Kovalchik 1993). Organic loam and sedge peat soils, with high available water content, are up to 1 m deep and classified as Cumulic Cryaquolls and Terric, Hemic, Sapric, and Fibric Histosols (Mutz and Queiroz 1983, Kovalchik 1993). A 5 cm surface litter/duff layer may be present. The soils of this community are held together by sod mats formed by Carex species and willow cover which effectively stabilize streambanks (Hansen et al. 1995).

MOST ABUNDANT SPECIES

Strata	Species
Tall shrub	Salix drummondiana, Salix geyeriana, Salix boothii, Salix sitchensis,Salix spp.
Short shrub	Betula glandulosa
Herbaceous	Carex utriculata, Carex aquatilis, Carex vesicaria, Phalaris arundinacea, Calamagrostis canadensis, Scirpus microcarpus, Equisetum arvense, Epilobium ciliatum, Geum macrophyllum

VEGETATION DESCRIPTION The Salix drummondiana/Carex urtriculata community type is variable, often having mixed Salix and Carex species present. Salix drummondiana is usually dominant with 30 to 55 percent cover and 70 to 100 percent constancy (Kovalchik 1993, Hansen et al. 1995, Jankovsky-Jones 1998b). Other tall willow species, such as Salix geyeriana, S. boothii, S. sitchensis, S. lasiandra, S. bebbiana, and S. pseudomonticola, usually have less than 40 percent cover and less than 30 percent constancy. While these species form a tall shrub canopy (to 4 m), shorter species, such as Salix farriae or Salix planifolia, can be prominent in the understory (Mutz and Queiroz 1983, Kovalchik 1993, Hansen et al. 1995). Where Salix species have been reduced by beaver or overgrazing, Betula glandulosa (10 to 15 percent cover), Spiraea douglasii, or Ribes species may be important (Hansen et al. 1995). Picea engelmannii, Abies lasiocarpa, and Alnus incana are also occasionally present. The herbaceous layer is dominated by Carex utriculata (10 to 39 percent cover, about 80 percent constancy) and Carex aquatilis (less than 34 percent cover, less than 80 percent constancy) with Carex vesicaria also common. Other associated Carex, having low cover and constancy, include Carex lanuginosa, C. lasiocarpa, C. lenticularis, and C. nebrascensis. Other common graminoid species, with low constancy but occasionally moderate cover (less than 40 percent), are Calamagrostis canadensis, Phalaris arundinacea, Scirpus microcarpus, Glyceria species, and Juncus species (Mutz and Queiroz 1983, Kovalchik 1993, Hansen et al. 1995, Jankovsky-Jones 1996, Jankovsky-Jones 1998b). Due to the dense Salix and Carex species cover, overall forb cover is low and mainly around shrub bases. Widespread species are Epilobium ciliatum, Geum macrophyllum, and Equisetum arvense. Less common species (but occasionally with higher cover) include Saxifraga arguta, Galium species, Petasites sagittatus, and Aster modestus (Mutz and Queiroz 1983, Kovalchik 1993, Hansen et al. 1995, Jankovsky-Jones 1996, Jankovsky-Jones 1998b). Moss cover is often high.

WILDLIFE VALUES In the winter, Salix drummondiana shoots are heavily browsed by

moose. Throughout the year Salix drummondiana is utilized by beaver and provides fair forage for elk and deer. Songbirds also utilize Salix species habitat for feeding and nesting. In addition to Salix root masses, the dense Carex utriculata and Carex aquatilis sod overhangs undercut banks creating prime fish habitat (Hansen et al. 1988, Hansen et al. 1995, Hall and Hansen 1997, Walford et al. 1997).

OTHER NOTEWORTHY SPECIES Exotic species known to occur in the Salix drummondiana/Carex utriculata community include Agrostis tenuis, Alopecurus pratensis, Iris pseudacorus, Phalaris arundinacea, Poa palustris, Poa pratensis, and Rumex crispus (Hansen et al. 1995, Jankovsky-Jones 1998b). In the Sawtooth Valley of Idaho, Moseley et al. (1994) found the Salix drummondiana/Carex utriculata community associated with rare, disjunct peatland species such as Carex buxbaumii, Carex livida, Drosera intermedia, Epilobium palustre, and Scirpus caespitosus.

ADJACENT COMMUNITIES Communities adjacent to Salix drummondiana/Carex utriculata include other Salix drummondiana types with slightly drier moisture regimes. Examples are Salix drummondiana/Calamagrostis canadensis, Salix drummondiana/Carex scopulorum var. prionophylla, and Salix drummondiana/Poa pratensis (Mutz and Queiroz 1983, Hansen et al. 1988, Kovalchik 1993, Hansen et al. 1995). Other adjacent communities with similar moisture levels are Salix geyeriana/Carex utriculata, Salix boothii/Carex utriculata, Salix farriae/Carex scopulorum var. prionophylla, and Salix wolfii communities (Mutz and Queiroz 1983, Kovalchik 1993, Hall and Hansen 1997, Walford et al. 1997). Slightly drier adjacent communities include Alnus incana/Calamagrostis canadensis, Alnus incana/Carex utriculata, Potentilla fruticosa/Deschampsia cespitosa, and Deschampsia cespitosa communities. Wetter adjacent communities are herbaceous types (Carex utriculata, Carex aquatilis, or Carex lasiocarpa dominated) and Salix farriae/Carex utriculata (Kovalchik 1993, Hansen et al. 1995). Adjacent uplands are Abies lasiocarpa, Pseudotsuga menziesii, Picea engelmannii, or Pinus ponderosa habitat types (Hansen et al. 1988, Hansen et al. 1995).

CONSERVATION RANK G3 S3

SUCCESSION AND MANAGEMENT The successional origin of Salix drummondiana/Carex utriculata is not well known. Both Salix drummondiana and Carex utriculata can be colonizers of fresh, mineral alluvium (Hansen et al. 1995, Walford et al. 1997). Thus, when alluvium is exposed, such as post-flood silt deposits around willow roots or after a beaver dam breaks, these species may invade. Alternately, Carex utriculata might invade on silt deposited in open beaver ponds, then allowing later Salix invasion as the site dries (Mutz and Queiroz 1983). Another hypothesis, taken from the similar Salix boothii/Carex utriculata type, is that a Salix community existed before the beaver dam. The beaver dam was built, flooding the Salix but not eliminating it, subsequent siltation allowed Carex utriculata to invade, and Salix rejuvenated later (Youngblood et al. 1985, Padgett et al. 1989). Whatever the origin, stability of the Salix drummondiana/Carex utriculata community is indicated by a thick accumulation of organic matter (Kovalchik 1993). Disturbance by livestock or beaver will reduce Salix drummondiana cover and allow graminoids, especially introduced species, to increase (Mutz and Queiroz 1983). If willows are reduced too much, beaver will leave in search of food and fail to

maintain dams washed out by storms. The water table will then lower as the stream downcuts and the community will change toward a drier Salix drummondiana/Calamagrostis canadensis or Abies lasiocarpa type (Hansen et al. 1988, Hansen et al. 1995).

Salix drummondiana/Carex utriculata can be a productive community but will decrease if soils are damaged or hydrologic conditions change. For example, recreation trails, road building, agriculture (including draining with ditches), and livestock grazing easily damage organic soils through compaction and reduction of water holding capacity (Mutz and Queiroz 1983, Moseley et al. 1994, Hansen et al. 1995). These activities also cause streambank sloughing as well as premature soil drying, the loss of vegetative protection, and eventual loss of the community. Fortunately, thick shrub cover and excessive wetness limits activities in this community. Livestock forage value varies with season and historic use, but both Salix drummondiana and Carex utriculata are fair to good forage in the spring (Hansen et al. 1988, Hansen et al. 1995). Overgrazing of willows decreases their vigor and eliminates them from the site allowing graminoid cover to increase. This occurs with late summer and fall grazing which reduces willow regrowth and allows sedges, with their underground root reserves, to later proliferate. Thus, long rest periods are needed to maintain the community (Hansen et al. 1995). Beaver are also important in maintaining necessary hydrologic conditions and should not be removed if possible. Prescribed fire effectively rejuvenates dead clumps because Salix drummondiana sprouts vigorously after fire (quick, hot fires are preferred over slow, cool burns). Fires also increase Carex utriculata but only if ungrazed before and after the fire (Hansen et al. 1995). Both Salix drummondiana and Carex utriculata (and Carex aquatilis and C. vesicaria) are excellent for re-vegetation over the long-term and provide good erosion control (Hansen et al. 1995).

CLASSIFICATION COMMENTS Earlier studies lumped this community within broader Salix/Carex rostrata [syn. Carex utriculata], Salix drummondiana-Salix boothii/Carex utriculata-Carex aquatilis, and Salix/Carex utriculata-Carex aquatilis communities (Tuhy and Jensen 1982, Mutz and Queiroz 1983, Walford et al. 1997). Likewise, in eastern Idaho, western Wyoming, and Utah, it may have been kept within the Salix boothii/Carex utriculata or Salix geyeriana/Carex utriculata community types (Youngblood et al. 1985, Padgett et al. 1989). These communities often have high cover and constancy of Salix drummondiana (to the level of co-dominance) making lumping of types seem logical (Hansen et al. 1995, Hall and Hansen 1997). Salix drummondiana communities, with their mixed Salix species composition, may be transitional to other community types (Kovalchik 1993). In addition, Salix sitchensis is easily confused with Salix drummondiana (with which it may hybridize). Salix sitchensis sometimes co-dominates stands making community identification difficult (Jankovsky-Jones 1998b).

Classification of Salix drummondiana/Carex utriculata is based on 43 stands in Montana (Hansen et al. 1995), 20 plots in eastern Washington (Kovalchik 1993), and 1 stand with plot data in Idaho (Jankovsky-Jones 1998b). The community has also been reported in central and eastern Idaho (Mutz and Queiroz 1983, Hall and Hansen 1997). It has also been observed in the Sawtooth Valley of Idaho at Vat Creek wetland, Huckleberry Creek Fen, Bull Moose Fen, and Alturas Lake Creek (Moseley et al. 1994). The Idaho Conservation Data Center has seven field records of the community: Moss Spring Beaver Ponds, Hotel Creek, and Fish Creek Springs in the greater Yellowstone region (Jankovsky-Jones 1996), Burgdorf Meadows/Lake Creek of central Idaho

(Moseley 1996), Gleason Meadow, Twin Lakes Fen, and Clear Creek/North Fork St. Joe River in northern Idaho (Jankovsky-Jones 1997a, Jankovsky-Jones 1998c).

EDITION 98-11-25

AUTHOR C. Murphy

SALIX EXIGUA/BARREN

COMMON NAME SANDBAR WILLOW/BARREN

PHYSIOGNOMIC TYPE Shrubland

SIMILAR COMMUNITIES Manning and Padgett (1995) described the Salix exigua/Bench community type from Nevada that is considered the same as the Salix exigua/Barren type of Padgett et al. (1989). Tuhy and Jensen (1982) described a similar type with no diagnostic undergrowth for central Idaho. One or more of Cole's (1995) Salix exigua types may be included within the variation of this one.

RANGE Stands occur in Idaho (Jankovsky-Jones 1996, 1997a, 1997b, 1997c, Moseley 1998), Nevada (Manning and Padgett 1995), Utah (Padgett et al. 1989), and probably elsewhere.

ENVIRONMENTAL DESCRIPTION This community type occurs along active streambanks or on nearby stream terraces. Flooding in this community is probably an annual event. The soils are young and fluvial in origin. It can occur in valley bottoms with very low to moderate gradients and can be from narrow to very wide. Elevations are mostly below 5,500 feet (Padgett et al. 1989, Manning and Padgett 1995, Moseley 1998).

Soils are highly variable, ranging from highly stable Cumulic Haplaquolls and Aquic Cryoborolls to early developmental Typic Udifluvents. All have developed on alluvium of varying ages. Estimated available water-holding capacity ranged from low to high, and particle-size classes include fine-loamy and sandy-skeletal. Water tables ranged from near the surface to over three feet below the surface (Padgett et al. 1989).

MOST ABUNDANT SPECIES

Strata	Species
Tree subcanopy	Populus spp.
Tall shrub	Salix exigua, Salix spp.

VEGETATION DESCRIPTION A dense stand of Salix exigua dominates the overstory of this otherwise depauperate community. Other willows, such as S. lasiandra, S. amygdaloides, and S. lutea, may occasionally be minor components. Rosa woodsii, Ribes inerme, or Cornus sericea may be present in the shrub layer, but in very low cover. The undergrowth is open with predominantly bare ground, rock, or leaf litter. Forb species are scattered and in low cover, although diversity may be high. Graminoids are generally absent or in low cover (Manning and

Padgett 1995).

WILDLIFE VALUES Stands of this community provide excellent thermal and hiding cover for a wide range of wildlife species. Salix exigua is normally not as heavily browsed as other willow species. Beavers tend to utilize Salix exigua (Hansen et al. 1995).

OTHER NOTEWORTHY SPECIES Information not available.

ADJACENT COMMUNITIES A wide range of upland communities can occur on adjacent slopes, ranging from salt desert shrub and sagebrush-steppe communities at the lower elevations to low-montane coniferous woodlands and forests at the higher elevations.

CONSERVATION RANK G3? S4

SUCCESSION AND MANAGEMENT The Salix exigua/Barren type is an early successional type that has had little undergrowth development. Some stands have rather xeric soils which inhibits the establishment of herbaceous species, while others are very wet, but have had insufficient time for establishment. Succession in this community without outside disturbance will likely lead toward the Salix exigua/Mesic forb or S. exigua/Mesic graminoid types in moist situations, while drier sites may develop into the S. exigua/Poa pratensis community (Padgett et al. 1989).

There is essentially no herbaceous livestock forage available in this type. The willows provide stability of streambanks as well as stream shading.

CLASSIFICATION COMMENTS Classification is based on seven stands in Utah, eight stands in Nevada (for the Salix exigua/Bench community), and several plots in Idaho.

EDITION 98-12-01

AUTHOR B. Moseley

SALIX EXIGUA/MESIC GRAMINOID

COMMON NAME SANDBAR WILLOW/MESIC GRAMINOID

PHYSIOGNOMIC TYPE Shrubland

SIMILAR COMMUNITIES Some Hansen et al. (1995) stands may fit in this type.

RANGE Stands occur throughout Utah and extreme western Colorado (Padgett et al. 1989) and throughout Idaho (Padgett et al. 1989, Jankovsky-Jones 1996, 1997a, 1997b, 1997c, Moseley 1998).

ENVIRONMENTAL DESCRIPTION This community type occurs on stream terraces and in

meadows associated with stream channels from about 2,000 to 7,700 feet. Valley bottoms may be narrow to very wide and of low to moderate gradient. This community is not in the most dynamic portion of the floodplain, as are some of the other Salix exigua types (Padgett et al. 1989).

Water tables range from the surface to over three feet below the surface. Distinct and prominent mottles are common within 20 inches of the surface, indicating a seasonally high water table. Soils indicate a broad range of development, from the well-developed Terric Borohemists, Cumulic Haploborolls, Typic Cryaquolls, and Pachic Cryoborolls to less-developed Aquic Cryofluvents and Fluvaquentic Haploxerolls. Soils develop on alluvial depositions of varying ages. Particle-size classes were highly variable, with estimated available water-holding capacity from low to moderate (Padgett et al. 1989).

MOST ABUNDANT SPECIES

Strata	Species
Tall shrub	Salix exigua
Herbaceous	Eleocharis palustris, Carex nebrascensis, Carex lanuginosa, Carex sheldonii, Scirpus pungens, Euthamia occidentale

VEGETATION DESCRIPTION Salix exigua dominates the overstory of this type. Salix lutea and/or S. lasiandra may also be prominent in the overstory and in some instances may codominate. Other shrubs are typically minor components of this type. The undergrowth is characterized by moderate to dense cover of graminoids species, icluding Carex nebrascensis, C. lanuginosa, Juncus balticus, Eleocharis palustris, Agrostis stolonifera, Scirpus pungens, Agropyron repens, and, in one Idaho stand, C. sheldonii. Forb cover is typically sparse (Padgett et al. 1989), although Equisetum spp. (E. arvense and E. laevigatum) can occasionally occur with relative high cover.

WILDLIFE VALUES Stands of this community provide excellent thermal and hiding cover for a wide range of wildlife species. Salix exigua is normally not as heavily browsed as other willow species. Beavers tend to utilize Salix exigua heavily (Hansen et al. 1995).

OTHER NOTEWORTHY SPECIES Information not available.

ADJACENT COMMUNITIES Because of the wide elevational gradient over which this type occurs, adjacent upland communities can range from sagebrush-steppe to coniferous forest associations.

CONSERVATION RANK G3? S3?

SUCCESSION AND MANAGEMENT In most situations the Salix exigua/Mesic graminoid community is considered an early successional type pioneering sand and gravel bars, but it may be persistent in certain instances. This type appears in general to be wetter than other Salix exigua types and the environment is likely to be more favorable to the establishment of rhizomatous graminoids (Padgett et al. 1989).

The rhizomatous graminoid cover in this community results in high soil-holding and streambank stabilization ability. Should the stands become drier and/or grazing levels increase, this type might be replaced by the Salix exigua/Poa pratensis community.

CLASSIFICATION COMMENTS Classification is based on seven plots from Utah and adjacent southeastern Idaho and western Colorado (Padgett et al. 1989) and five plots from elsewhere in Idaho.

EDITION 98-12-01

AUTHOR B. Moseley

SALIX GEYERIANA/CAREX UTRICULATA

COMMON NAME GEYER'S WILLOW/BLADDER SEDGE

PHYSIOGNOMIC TYPE Shrubland

SIMILAR COMMUNITIES See discussion in Classification Comments section on the treatment of Salix boothii and Carex aquatilis within the S. geyeriana/C. utriculata community type. The community described here is a narrow one, that is Salix boothii-dominated sites are treated as different associations (sensu Padgett et al. 1989, Walford et al. 1997, and others) and Carex aquatilis-dominated understory similarly defines a separate type (sensu Padgett et al. 1989 and others).

RANGE This is a common and widespread type in the Intermountain and Rocky Mountain areas. It is distributed from the eastern Sierra Nevada (Manning and Padgett 1995) and central Oregon (Kovalchick 1987) on the west, across northeastern Oregon (Crowe and Clausnitzer 1997), Idaho (Tuhy 1981, Tuhy and Jensen 1982, Mutz and Queiroz 1983, Youngblood et al. 1985, Jankovsky-Jones 1996, Hall and Hansen 1997), Nevada (Manning and Padgett 1995), and northern Utah (Padgett et al. 1989) to Colorado (Kittel and Lederer 1993), Wyoming (Norton et al. 1981, Chadde et al. 1988, Walford et al. 1997) and Montana (Hansen et al. 1995).

ENVIRONMENTAL DESCRIPTION Throughout its distribution, this community occurs in mountains and high valleys at elevations ranging from 4,300 to 9,000 feet. This type is most common on broad, level flood plains, but does occur in narrow bands along smaller streams in open, U-shaped valleys. Valley bottom gradients are usually low. Surface microtopography is often hummocky as a result of the irregular buildup of organic material. Hydrology of these sites is usually maintained through subirrigation and soil moisture is maintained at or near the surface in most cases. These sites may or may not be annually flooded during high water in the spring and early summer.

This community occurs on a range of soil types that are typically wet, cold, and organic or have organic surface horizons. They are generally classified as Mollisols and Histisols. Organic

surface horizons, often extending to a depth of 18 inches or more, are riddled with fibrous root and plant material. Soil textures are categorized as fine, generally silts and clays. Deeper alluvial mineral deposits are comprised of coarse and fine sands and gravels. The soils are usually mottled (Hall and Hansen 1997).

MOST ABUNDANT SPECIES

Strata	Species
Tall shrub	Salix geyeriana, Salix drummondiana, Salix boothii
Short shrub	Betula glandulosa, Potentilla fruticosa
Herbaceous	Carex utriculata

VEGETATION DESCRIPTION Salix geyeriana dominates the open overstory and characteristically appears in large, often widely-spaced clumps. Salix geyeriana can be as much as 3 m tall. A diversity of other shrubs may be present, but usually in low amounts. Some of these subordinate shrubs include Betula glandulosa, Salix boothii, Salix drummondiana, Ribes inerme, Lonicera involucrata, Potentilla fruticosa, and Alnus incana. The lower shrubs of this group often occur at the base of S. geyeriana. Carex utriculata clearly dominates the understory. Other sedges and grasses, such as Carex aquatilis, Carex interior, and Calamagrostis canadensis, may be present, but they have low cover. Forb species are sparse, but Geum macrophyllum appears to be the most constant species across the range of this type.

WILDLIFE VALUES A diversity of wildlife species, ranging from small mammals to rodents and songbirds, use this type for food, cover, and nesting. Moose and beaver, in particular, are important in this community. Beaver may provide a vital role in the maintenance of this community in many places by maintaining high water tables (Hall and Hansen 1997).

OTHER NOTEWORTHY SPECIES Information not available.

ADJACENT COMMUNITIES Adjacent upland and riparian communities vary considerably across the wide range of this type. Upland types include sagebrush-steppe, aspen, and coniferous forest. Adjacent riparian communities are even more diverse and too numerous to mention here, but mostly include other willow types and those dominated by graminoids.

CONSERVATION RANK G5 S4

SUCCESSION AND MANAGEMENT The Salix geyeriana/Carex utriculata association is the wettest of all S. geyeriana types. Prolonged, intense utilization by livestock and wild ungulates may shift the site potential to a drier grazing disclimax, characterized by more open stands with exotic grasses, such as Poa pratensis and Agrostis stolonifera, dominating the understory. Beavers may exert a significant influence on sites as well. Active dams maintain high water tables needed to support this type. However, sustained removal of willows by beavers may reduce the site to a Carex utriculata community type. When beaver abandon a site, the dams eventually deteriorate and the water table may drop, shifting the site potential to the S. geyeriana/Calamagrostis canadensis type (Hall and Hansen 1997).

The wet organic soils can be strongly impacted by livestock and heavy machinery, but the dense roots and rhizomes of Carex utriculata bind the soils and stabilize the site. Loss of the shallow water table, through soil damage and/or stream incision, will initially shift undergrowth composition towards drier graminoids and forbs. Willow regeneration will be limited and the mature individuals will eventually become decadent. Carex utriculata provides a very high level of streambank stabilization.

CLASSIFICATION COMMENTS This community has been quantitatively defined and described by at least 12 studies throughout the Intermountain region and Rocky Mountains. All these classifications have used the old name, Carex rostrata, which is now known to be strictly boreal. This name is now superseded by C. utriculata (Reznicek 1987). Because of the wide geographic distribution, different studies have taken different approaches to its classification, with some taking a rather narrow approach and others taking a much broader view of this type. Most of the variability revolves around the treatment of Salix boothii, Salix drummondiana, and Carex aquatilis. Salix geyeriana and S. boothii have been treated differently in different classifications. For example, Hansen et al. (1995) in Montana include in their Salix geyeriana types those stands with all combinations of S. geyeriana and S. boothii, citing similarities between the two species in the environments they occupy and in management issues. On the other hand, Padgett et al. (1989) place stands with at least 25 percent cover of S. boothii into their S. boothii community types, even if the stands have greater cover of the taller S. geyeriana, arguing that at presence much S. boothii cover significantly alters the structure of the vegetation. Some studies have taken an even broader approach by lumping stands dominated by Salix geyeriana and S. drummondiana, as well as S. boothii, S. lemmonii, S. bebbiana, S. wolfii and/or Betula glandulosa, into a generic Salix/Carex utriculata type (e.g., Tuhy and Jensen 1982, Kovalchik 1987, Crowe and Clausnitzer 1997). Studies have also taken varying approaches to the amount of Carex aquatilis in this community type. Some studies (e.g., Youngblood et al. 1985, Mutz and Queiroz 1983, Hall and Hansen 1997) take the broad view by defining a S. geyeriana/Carex utriculata type with either C. utriculata or C. aquatilis as the herbaceous dominant. A narrower approach has been taken by others (e.g., Padgett et al. 1989, Kittel and Lederer 1993, Walford et al. 1997), where C. utriculata is the sole herbaceous dominant and C. aquatilis-dominated sites would be a different community type.

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AUTHOR B. Moseley

SALIX PLANIFOLIA/CAREX AQUATILIS-CAREX UTRICULATA

COMMON NAME TEA-LEAF WILLOW/LEAFY TUSSOCK SEDGE-BLADDER SEDGE

PHYSIOGNOMIC TYPE Shrubland

SIMILAR COMMUNITIES Salix planifolia var. monica/Carex aquatilis-Carex utriculata is structurally and sometimes compositionally similar to other low willow communities. These communities include: Salix eastwoodiae/Carex aquatilis (also sometimes with Carex utriculata as

in Mutz and Queiroz (1983)); Salix candida/Carex utriculata; Salix planifolia/Carex scopulorum; Salix farriae/Carex utriculata; Salix commutata communities; Salix wolfii/Carex aquatilis; and Salix wolfii/Carex utriculata, which all can have Salix planifolia well represented and a mix of Carex aquatilis and Carex utriculata in the understory (Padgett et al. 1989, Kovalchik 1993, Hansen et al. 1995, Walford et al. 1997). In Yellowstone National Park, Salix wolfii/Carex aquatilis can have Carex utriculata and Salix phylicifolia (syn. S. Planifolia) phases which are very similar to Salix planifolia/Carex aquatilis-Carex utriculata, having co-dominance by Salix species (Mattson 1984). Also similar in structure and species composition, though occupying slightly drier sites, are Salix planifolia/Deschampsia cespitosa and Salix wolfii/Swertia perennis-Pedicularis groenlandica (Mutz and Queiroz 1983, Padgett et al. 1989). Cold-site tall-willow communities, such as Salix drummondiana/Carex utriculata and Salix geyeriana/Carex aquatilis or Carex utriculata, may also have abundant Salix planifolia in the understory, as well as other herbaceous species common to Salix planifolia communities (Padgett et al. 1989, Hansen et al. 1995). Salix planifolia var. planifolia communities are structurally taller and found at lower elevations than S. planifolia var. monica types, and thus, have different species composition (Hansen et al. 1995). In Alaska, Salix planifolia ssp. pulchra/Carex aquatilis is structurally similar but has other associated Salix and Carex species uncommon or not found in the lower 48 states (Viereck et al. 1992).

RANGE Salix planifolia/Carex aquatilis-Carex utriculata has been sampled in the Centennial Mountains, the South Fork Salmon River, Bear Valley, and Stanley Basin of Idaho (Mutz and Queiroz 1983). It is also known from the northeast shore of Henry's Lake, the Lemhi Mountains, and the Lemhi River basin of Idaho (Jankovsky-Jones 1998b). Very similar and more common Salix planifolia/Carex aquatilis and broader Salix planifolia communities are located in the Pioneer Mountains of Idaho; the mountains of central and southwestern Montana (Hansen et al. 1995); the Beartooth and Wind River Mountains of northwestern Wyoming and Colorado (Youngblood et al. 1985, Walford et al. 1997); the Uinta Mountains and central Utah plateau (Padgett et al. 1989); and Alaska (Viereck et al. 1992). The synonymous community Salix farriae/Carex utriculata is known from the Cascade Mountains (on the east side of the crest) (Kovalchik 1993) and the headwaters of the West Fork of the Pahsimeroi River in the Lost River Mountains of Idaho (Jankovsky- Jones 1998b). Mattson (1984) described a Salix phylicifolia phase of Salix wolfii/Carex aquatilis (which can be considered synonymous with Salix planifolia/Carex aquatilis) in Yellowstone National Park, Wyoming.

ENVIRONMENTAL DESCRIPTION Salix planifolia/Carex aquatilis-Carex utriculata (including the ecologically similar communties Salix planifolia/Carex aquatilis (Padgett et al. 1989, Hansen et al. 1995, Walford et al. 1997); Salix wolfii/Carex aquatilis, Carex utriculata and Salix phylicifolia phases (syn S. Planifolia) (Mattson 1984); Salix farriae/Carex utriculata (Kovalchik 1993); and the broader Salix planifolia community type (Youngblood et al. 1985)) is in the wettest of any low-willow community sites. It is found in subalpine to alpine areas with flat to gently sloping, broad U-shaped valley bottoms, basins, cirques, and gentle alluvial toeslopes (Padgett et al. 1989, Kovalchik 1993, Hansen et al. 1995, Jankovsky-Jones 1998b). The community is associated with poorly drained meadows or floodplains, often next to lakes, banks of narrow and meandering streams, abandoned meanders, broadly sloping seeps, and springs. These habitats usually have sub-irrigated organic soils, occasionally with enough peat to qualify as

rich fens, which experience permanent saturation and shallow flooding in the spring and early summer (Mutz and Queiroz 1983, Mattson 1984, Padgett et al. 1989, Kovalchik 1993, Hansen et al. 1995, Walford et al. 1997, Jankovsky-Jones 1998b). The micro-topography is sometimes characterized by freeze-thaw hummocks and tussocks, with standing water or rivulets in inter-mound depressions and quaking saturated ground.

Elevations range from below 1890 m in Washington (Salix farriae community of Kovalchik (1993) to between 1750 m and 2700 m in Montana and Idaho's Centennial Mountains (Youngblood et al. 1985, Hansen et al. 1995). In Yellowstone National Park, western Wyoming, and Idaho's east-central mountains elevations range from 2060 m to over 2840 m (Mattson 1984, Walford et al. 1997, Jankovsky-Jones 1998b), while in Utah they are between 2745 and 3355 m (Padgett et al. 1989).

The organic soils are acidic (4.4 to 6.3 pH) with a surface layer of organic matter, such as sedge or moss peat, ranging from 20 to 110 cm in thickness. Though soils are often shallow, the organic layer usually overlies sand, silt, or clay loams which, in turn, is over sand and gravel moraine or floodplain deposits (Mutz and Queiroz 1983, Mattson 1984, Padgett et al. 1989, Kovalchik 1993, Hansen et al. 1995, Walford et al. 1997). Mineral soils are mottled or gleyed near their upper boundary with the organic horizon. Soils are most commonly Mollisols (Histic and Typic Cryaquolls) but Histosols (Typic or Terric Cryofibrists, Borofibrists, Borohemists, Borosaprists) and Inceptisols (Histic Cryaquepts) are also well represented (Mutz and Queiroz 1983, Mattson 1984, Padgett et al. 1989, Kovalchik 1993, Hansen et al. 1995, Walford et al. 1997). The water table is usually at the surface (but occasionally drops to 64 cm deep), though water is not stagnant.

MOST ABUNDANT SPECIES

Strata	Species
Short shrub	Salix planifolia, Betula glandulosa, Salix wolfii, Salix spp., Potentilla fruticosa
Herbaceous	Carex aquatilis, Carex utriculata, Carex spp., Senecio spp., Deschampsia cespitosa, Pedicularis groenlandica

VEGETATION DESCRIPTION Salix planifolia/Carex aquatilis-Carex utriculata (including Salix planifolia/Carex aquatilis (Padgett et al. 1989, Hansen et al. 1995, Walford et al. 1997); Salix wolfii/Carex aquatilis, Carex utriculata and Salix phylicifolia phases (syn. S. Planifolia) (Mattson 1984); Salix farriae/Carex utriculata (Kovalchik 1993); and the broader Salix planifolia community type (Youngblood et al. 1985)) is dominated by Salix planifolia. Salix planifolia forms a low shrub layer 30 to 100 cm in height (avgeraging 40 to 70 cm tall) with up to 36 percent cover and 45 to 93 percent constancy (Mutz and Queiroz 1983, Mattson 1984, Kovalchik 1993, Hansen et al. 1995, Jankovsky-Jones 1998b). Salix wolfii is a commonly associated shrub (usually less than 25 percent cover but co-dominant in Yellowstone National Park) along with Betula glandulosa (up to 33 percent cover and 40 percent constancy) and Potentilla fruticosa (less than 25 percent cover) (Mutz and Queiroz 1983, Mattson 1984, Padgett et al. 1989, Kovalchik 1993, Hansen et al. 1995, Jankovsky-Jones 1998b). Several other shrub species, mainly low Salix species, are usually present, occasionally with moderate cover and/or constancy. They include

Salix pseudomonticola, Salix farriae (co-dominant in eastern Washington), Salix candida, Salix boothii, Salix eastwoodiae, Salix commutata, Alnus incana, and Spiraea douglasii. The herbaceous layer is dominated by Carex species, usually Carex aquatilis (with 13 to 40 percent cover and at least 74 percent constancy), or Carex utriculata (with 15 to 50 percent cover and at least 59 percent constancy), or an equal combination of these two species (Mutz and Queiroz 1983, Mattson 1984, Youngblood et al. 1985, Padgett et al. 1989, Kovalchik 1993, Hansen et al. 1995, Jankovsky-Jones 1998b). Both Carex aquatilis and Carex utriculata are usually present, though not always. Other Carex species are usually common but individual cover and constancy is highly variable from trace to 33 percent. Common species include Carex nebrascensis, C. simulata, C. canescens, C. aurea, C. aperta, and C. scopulorum. In addition, Deschampsia cespitosa is common (with low cover) and Calamagrostis canadensis, Phleum alpinum, Juncus balticus, and Luzula parviflora are also sometimes present (usually with low cover and constancy) (Mutz and Queiroz 1983, Mattson 1984, Youngblood et al. 1985, Padgett et al. 1989, Kovalchik 1993, Hansen et al. 1995, Jankovsky-Jones 1998b). Forb cover is much less than graminoids, and species diversity can be relatively low. The most commonly encountered species are Pedicularis groenlandica (low cover and moderate constancy) followed by Senecio (Senecio cymbalaria, S. sphaerocephalus, S. integerrimus, and S. triangularis with up to 10 percent cover), Aster (Aster occidentalis and A. foliaceus), Epilobium, Galium (Galium bifolium, G. trifidum), Potentilla, Viola, Gentiana, and Erigeron species. Moss cover can be thick and continuous or associated with hummocks (30 to 60 percent cover) (Mattson 1984, Padgett et al. 1989, Kovalchik 1993, Jankovsky- Jones 1998b). Scattered conifers, such as Picea engelmannii and Pinus contorta, may also be found on hummocks.

WILDLIFE VALUES Salix planifolia communities are valuable for wildlife, especially as winter forage. Beaver, elk, and moose use of Salix planifolia is moderate to heavy, though few wildlife trails are observed (Padgett et al. 1989, Hansen et al. 1995, Walford et al. 1997). If shrubs are exposed, moose and other ungulates will browse the shrub to the level of the snowpack. Birds, such as common snipe and common yellowthroat, also use Salix planifolia habitat (Youngblood et al. 1985). The understory of Salix planifolia/Carex aquatilis-Carex utriculata is also important. For example, Carex aquatilis seeds are eaten by waterfowl which also use Carex stands for cover. Ungulates graze Carex aquatilis moderately. The roots of Salix planifolia and associated Carex sod create stable, overhanging streambanks which are excellent fish habitat (Hansen et al. 1995).

OTHER NOTEWORTHY SPECIES In Idaho, Salix planifolia/Carex aquatilis-Carex utriculata may be associated with peatlands which potentially support rare, often disjunct, species. Salix farriae and Salix pseudomonticola are considered rare in Idaho, both of which are associated with Salix planifolia in the West Fork of the Pahsimeroi River and Lemhi River basin respectively (Jankovsky-Jones 1998b). Exotic species are rarely found in this community, the only one sampled being Poa pratensis (Mattson 1984, Hansen et al. 1995, Jankovsky-Jones 1998b).

ADJACENT COMMUNITIES Wetter communities adjacent to Salix planifolia/Carex aquatilis-Carex utriculata include open water, Carex saxatilis stands, or Carex utriculata meadows (Mutz and Queiroz 1983, Jankovsky-Jones 1998b). The change to slightly drier

adjacent communities is more abrupt. These communities include Deschampsia cespitosa, Carex simulata, or Juncus balticus meadows and Salix wolfii/Carex utriculata, Salix wolfii/Swertia perennis-Pedicularis groenlandica, other Salix species stands, or stands of Potentilla fruticosa. Neighboring uplands may be talus, with interspersed Pinus contorta and Pinus flexilis, and Pinus contorta forest (Mutz and Queiroz 1983, Jankovsky-Jones 1998b). In addition to the aforementioned communities, adjacent wetter communities to the ecologically similar Salix planifolia/Carex aquatilis, Salix wolfii/Carex aquatilis (Carex utriculata and Salix phylicifolia phases), and Salix farriae/Carex utriculata communities include Carex aquatilis, Eleocharis pauciflora, Carex lasiocarpa, and Eriophorum polystachion. On similarly moist, or slightly drier sites, adjacent communities include Salix boothii/Mesic Graminoid, Calamagrostis canadensis meadows, Salix farriae/Carex scopulorum, Salix drummondiana/Carex scopulorum, and Salix geyeriana/Calamagrostis canadensis. Even drier neighboring sites support Picea engelmannii/Carex scopulorum, Abies lasiocarpa/Trollis laxus, Ledum glandulosum, and Abies lasiocarpa/Calamagrostis canadensis (Padgett et al. 1989, Kovalchik 1993, Hansen et al. 1995, Walford et al. 1997). Other associated uplands include Artemisia tridentata steppe (Mattson 1984) and Abies lasiocarpa or Picea engelmannii forests.

CONSERVATION RANK G3Q S3

SUCCESSION AND MANAGEMENT Due to the long-term accumulation of peat, Salix planifolia/Carex aquatilis-Carex utriculata (and related Salix planifolia/Carex aquatilis) is apparently a stable community. Though little is known about Salix planifolia community succession, it is probably similar to Salix wolfii/Carex aquatilis which forms over time on organic soils where Carex aquatilis has replaced Carex utriculata (Youngblood et al. 1985). Carex utriculata colonizes old beaver ponds that have filled with silt and clay and eventually Salix species establish on higher points where surface water is less. Carex utriculata and Carex aquatilis have a similar moisture regime, but Carex utriculata appears to be more pioneering and tolerant of deeper water than Carex aquatilis (Padgett et al. 1989). Thus, if hydrologic conditions change slightly, then Carex aquatilis may be able to replace Carex utriculata. Alternatively, Carex aquatilis more often establishes on sites where floods deposit sediment and moving water keeps the root zone aerobic (versus anaerobic, which Carex utriculata better tolerates) (Mutz and Queiroz 1983). It is possible that Salix planifolia may invade suitable habitat in a Carex aquatilis community (instead of a Carex utriculata community) and the presence of Carex utriculata is due to microtopographical or soil variation at a site. Beaver are important in maintaining high water tables necessary for Salix planifolia/Carex aquatilis-Carex utriculata perpetuation. If beaver leave a site or the hydrology is otherwise altered, stream channels may downcut, lowering the water table and allowing invasion by species less tolerant of saturated conditions (Padgett et al. 1989, Hansen et al. 1995, Walford et al. 1997, Jankovsky-Jones 1998b). Such species include Salix wolfii or other Salix species, Potentilla fruticosa, Deschampsia cespitosa, Poa pratensis, Juncus balticus, Trifolium species, and various mesic forbs. Succession would be a slow process, however, since organic matter decomposes very slowly during the short growing seasons. If the site becomes even drier, Picea engelmannii or Pinus contorta communities may form (Youngblood et al. 1985).

The high water table and fragile organic soils make most management activities incompatible with

perpetuation of the Salix planifolia/Carex aquatilis-Carex utriculata community. Though not commonly grazed by livestock, Carex aquatilis and Carex utriculata are of variable value as forage and production can be moderate (Hansen et al. 1995). However, livestock grazing is not recommended on saturated organic soils. In the rare chance that soils sufficiently dry by fall, late season grazing may be possible. However, late grazing can potentially damage Salix which needs late season regrowth. Off-road vehicles, livestock, and recreationists easily damage organic soils, crushing fibers and causing deep ruts. Thus, roads and trails should be on neighboring upland soils (Hansen et al. 1995). The dense roots of Salix planifolia and sod mats of Carex utriculata and Carex aquatilis are excellent streambank stabilizers. Root wads also filter out sediments, build banks, and reduce flood erosional energy (Hansen et al. 1995). Water diversion, caused by road construction or trails, removal of beaver and their dams, or other hydrologic alterations will cause the water table to drop. Sites supporting the community will dry and organic layers will begin to decompose, increasing soil erosion possibilities (Mutz and Queiroz 1983). The construction of rock check dams can raise water tables, helping restore the hydrologic regime (Hansen et al. 1995). In addition, Salix planifolia is valuable for revegetation. Fire is rare in these wet sites and, while Salix planifolia may resprout after fire, the effects of fire are not well known. Salix planifolia communities are good for wildlife viewing and fishing, though excessive human use can damage soils, create trails, and cause streambank sloughing and erosion (Mutz and Queiroz 1983, Hansen et al. 1995).

CLASSIFICATION COMMENTS Salix planifolia var. monica/Carex aquatilis-Carex utriculata [syn. C. utriculata] is a broadly defined community encompassing variation in understory species importance throughout its range. The understory can be dominated by either Carex species, but Carex aquatilis dominates most often. With further sampling, this community could potentially be split into Salix planifolia/Carex utriculata (currently not described) and Salix planifolia/Carex aquatilis (described or recognized by Padgett et al. 1989, Hansen et al. 1995, Walford et al. 1997, Jankovsky-Jones 1998b). Alternatively, the similarity of Salix planifolia/Carex aquatilis with Salix planifolia/Carex aquatilis-Carex utriculata could warrant lumping as one community named for the broader two-sedge type. Though Carex utriculata and Carex aquatilis have different ecological requirements, the presence of both could be a function of microtopographic or soil variation at a site (Mutz and Queiroz 1983). Youngblood et al. (1985) described a broad Salix planifolia community type which is similar to Salix wolfii/Carex utriculata in soils and species composition. Though Salix wolfii communities do not always have high cover or constancy of Salix planifolia, they are sometimes considered synonymous with Salix planifolia communities. For example, in Yellowstone National Park, Wyoming, the Carex utriculata and Salix phylicifolia [syn. Salix planifolia] phases of Salix wolfii/Carex aquatilis are very similar to Salix planifolia/Carex aquatilis-Carex utriculata in that both Salix species are co-dominant (Mattson 1984). The phases of this community are considered synonymous with Salix planifolia/Carex aquatilis by Walford et al. (1997). Kovalchik's (1993) Salix farriae/Carex utriculata is also considered synonymous with Salix planifolia/Carex aquatilis-Carex utriculata due to co-dominance by Salix planifolia and the moderate amount of Carex aquatilis (Jankovsky-Jones 1998b).

Classification of Salix planifolia/Carex aquatilis-Carex utriculata is based on three plots from the Lemhi Mountains area of east-central Idaho (one of which is protected in the Trail Creek

Research Natural Area, Jankovsky-Jones 1998b), two plots from the Centennial Mountains, and six sites in central Idaho (Mutz and Queiroz 1983). The Salix planifolia/Carex aquatilis community is much more common and its classification is based on 57 stands from Montana (Hansen et al. 1995); over 8 stands in Utah (Padgett et al. 1989); at least 4 plots from northwestern Wyoming plus Mattson's (1984) Salix wolfii/Carex aquatilis-Salix phylicifolia plots from Yellowstone National Park (Walford et al. 1997); and unknown numbers of plots elsewhere in its range. In addition, Kovalchik (1993) sampled five Salix farriae/Carex utriculata stands in the Cascades of Washington which are considered synonymous with Salix planifolia/Carex aquatilis-Carex utriculata. Two other Salix planifolia dominated stands are known from Idaho and both are protected as Research Natural Areas in the Pioneer Mountains (Jankovsky-Jones 1998b).

EDITION 99-02-02

AUTHOR C. Murphy

SARCOBATUS VERMICULATUS/DISTICHILIS STRICTA

COMMON NAME GREASEWOOD/SALTGRASS

PHYSIOGNOMIC TYPE Sparse shrubland

SIMILAR COMMUNITIES This is a distinctive type in the Sarcobatus vermiculatus alliance.

RANGE This community occurs in Colorado, Idaho, Montana, Washington, and Oregon (Bourgeron and Engelking 1994), and possibly also Wyoming, Nevada, and Utah (Daubenmire 1970).

ENVIRONMENTAL DESCRIPTION The Sarcobatus vermiculatus/Distichilis stricta community occurs in broad, level to gently sloping bottomlands, along low-gradient creeks and rivers, or internally drained basins. These depositional areas generally have deep alluvial soils. The water table is generally within a few cm of the soil surface throughout the growing season. Elevations are generally less than 5,000 and the climate is arid. Salts accumulate in the soils as inflowing surface waters evaporate.

The type occurs on poorly-drained, fine-textured alluvium. Soils have a high pH. Daubenmire (1970) found that Sarcobatus vermiculatus raises the soil pH directly beneath the canopy.

MOST ABUNDANT SPECIES

Strata	Species
Short shrub	Sarcobatus vermiculatus
Herbaceous	Distichilis stricta, Hordeum jubatum

VEGETATION DESCRIPTION This type is characterized by a sward of Distichilis stricta

over which are scattered bushes of Sarcobatus vermiculatus growing 1-2 m tall. Species richness is very low.

WILDLIFE VALUES Information not available.

OTHER NOTEWORTHY SPECIES A vascular plant species rare in Idaho, Teucrium canadense, occurs in the ecotone between this community and the Scirpus acutus type at one site.

ADJACENT COMMUNITIES The low elevations occupied by this community limit adjacent upland vegetation to either salt-desert shrub (e.g., A. confertifolia and Grayia spinosa) or Artemisia tridentata-steppe vegetation.

CONSERVATION RANK G4 S1

SUCCESSION AND MANAGEMENT Fire kills Sarcobatus vermiculatus back only to the ground surface, and sprouts from the root crown appear promptly afterward (Daubenmire 1970). Distichilis stricta appears to recover to near pre-fire cover within five years. Heavy grazing leads to the dominance by annuals such as Bromus tectorum, Lepidium perfoliatum, and Bassia hyssopifolia, but the Distichilis itself is highly tolerant of grazing. Only severe use will bring about its displacement.

Ordinarily, Sarcobatus vermiculatus is little used by livestock, but under heavy grazing pressure the shrubs become smaller and develop a compact canopy of foliage, with Bromus tectorum replacing the Distichilis. It has been shown that in a Sarcobatus stand where Distichilis had been replaced by Bromus tectorum because of past heavy grazing, winter rains moistened the soil profile no deeper than 6 dm. However, the negligible transpiration of the leafless shrub in winter allowed so much water to be stored in the soil that the following spring Bromus was distinctly more productive here than in a nearby area where the only shrub was the evergreen, Artemisia tridentata (Daubenmire 1970).

CLASSIFICATION COMMENTS Stands of this community have been sampled in Washington (7), Idaho (2), and possibly elsewhere.

EDITION 98-01-05

AUTHOR B. Moseley

SARCOBATUS VERMICULATUS/ELYMUS CINEREUS

COMMON NAME GREASEWOOD/GREAT BASIN WILDRYE

PHYSIOGNOMIC TYPE Sparse shrubland

SIMILAR COMMUNITIES The Sarcobatus vermiculatus/Elymus cinereus community is

found where surface soils are less saline than sites supporting the Sarcobatus vermiculatus/Distichlis spicata community. Elymus cinereus is diagnostic of the Sarcobatus vermiculatus/Elymus cinereus community and Distichlis spicata is not reported to occur in the stands. A less saline Sarcobatus vermiculatus/Agropyron smithii community is reported by Hansen et al. (1995) and Mueggler and Stewart (1980).

RANGE Minor type at lower elevations in Montana, Idaho, Oregon, and Washington, and possibly Nevada and California.

ENVIRONMENTAL DESCRIPTION The Sarcobatus vermiculatus/Elymus cinereus community occurs as a narrow band along low-gradient creeks and rivers or in internally drained basins. These depositional areas generally have deep alluvial soils. The water table is generally within a few cm of the soil surface throughout the growing season. Elevations are generally less than 6,500 feet and the climate is arid. Salts accumulate in the soils as inflowing surface waters evaporate.The communty type occurs on poorly-drained, saline or alkaline clay soils.

MOST ABUNDANT SPECIES

Strata	Species
Short shrub	Sarcobatus vermiculatus, Chrysothamnus nauseosus, C. viscidiflorus
Herbaceous	Elymus cinereus, Juncus balticus, Poa juncifolia, Phlox kelseyi var. kelseyi

VEGETATION DESCRIPTION The Sarcobatus vermiculatus/Elymus cinereus community is comprised of approximately equal cover of Sarcobatus vermiculatus and Elymus cinereus. The shrub Chrysothamnus nauseosus (and/or C. viscidiflorus) is frequently present with high cover indicative of disturbance. Forbs and grasses are sparse and bare ground is usually present. Crepis runcinata, Haplopappus uniflorus, Phlox kelseyi var. kelseyi, Sisyrinchium idahoense, Agropyron smithii, Juncus balticus, and Poa juncifolia are often present.

WILDLIFE VALUES Sarcobatus vermiculatus may be utilized by cattle, deer, and antelope in the winter, but it is poisonous to sheep (Muegler and Stewart 1980). This community may provide some habitat and thermal and hiding cover for big game and upland birds (Hansen et al. 1995).

OTHER NOTEWORTHY SPECIES A rare vascular plant, Astragalus diversifolius, sometimes occurs in this community.

ADJACENT COMMUNITIES The low elevations occupied by this community limit adjacent upland vegetation to either salt-desert shrub (e.g. Atriplex confertifolia and Grayia spinosa) or Artemisia tridentata-steppe vegetation. Adjacent wetlands may be dominated by graminoids (e.g. Carex aquatilis, Juncus balticus, Deschampsia cespitosa) or shrubs (Potentilla fruticosa).

CONSERVATION RANK G3 S2

SUCCESSION AND MANAGEMENT Fire kills Sarcobatus vermiculatus back only to the

ground surface, and sprouts from the root crown appear promptly afterward (Daubenmire 1970).

Both of the diagnostic species are palatable early in the growing season. Spring grazing of Elymus cinereus is very harmful to this grass species and at least 10 to 12 inches of stubble should be left. Sarcobatus vermiculatus is moderately poisonous to cattle and sheep, but will be browsed in the spring (Ogle 1997). Heavy spring and summer grazing will result in a decrease in Sarcobatus (Hansen et al. 1998).

CLASSIFICATION COMMENTS Stands of this community have been sampled in Washington (7), Montana (2), and Idaho (3), and possibly elsewhere.

EDITION 98-06-03

AUTHOR M. Jankovsky-Jones

AGROPYRUM SMITHII

COMMON NAME WESTERN WHEATGRASS

PHYSIOGNOMIC TYPE Herbaceous

SIMILAR COMMUNITIES This community is similar to several others that are dominated or co-dominated by Agropyron smithii. Further work needs to be done to refine the differences in composition and environmental characteristics.

RANGE Major type at lower elevations in Montana, Idaho, Colorado, Utah, Nebraska, Saskatchewan, and possibly North Dakota.

ENVIRONMENTAL DESCRIPTION This community occurs on flat to gently sloping topography. Soils are clay, clay loam, and silt loam. It is sometimes found on alluvial fans of small streams or in swales where either overland flow or fine textured soils allow for wetter moisture regimes.

Soil texture ranges from poorly drained to very poorly drained clay to silt loams. Soils vary widely from neutral to moderately akali (Hansen et al. 1995). The soils are deep (40-100 cm) and well developed. Seasonal flooding is common in spring following snowmelt. The type is able to withstand drought conditions.

MOST ABUNDANT SPECIES

Strata	Species
Herbaceous	Agropyron smithii

VEGETATION DESCRIPTION Agropyron smithii occurs in nearly pure stands (80 percent cover) with few associates. Species such as Koeleria macrantha and Poa spp. may be locally abundant. Artemisia leudoviciana, Bouteloua gricilis, Stipa viridula, and Stipa comata may

also be present. The type occurs in swales and nearly level alluvial terraces where either overland flow or fine textured soils allow for a wetter moisture regime (Hansen et al. 1995).

WILDLIFE VALUES Agropyron smithii community types may be used by waterfowl for nesting sites. The dominant graminoid is preferred by antelope and deer during the spring.

OTHER NOTEWORTHY SPECIES Information not available.

ADJACENT COMMUNITIES Adjacent wetter sites may include Spartina gracilis, Phragmites australis, or Phalaris aurundinacea. Drier sites are typically occupied by upland species (Hansen et al. 1995).

CONSERVATION RANK G3G5 S1

SUCCESSION AND MANAGEMENT The Agropyron smithii community is considered a late successional, stable community. This type is tolerant of grazing pressure and drought. Following drought or management of overgrazed areas the dominant species will rapidly colonize areas it previously occupied (Hansen et al. 1995). Overgrazing in May and June may decrease its productivity and may eventually result into coversion to a type dominated by the exotics Poa pratensis or Agrostis stolonifera. When grazing is removed Symphoricarpos occidentalis, Glycyrrhiza lepidota, and Cirsium arvense may invade (Hansen et al. 1995).

Agropyron smithii is tolerant of fire during the dormant state. During the growing season recovery from fire may be delayed. The dominant graminoid has potential for revegetating disturbed or degraded wetland sites. Transplants are desirable since seedlings may be slow growing. Once the species becomes established, the plants are able to spread quickly by rhizomes (Hansen et al. 1995).

CLASSIFICATION COMMENTS Classification based on 32 stands in Montana, and an unknown number of stands in eastern Idaho.

EDITION 96-02-05

AUTHOR M. Jankovsky-Jones

CAREX NEBRASCENSIS

COMMON NAME NEBRASKA SEDGE

PHYSIOGNOMIC TYPE Herbaceous

SIMILAR COMMUNITIES Other communities for which Carex nebrascensis is a community dominant or codominant include the C. nebrascensis-C. microptera community possibly occurring in California, Nevada, Oregon, and Washington, the C. nebrascensis-Catabrosa aquatica community from Colorado, and the Deschampsia cespitosa-C. nebrascensis community

from Colorado and Wyoming (Bourgeron and Engelking 1994, Anderson et al. 1998).

RANGE The Carex nebrascensis community type has been documented in every western state, with the possible exception of New Mexico and Washington (Manning and Padgett 1995, Anderson et al. 1998).

ENVIRONMENTAL DESCRIPTION This community typically occurs at low to mid-elevations in the mountains, ca. 3,300 to 9,200 feet depending on latitude. It most often occurs in meadows and on broad alluvial terraces with fine-textured soils, but also around seeps. Although stands can occur near streams and rivers, the high water tables found in this type appear to result from lateral subirrigation rather than fluvial flooding. Valley bottom widths can range from very narrow to very broad (typically moderate to broad) and gradients can range from very low to very high (typically low). It also occurs along a wide variety of Rosgen stream classes (Youngblood et al. 1985, Padgett et al. 1989, Hansen et al. 1995, Manning and Padgett 1995, Crowe and Clausnitzer 1997).

The Carex nebrascensis community type is mostly associated with deep, fine-textured mineral soils (Mollisols, Andisols, Entisols, and Inseptisols). It rarely occurs on organic substrates (Histisols). Water tables are typically at or near the surface, at least in the early growing season, occasionally dropping to more than 1 m. Estimated available water holding capacity is moderate to high (Youngblood et al. 1985, Padgett et al. 1989, Hansen et al. 1995, Crowe and Clausnitzer 1997).

MOST ABUNDANT SPECIES

Strata	Species
Herbaceous	Carex nebrascensis, Juncus balticus, Deschampsia cespitosia

VEGETATION DESCRIPTION Stands of the Carex nebrascensis community type are generally small and widely scattered on the landscape. Carex nebrascensis clearly dominates the vegetation, with generally minor amounts of other graminoids, including Glyceria striata, Deschampsia cespitosa, Juncus balticus, Calamagrostis neglecta, and Poa pratensis, among many others. Forbs species present in the community are highly variable and typically sparse (Youngblood et al. 1985, Padgett et al. 1989, Hansen et al. 1995, Manning and Padgett 1995, Crowe and Clausnitzer 1997, Hall and Hansen 1997).

WILDLIFE VALUES Carex nebrascensis is palatable to elk and provides food and cover for waterfowl (Hansen et al. 1995).

OTHER NOTEWORTHY SPECIES Information not available.

ADJACENT COMMUNITIES Because of the wide elevational and geographical distribution, adjacent upland communities can range from sagebrush-steppe at the lower elevations to a diversity of montane and subalpine coniferous forest types. Adjacent riparian communities are equally diverse and include coniferous forest, deciduous forest, tall shrub, low shrub, and herbaceous communities.

CONSERVATION RANK G4 S3

SUCCESSION AND MANAGEMENT Some studies consider all stands of the Carex nebrascensis community type to be a grazing disclimax (e.g., Hansen et al 1995, Crowe and Clausnitzer 1997, Hall and Hansen 1997), while others consider it to be the potential natural community in some cases (e.g., Youngblood et al. 1985, Padgett et al. 1989, Manning and Padgett 1995). These latter studies apparently sampled stands that they considered to have received little or no grazing pressure. Carex nebrascensis is strongly rhizomatous and robust, outcompeting other species that occupy similar sites, such as Deschampsia cespitosa. The dominance of C. nebrascensis may represent disturbance conditions because it can persist under heavy grazing. Under high quality conditions, however, increaser species (e.g., Juncus balticus, Poa pratensis, Aster spp., and/or Trifolium spp.) are either absent or present with low cover. While Deschampsia cespitosa may have once codominated some sites, the strongly rhizomatous habit of C. nebrascensis has likely facilitated its continued dominance. Once C. nebrascensis dominates a site, it should be considered the potential natural community for these sites (Manning and Padgett 1995).

Carex nebrascensis, although an increaser in some communities, is very palatable to livestock and an excellent soil binder in wet meadows. Several studies suggest that management of this community should allow for regrowth at the end of the grazing season to replenish carbohydrate reserves for winter respiration and early spring growth. The typically wet, fine-textured soils are susceptible to compaction and hummocking by excessive livestock use particularly if the sod layer is broken and hummocks are present. Grazing value ratings are high for elk, cattle and horses, and medium for sheep and deer. The erosion control potential rating is high. It is valuable for streambank stabilization because of its strong rhizomes and dense roots (Manning and Padgett 1995).

CLASSIFICATION COMMENTS Classification of this community is based on many plots from many studies in Oregon, Nevada, Idaho, California, Montana, Wyoming, Utah, and Colorado, at least.

EDITION 98-12-08

AUTHOR B. Moseley

CAREX SIMULATA

COMMON NAME SHORT BEAKED SEDGE COMMUNITY TYPE

PHYSIOGNOMIC TYPE Herbaceous

SIMILAR COMMUNITIES Not identified.

RANGE The Carex simulata community type is a minor, although widespread, type which occurs in the montane valleys throughout southern and south-central Idaho; the Wyoming Range

and the Yellowstone Volcanic Plateau of northwestern Wyoming (Youngblood 1985), the Uinta Mountains and the Wasatch Plateau of Utah (Padgett et al. 1989), the mountains of Montana (Hansen et al. 1995), and is scattered throughout central Oregon (Kovalchik 1987).

ENVIRONMENTAL DESCRIPTION Stands are located in wet depressions such as broad meadows, toe slope seeps or gentle slopes below seeps, flat alluvial terraces adjacent to streams, and swales formed by abandoned channels.

Soils of the Carex simulata community type commonly have organic matter accumulation 30-120 cm thick; Padgett et al. (1989) noted that although the degree of organic matter decomposition is variable, communities within his study area were most often associated with organic soils rather than highly decomposed mineral soils. Kovalchik (1987) describes soils of this community type as organic loam and sedge peats. This type may also be found on poorly drained, fine textured, mineral soils (Hansen et al. 1995) or fine loams and clays with organic surface horizons of thick (cumulic) mollic epipedons (Youngblood et al. 1985). Water tables remain at or near the soil surface throughout the growing season. Available water capacity is moderate to high. Soil reaction is slightly acid to neutral (Hansen et al. 1995).

MOST ABUNDANT SPECIES

Strata	Species
Herbaceous	Carex simulata, Carex utriculata, Deschampsia cespitosa, Carex aquatilis, Juncus balticus

VEGETATION DESCRIPTION Carex simulata dominates the intermediate to rich fen with 60-85 feet cover. Moss cover is typically high. Low species diversity, with Carex aquatilis, Deschampsia cespitosa and C. utriculata being the only associates with high constancy, is characteristic. The shrubs Potentilla fruticosa, Salix wolfii, and S. brachycarpa are sometimes present. The most common forbs include Pedicularis groenlandica and Swertia perennis.

WILDLIFE VALUES Waterfowl may use wetter extremes of this type for foraging (Hansen et al. 1995). This type may provide early spring forage for deer when adjacent uplands are still covered by snow. Streams are generally too small or intermittent to support salmonids (Kovalchik 1987).

OTHER NOTEWORTHY SPECIES Information not available.

ADJACENT COMMUNITIES Wetter sites are the Scirpus acutus community type, open water (Hansen et al. 1995), or Carex utriculata or Carex aquatilis community types (Padgett et al. 1989). The Potentilla fruticosa/Deschampsia cespitosa community types are common on drier sites (Hansen et al. 1995), while uplands may be dominated by Pinus contorta, Picea engelmannii, and/or Populus tremuloides (Padgett et al. 1989).

CONSERVATION RANK G4 S2

SUCCESSION AND MANAGEMENT The strongly rhizomatous Carex simulata appears to

form a dense, stable community (Padgett et al. 1989). Continually high water tables limit the successful establishment of most other species. Due to the season-long high-water table, the sites are often inaccessible and minimally disturbed (Hansen et al. 1995).

Carex simulata appears able to withstand moderate grazing pressures, though impacts on soils may include hummocking and pitting (Padgett et al. 1989). For a grazing program to be successful, it must meet the basic biological requirement of the plants; long rest periods may be required to maintain or improve a plant community (Hansen et al. 1995). Prescribed fire is not a useful tool on this type. If the soil surface becomes dry, the organic soil may be quite flammable and fire will penetrate the soil and destroy sedge rhizomes (Kovalchik 1987).

CLASSIFICATION COMMENTS Classification based on 3 stands in Utah and Southeastern Idaho, 12 stands in Eastern Idaho-Western Wyoming, 15 stands in Montana, and 15 stands in Oregon.

EDITION 95-08-06

AUTHOR L. Williams

CAREX UTRICULATA

COMMON NAME BLADDER SEDGE

PHYSIOGNOMIC TYPE Herbaceous

SIMILAR COMMUNITIES This sedge species was previously thought to be Carex utriculata, which was included in many community type names throughout the west. We now know this species as C. utriculata.

RANGE This community occurs in the following states: Washington, Oregon, Nevada, Idaho, Montana, Wyoming, Utah, New Mexico, and Colorado.

ENVIRONMENTAL DESCRIPTION This community is widespread at moderate to high elevations in the mountains, rarely the low-elevation valleys, or on volcanic plains. It occurs in a wide variety of landscape settings, such as in narrow to broad valley bottoms on meadows, seeps, stream terraces and is commonly associated with ponds and sloughs that have silted in. It can occur in standing water or on sites that become relatively dry during the latter part of the growing season. Valley bottom gradients are low (Padgett et al. 1989, Hall and Hansen 1997).

Soils are classified as Histisols, Mollisols, Inceptisols, and Entisols. Mineral soils are generally very organic-matter rich and often have an incipient histic epipedon forming at the surface. These soils may eventually become Histisols. Most of the mineral soils are fine-textured and have high water holding capacity. The soils are saturated to the surface well into the summer and the water table is usually within two feet of the surface late into the growing season (Crowe and Clausnitzer

1997, and others).

MOST ABUNDANT SPECIES

Strata	Species
Herbaceous	Carex utriculata, Carex nebrascensis, C. aquatilis

VEGETATION DESCRIPTION Carex utriculata typically exhibits monospecific dominance in this community, with dense cover. Carex nebrascensis, C. aquatilis, and/or Juncus balticus may be abundant in this species-poor community. Litter often accumulates and few species can establish on these organic, permanently saturated or inundated soils. This is why willows are rarely present in this community (Hansen et al. 1995, Manning and Padgett 1995, Crowe and Clausnitzer 1997).

WILDLIFE VALUES This community performs a vital role in maintaining water quality and aquatic health in headwater streams. Past beaver activity is often evident in this community type, and Carex utriculata is one of the species likely to pioneer newly-flooded beaver ponds. Palatability appears to be lower than for other sedges such as Carex nebrascensis or C. aquatilis (Padgett et al. 1989). Carex utriculata provides valuable breeding and feeding grounds for waterfowl and snipe. Common yellowthroats, red-winged blackbirds, song sparrows, and tree swallows are commonly associated with this community (Crowe and Clausnitzer 1997).

OTHER NOTEWORTHY SPECIES Information not available.

ADJACENT COMMUNITIES Because of the wide elevational and geographical distribution, adjacent upland communities can range from sagebrush-steppe at the lower elevations (rare) to a diversity of montane and subalpine coniferous forest types.

CONSERVATION RANK G5 S4

SUCCESSION AND MANAGEMENT Carex utriculata is a widespread species that occupies mineral or organic soils with seasonally high water tables. This community typically colonizes recently formed ponds and/or sites in or adjacent to low-gradient stream channels. It has been observed that C. utriculata has higher cover on sites that are seasonally flooded; continually inundated sites had decreased shoot density. It can colonize permanently flooded sites, often doing so from the outer edge. As soil and litter build up, these sites are more conducive to increased C. utriculata dominance. This species is relatively long-lived and maintains dominance with high soil moisture; communities are at potential for these sites. As soil moisture decreases, other species such as C. nebrascensis, C. simulata, or Deschampsia cespitosa may replace C. utriculata (Manning and Padgett 1995).

Though C. utriculata produces large amounts of herbage every year, it apparently is relatively unpalatable to livestock, especially as it matures. It is a coarse sedge with high amounts of silica in its leaf cells. The dense network of rhizomes and roots provides excellent streambank stabilization.

CLASSIFICATION COMMENTS Classification of this community is based on many plots from Washington, Oregon, Nevada, Idaho, Montana, Wyoming, Utah, New Mexico, and Colorado.

EDITION 98-01-02

AUTHOR B. Moseley

CAREX LIMOSA

COMMON NAME MUD SEDGE COMMUNITY TYPE

PHYSIOGNOMIC TYPE Herbaceous

SIMILAR COMMUNITIES Carex limosa appears closely related to the C. aquatilis community type with which it is commonly associated (Padgett et al. 1989). Mattson's (1984) C. limosa series and phases described for the central portion of Yellowstone National Park are included.

RANGE The Carex limosa community type is distributed throughout the northern hemisphere; in the western United States it is a minor type in the Uinta Mountains of Utah, southeastern Idaho, throughout much of Montana, and in central Yellowstone National Park.

ENVIRONMENTAL DESCRIPTION This community type is associated with pond and lake margins, and often develops on floating or quaking mats. It may also occur on low gradient inflows or outflows of ponds or lakes. Carex limosa is strongly rhizomatous and when combined with mosses, maintains the fibric nature of the organic sedge and moss peat soils (Padgett et al. 1989).

MOST ABUNDANT SPECIES

Strata	Species
Herbaceous	Carex limosa, C. aquatilus, C. utriculata, Eleocharis pauciflora, Scirpus cespitosus

VEGETATION DESCRIPTION Carex limosa has 50 percent or greater cover. Carex aquatilis, C. utriculata, Eleocharis pauciflora, and Scirpus cespitosus are often present and contribute up to 15 percent cover. Caltha leptosepala and Pedicularis groenlandica contribute trace amounts in nearly all stands.

WILDLIFE VALUES Otters, beaver, sandhill cranes, and waterfowl use this community type for bedding and foraging areas.

OTHER NOTEWORTHY SPECIES Information not available.

ADJACENT COMMUNITIES Adjacent wetter sites include the Eleocharis pauciflora habitat

type or open water. Adjacent drier sites include either the Carex utriculata, C. aquatilis, C. lasiocarpa, or the Scirpus acutus communities.

CONSERVATION RANK G3 S1

SUCCESSION AND MANAGEMENT Carex limosa is considered a stable, long lived community type; however, dewatering and subsequent decompositon of organic soils may result in a shift in species composition due to invasion by exotic species or an increase in species such as Carex aquatilis (Padgett et al. 1989).

Drought years may make stands accessible to both domestic and wild grazing animals which could cause rutted and hummocky soils on margins. These sites are generally so wet as to preclude most types of recreational uses except fishing. Heavy disturbance such as from ORV use should be avoided because the organic soils are slow to recover from mechanical damage. High water tables make burning difficult, but fire can be used on sites adjacent to floodplains; dominant sedges of this community type are resistant to damage by fire except where hot fires penetrate the peat soil (Hansen et al. 1995).

CLASSIFICATION COMMENTS Classification is based on 11 stands in central Yellowstone National Park, 4 stands in southwestern Montana, 4 stands in Utah and southeastern Idaho, 4 stands in northwestern Montana, and 5 stands in central and eastern Montana.

EDITION 95-07-10

AUTHOR L. Williams

ELEOCHARIS ROSTELLATA

COMMON NAME BEAKED SPIKERUSH

PHYSIOGNOMIC TYPE Herbaceous

SIMILAR COMMUNITIES In some cases, Eleocharis rostellata may be confused with E. palustris, especially if the stolons of E. rostellata are not present or not obvious. Be sure of the plant's true identity. A misidentification will result in the wrong community type and the sites on which they occur are very different ecologically.

RANGE Eleocharis rostellata is a minor type in Idaho, Montana, and Yellowstone National Park, Wyoming, and may occur in Washington, British Columbia, and other parts of Wyoming.

ENVIRONMENTAL DESCRIPTION The community occurs in spring-fed wetlands which are saturated throughout the year, often with water running over the ground surface through the stands. It is known to occur in a variety of soils from relatively deep organic, to alkaline and calcareous soils, to coarse wet mineral soils that are directly in contact with thermal waters.

MOST ABUNDANT SPECIES

Strata	Species
Herbaceous	Eleocharis rostellata

VEGETATION DESCRIPTION The community type forms near monocultures and may occur as a quaking mat, or may be more open with considerable areas of bare soil, gravel, rock, and open water (Moseley 1995). Hansen et al. (1995) state that E. rostellata dominates a low (less than 30 cm) herbaceous layer. Moseley (1995) notes that there are two distinct phases of the this communtiy: stands with 90 percent cover of E. rostellata, occurring on relatively deep organic soils and sometime forming a quaking mat; and stands with less than 70 percent cover that are more open, with considerable areas of bare soil, gravel, rock, and open water on the surface. The open phase appears restricted to mineral substrates and occurs on gentle as well as very steep slopes. Low species diversity is characteristic of the E. rostellata community type. Common associated species with low cover include Deschampsia cespitosa, Juncus balticus, Muhlenbergia asperifolia, Potentilla fruticosa, Aster ascendens, Mimulus guttatus, Helianthus nuttallii, Castilleja exilis, Scirpus americanus, Carex simulata, C. nebrascensis, and C. scirpoidea.

WILDLIFE VALUES This community is a source of green forage early in the spring and attracts wildlife (especially elk and deer). Waterfowl also use this type (Hansen et al. 1995).

OTHER NOTEWORTHY SPECIES Information not available.

ADJACENT COMMUNITIES Adjacent upland communities are often sagebrush-steppe or coniferous forest types. Adjacent riparian communities may be dominated by Carex spp., Potentilla fruticosa, and Deschampsia cespitosa.

CONSERVATION RANK G2 S2

SUCCESSION AND MANAGEMENT The successional status of this community is poorly described. However, its occurrence on organic soils indicates that it is a long-lived, stable type.

This community type is threatened by development of thermal areas for recreation (Lesica 1991). Because of the wet, often unstable nature of the substrate, soil disturbance and grazing by livestock is probably minimal. Yet trampling damage of the wet, organic soils of this association occurs readily with any livestock utilization. Livestock may graze forage plants in this association, but overgrazing can cause compositional changes to species of lower palatability (Hansen et al. 1995).

CLASSIFICATION COMMENTS In Montana, Hansen et al. (1995) lumped all combinations of E. rostellata and E. pauciflora into an E. pauciflora habitat type due to similarities in environmental conditions and management concerns. Observations in Montana by Lesica (1990), indicate that the E. rostellata association is distinct, and at least partially thermophilic, unlike the E. pauciflora type.

Type description based on literature review and summary of community observations and plots in

Idaho.

EDITION 98-12-14

AUTHOR L. Williams

ELEOCHARIS PALUSTRIS

COMMON NAME COMMON SPIKERUSH

PHYSIOGNOMIC TYPE Herbaceous

SIMILAR COMMUNITIES In some cases, Eleocharis palustris may be confused with E. rostellata, especially if the stolons of E. rostellata are not present or not obvious. Be sure of the plant's true identity. A misidentification will result in the wrong community type and the sites on which they occur are very different ecologically.

RANGE Eleocharis palustris is a common type in California, Colorado, Idaho, Montana, Nevada, Oregon, Utah, Washington, Wyoming, and Saskatchewan. Essentially it has been documented from every western state except Arizona and New Mexico (Bourgeron and Engelking 1994, Anderson et al. 1998).

ENVIRONMENTAL DESCRIPTION The Eleocharis palustris community type is found at low to moderate elevations, generally in wide, low gradient valleys of all shapes. Sites are wet basins, floodplains, meadows, gravel bars, and lake edges. It is typically in sites that are prone to yearly flooding or persistent surface water. Where streams are present, they are Rosgen's C and E stream types. Elevations range from 2,200 to at least 8,700 feet, depending on latitude (Hansen et al. 1995, Manning and Padgett 1995, Crowe and Clausnitzer 1997, Hall and Hansen 1997).

Soils of this community type are classified as Mollisols, Entisols, Histisols, and Inseptisols. Textures are variable, ranging from sites that are very coarse-fragment rich to others that are deep and fine-textured. The surface is usually rich in organic matter and the litter accumulation may blend into rich, black organic muck soils. The fine-textured upper horizons often arise from alluvial deposition. Sands, gravels, and cobbles usually constitute the main body of deeper subsurface materials (Manning and Padgett 1995, Crowe and Clausnitzer 1997, Hall and Hansen 1997).

MOST ABUNDANT SPECIES

Strata	Species
Herbaceous	Eleocharis palustris, Carex spp., Alopecurus aequalis

VEGETATION DESCRIPTION Eleocharis palustris is an aggressive, rhizomatous species that nearly excludes all other species from establishing any significant cover. Common associates in high quality sites include Alopecurus aequalis, Mentha arvense, Rumex crispus, Eleocharis acicularis, Carex utriculata, Glyceria spp., and Phalaris arundinacea. On some sites aquatic

species, such as Hippuris vulgaris, Utricularia vulgaris, and Potamogeton natans, have high cover.

WILDLIFE VALUES Broad zones of this type along streams, rivers, lakes, and reservoirs provide valuable feeding and nesting areas for waterfowl. Eleocharis palustris and associated plants are a valuable source of food and cover for waterfowl. Wild ungulates seldom browse this habitat type due to its low palatability (Hall and Hansen 1997).

OTHER NOTEWORTHY SPECIES Information not available.

ADJACENT COMMUNITIES Due to the wide geographic distribution of this type, adjacent upland communities are varied, including shrub-steppe, woodland, and coniferous forest types. Adjacent riparian communities may be dominated by an equally varied assortment of types including deciduous forest, tall shrub, low shrub, and herbaceous communities.

CONSERVATION RANK G5 S3

SUCCESSION AND MANAGEMENT Padgett at al. (1989) suggest that Eleocharis palustris can represent an early seral species on ponds and streambanks where water is at or above the ground surface. As siltation occurs over time, other communities, such as Carex utriculata, may replace it. However, due to the continual saturated conditions and dense growth of Eleocharis palustris, once formed, stands appear difficult to displace and may persist as climax vegetation. If water levels rise, Scirpus spp. and Typha latifolia may be able to supplant E. palustris. Hansen et al. (1995) have observed that disturbance can drastically shift the vegetative composition of this type toward increaser or invader species such as Hordeum jubatum. Seasonally wet conditions and low palatability of Eleocharis palustris limit the grazing value of this type for livestock, even during drought years when upland forage dries early and dies back (Kovalchik 1987). Sites occupied by this type are typically inundated or at least saturated for much of the year so as to preclude most development. Trampling damage and soil churning occurs readily with livestock use and may result in a shift toward more disturbance tolerant species such as Hordeum jubatum, Carex nebrascensis, and Juncus balticus (Hall and Hansen 1997).

CLASSIFICATION COMMENTS This type has been quantitatively defined and described by numerous studies throughout the western United States and Canada (Bourgeron and Engelking 1994, Anderson et al. 1998).

EDITION 98-12-08

AUTHOR B. Moseley

JUNCUS BALTICUS

COMMON NAME BALTIC RUSH

PHYSIOGNOMIC TYPE Herbaceous

SIMILAR COMMUNITIES This appears to be a distinctive type. Eleocharis palustris-Juncus balticus and J. balticus-Carex rossii community types have been described from central and southern Utah (Bourgeron and Engelking 1994) that may relate to the J. balticus community type described here. Similarly, Mattson's (1984) Deschampsia cespitosa - Juncus balticus from the Yellowstone Plateau is rich in J. balticus.

RANGE The Juncus balticus community type has been documented from every state in the western United States, with the exception of Arizona (Bourgeron and Engelking 1994, Manning and Padgett 1995, Anderson et al. 1998).

ENVIRONMENTAL DESCRIPTION The elevational range occupied by the Juncus balticus type is as wide as the geographic range, ranging from 3,000 feet in Montana to over 10,000 feet farther south. Throughout its range it occurs near seeps, in meadows, and on alluvial terraces. Where streams are present the Rosgen reach types have been identified as B3, B4, C3, C4, C6, E4, E6, and F4. Surface topography is usually level or sometimes undulating or hummocky. Valley bottom characteristics are equally diverse, with widths ranging from very narrow to very broad and gradients from low to high (Padgett et al. 1989, Hansen et al. 1995, Manning and Padgett 1995, Crowe and Clausnitzer 1997).

This community type typically occurs on fine-textured surface soils. Textures range from silt to sandy-loam. The water table ranged from the surface to ca. 50 cm below the surface, occasionally falling below 1 m by the end of the summer. Estimated available water-holding capacity ranged from low to high. A soils have been classified as Mollisols, Inceptisols, and Histisols. Soil reaction ranges from neutral to mildly alkaline, pH 7.0 to 8.0 (Padgett et al. 1989, Hansen et al. 1995, Manning and Padgett 1995, Crowe and Clausnitzer 1997).

MOST ABUNDANT SPECIES

Strata	Species
Herbaceous	Juncus balticus, Poa pratensis

VEGETATION DESCRIPTION Baltic rush dominates the stands with canopy cover generally over 50 percent, usually higher. Cover by other graminoids is usually low, although Poa pratensis appears to be a common associate over the range of this type. Hordeum jubatum has high constancy in Montana stands. There is a wide diversity of other graminoids and forbs, both native and exotic, that occur in Juncus balticus stands throughout its range, generally at low cover (Padgett et al. 1989, Hansen et al. 1995, Manning and Padgett 1995, Crowe and Clausnitzer 1997, Walford et al. 1997).

WILDLIFE VALUES This type provides early season forage for wildlife (Hansen et al. 1995).

OTHER NOTEWORTHY SPECIES Information not available.

ADJACENT COMMUNITIES As would be expected with a community distributed over the western United States and having at least a 6,000-foot elevational range, the adjacent upland and

riparian communities are diverse. Upland communities range from steppe and shrub-steppe at the lower elevations to alpine communities at the higher.

CONSERVATION RANK G5 S4

SUCCESSION AND MANAGEMENT Some studies state unequivocally that the Juncus balticus community type is a livestock grazing-induced type (e.g., Evenden 1989, Hansen et al. 1995, Manning and Padgett 1989, Hall and Hansen 1997, Crowe and Clausnitzer 1997), while others hedge somewhat stating that many or most occurrences are grazing-induced (e.g., Padgett et al. 1989, Walford et al. 1997). There is evidence for the latter view. Two stands in central Idaho occur at sites that were never grazed by livestock, being protected by insurmountable cliff bands. They contain extensive near-monocultures of Juncus balticus and have significant hummocking (Jankovsky-Jones, IDCDC, unpublished data). Observations in Montana and elsewhere indicate that J. balticus acts as an increaser and/or invader, occurring over a wide range of environmental conditions. It can increase after intensive grazing on sites occupied by the Carex nebrascensis, Deschampsia cespitosa, Calamagrostis canadensis, and possibly others. It is an increaser because it has a high tolerance for grazing. Once established, J. balticus will maintain community dominance until site conditions are radically changed, either through a severe drop in water table depth or season-long flooding (Evenden 1989, Padgett et al. 1989, Hansen et al. 1995, Manning and Padgett 1995).

Grazing value ratings for Juncus balticus are moderate for cattle and low (except in the spring when rated medium) for sheep, horses, mule deer, and elk. Juncus balticus has vigorous rhizomes and a wide ecological amplitude. It is an excellent streambank stabilizer with dense fibrous roots that not only bind horizontally in the soil, but grow to a greater depth than other rhizomatous graminoids. It has high erosion control potential. Because of its tenacious nature and relatively low palatability to livestock, this species is very important as a soil binder and streambank stabilizer. Planting J. balticus plugs in the flood plain of an incised but aggrading stream will enhance bank building by binding soils and trapping sediment (Manning and Padgett 1995).

CLASSIFICATION COMMENTS This community has been quantitatively defined and described by many studies throughout the western United States. In Idaho, Tuhy's (1981) Juncus balticus-Muhlenbergia filiformis community type is included in this type. This type has been quantitatively defined and described by numerous studies throughout the western United States (refer to Bourgeron and Engelking 1994 and Manning and Padgett 1995 for references).

EDITION 98-12-09

AUTHOR B. Moseley

POA JUNCIFOLIA

COMMON NAME ALKALI BLUEGRASS

PHYSIOGNOMIC TYPE Herbaceous

SIMILAR COMMUNITIES Similar grasslands, including the Poa juncifolia/Glaux maritima community (Cooper 1995), Poa nevadensis community type (Manning and Padgett 1995), and Dry graminoid ecological type (Weixelmann et al. 1996), have been described. Poa juncifolia is a diagnostic species in both Cooper's (1995) and Weixelmann et al's. (1996) communities. The taxonomic status of Poa juncifolia is unclear. The National Plant Data Center (USDA, NRCS 1994) treats Poa juncifolia, P. nevadensis, P. sandbergii, P. scabrella, and their subspecies and varieties as Poa secunda. The Jepson Manual (Hickman 1993) acknowledges that many ecological forms of Poa secunda exist and subspecies tend to intergrade. Poa secunda ssp. juncifolia is recognized by Hickman (1993) and includes three ecotypes including Poa ampla, Poa juncifolia, and Poa nevadensis.

RANGE The Poa juncifolia community is a minor type known from Colorado, Nevada, and Idaho.

ENVIRONMENTAL DESCRIPTION The grasslands are reported from Nevada on trough drainageways, floodplains, and occasionally at springs along fault lines. Sites are moist during the growing season, but not saturated (Weixelmann et al. 1995).

In Idaho, the grasslands are located in broad fault-block valleys surrounded by alluvial fans. Perennial drainages leaving the mountains typically do not flow through the alluvial fans, but sink into the alluvium. Runoff in fault-block valleys moves through the porous gravels into wetlands. Relative porosity of the fill materials within the wetland sites allows upwelling in a complex of numerous seeps.

The hydrograph in the wetlands is relatively stable with two pulses. A peak flow in the early spring occurs due to local snow melt. The flows may level off and pulse again in the fall due to lag time in percolation from the mountains, or underflow from the ground watershed. The Poa juncifolia community occurs on gently sloping terraces and benches that are elevated up to 1 meter above spring creeks in alkaline fens. The terraces are subirrigated and represent the highest wetlands above the water table. In Cooper's (1995) central Colorado stands, the soils are classified as Sodic Peats with more than 20 percent organic matter and a soil surface that is white at the surface due to salts. Seeps are present at the base of terraces indicating subsurface water storage which may contribute to the maintenance of groundwater flow.

MOST ABUNDANT SPECIES

Strata	Species
Herbaceous	Carex douglasii, Elymus trachycaulus, Muhlenbergia richardsonis, Poa juncifolia, Spartina gracilis, Antenaria microphylla, Crepis runcinata, Haplopappus uniflorus, Phlox kelseyi, Senecio debilis

VEGETATION DESCRIPTION The grassland occurs on subirrigated terraces and benches and supports a mix of alkaline tolerant graminoids and forbs. Poa juncifolia, Muhlenbergia richardsonis, and Spartina gracilis dominate the community (ca. 50 percent cover alone or in combination). Carex douglasii, Crepis runcinata, Elymus trachycaulus, Haplopappus uniflorus,

Juncus balticus, Phlox kelseyi, and Senecio debilis are common associates.

WILDLIFE VALUES Stands may provide forage for deer and elk. The grasslands may also be foraging areas for raptors as rodents, including mice, pocket gophers, and ground squirrels, are often present.

OTHER NOTEWORTHY SPECIES Information not available.

ADJACENT COMMUNITIES Adjacent communities on terraces and elevated benches may include shrublands dominated by shrubby cinquefoil or greasewood. Springs emerge at the toe slopes of terraces and benches and support Carex simulata and Eleocharis pauciflora alkaline fens. Other moister communities may include Potentilla fruticosa/Deschampsia cespitosa, Deschampsia cespitosa, and Juncus balticus.

CONSERVATION RANK G3 S3

SUCCESSION AND MANAGEMENT The alkali bluegrass community occurs on sites that are moist early in the growing season and dry out as the season progresses. Poa juncifolia is a deeply rooted bunch grass that will maintain dominance as long as it is not heavily grazed (Manning and Padgett 1995). Muhlenbergia richardsonis and Poa juncifolia will decrease as disturbance increases due to loss of root reserves and trampling. Carex douglasii, Iris missouriensis, or Juncus balticus dominated communities may then become established. With increased disturbance, stands may revert to a mix of forb species (Weixelmann et al. 1995).

Poa juncifolia is highly palatable to cattle, horses, and elk and moderately palatable to sheep and mule deer. Heavy grazing will result in a decrease in the diagnostic graminoids and an increase in less palatable species. Management should focus on maintaining good ground cover and deep rooted species that tend to hold the soil together.

CLASSIFICATION COMMENTS Description is based on classification work in central Colorado (Cooper 1995), Nevada (Manning and Padgett 1995 and Weixelmann et al. 1996), and field surveys in east-central Idaho (Jankovsky-Jones 1998b).

EDITION 98-04-07

AUTHOR M. Jankovsky-Jones

SCIRPUS ACUTUS

COMMON NAME HARDSTEM BULRUSH

PHYSIOGNOMIC TYPE Herbaceous

SIMILAR COMMUNITIES Hansen et al. (1995) and Hall and Hansen (1997) have a Scirpus acutus habitat type in their classifications that includes all combinations of Scirpus acutus and S.

validus (=S. tabernaemontani) due to similarities in environmental conditions and management concerns. Scirpus validus is treated as a separate alliance in the Western Regional Vegetation Classification (Bourgeron and Engelking 1994). Cole (1995) described four associations with S. acutus as the dominant species, S. acutus-Veronica anagallis-aquatica, S. acutus-Lemna sp., S. acutus-Lemna sp.-Solanum dulcamara, and S. acutus-Typha latifolia. The Scirpus acutus type described in this abstract encompasses enough compositional and structural variation to include Cole's types.

RANGE Stands are known from Oregon, Washington, Nevada, California, Idaho, and Montana.

ENVIRONMENTAL DESCRIPTION Stands of this community type occur along the margins of ponds, lakes, and reservoirs, stringers paralleling stream and river channels, or broad swaths in backwater marshes and sloughs. It is found at low to mid-elevations, from about 2,000 feet to at least 6,600 feet. This type often inhabits relatively deep water, although the water level may draw down considerably through the growing season (Hansen et al. 1995, Hall and Hansen 1997).

Soils are commonly Mollisols (Aquolls), Entisols (Aquents), or occasionally Histisols. Textures of surface horizons on long-lived stands are predominantly fines, which appear as black or gleyed, mucky clay or silty loam soils with high concentrations of decomposed and partially decomposed plant material that accumulate over time from annual dieback. Alluvial sands, gravels, and cobbles may form an unconsolidated matrix in the subsurface horizons. Water tables are generally at or above the soil surface throughout the growing season. Soil reaction varies from neutral to moderately alkaline (pH 7.0 to 8.0) (Hansen et al. 1995, Hall and Hansen 1997).

MOST ABUNDANT SPECIES

Strata	Species
Herbaceous	Scirpus acutus, Typha latifolia, Lemna sp., Solanum dulcamara

VEGETATION DESCRIPTION The Scirpus acutus community type usually appears as an impenetrable monotypic stand often reaching 2 m or more in height. Scirpus spp. require high levels of moisture throughout the year; and while stands may colonize saturated soils along streambanks or on the periphery of ponds and reservoirs, they typically extend out into the water column to 2 m in depth. Due to the dense growth form and flooded water regimes, other species are largely absent, or if present, in limited amounts (Cole 1995, Hansen et al. 1995, Hall and Hansen 1997).

WILDLIFE VALUES Scirpus acutus provides valuable nesting and roosting cover for a variety of songbirds and waterfowl, notably redwinged blackbirds, yellow-headed blackbirds, and wrens. Scirpus acutus is a staple for muskrats and is used in construction of their huts. Seeds of S. acutus are eaten by a variety of birds. Waterfowl managers often attempt to increase the proportion of S. acutus relative to Typha latifolia as a means of improving habitat (Hall and Hansen 1997).

OTHER NOTEWORTHY SPECIES A vascular plant species rare in Idaho, Teucrium canadense, occurs in the ecotone between this community and the Sarcobatus vermiculatus/Distichilis stricta type at one site.

ADJACENT COMMUNITIES Adjacent semipermantly flooded wetland communities may include stands dominated by Typha latifolia and Carex utriculata. Temporarily flooded communities and upland habitats are variable due to the wide range of landscape settings where this community is found.

CONSERVATION RANK G5 S4

SUCCESSION AND MANAGEMENT Scirpus acutus occupies some of the wettest sites on the landscape and tolerates prolonged flooding better than most riparian communities. These highly saturated conditions, coupled with an extremely dense growth form, allow this species to colonize sites at an early successional stage and maintain dominance on undisturbed sites as the climax vegetation. However, Scirpus acutus is regularly accompanied by other hydrophytes, such as Sparganium emersum and Typha latifolia. The reasons for the distribution of these species is difficult to discern, but minor changes in water chemistry or nutrient availability may favor the expansion of one species over another. Seasonal climatic changes may also play a role in determining which species may dominate a site at a particular point in time (Hall and Hansen 1997). Cole (1995) discusses tentative successional relationships of Scirpus acutus types.

Wet conditions and lack of palatable forage limit livestock use of this type. However, if upland forage becomes sparse and soil conditions dry, livestock may make use of Scirpus acutus. Soils are wet throughout the growing season and easily damaged from trampling by livestock and wildlife. Vegetation can also be damaged by trampling. This community will burn in either late fall or early spring if the water levels have dropped sufficiently (Hansen et al. 1995).

CLASSIFICATION COMMENTS Classification is based on sampling of 58 stands in Montana (Hansen et al. 1995), an unknown number of stands in Washington (Evans 1989), 6 stands in eastern Idaho (Hall and Hansen 1997), and at least 22 stands in Idaho (Cole 1995).

EDITION 98-01-05

AUTHOR B. Moseley

SCIRPUS AMERICANUS

COMMON NAME THREESQUARE BULRUSH

PHYSIOGNOMIC TYPE Herbaceous

SIMILAR COMMUNITIES Stands of the Scirpus pungens community are dominated by Scirpus pungens rather than S. Americanus.

RANGE Minor type in Idaho, Montana, and Oregon.

ENVIRONMENTAL DESCRIPTION Scirpus americanus occurs in marshes and wet meadows and is tolerant of alkaline conditions. Soils are variable ranging from relatively deep organic, to alkaline and calcareous clay soils, to coarse wet mineral soils that are directly in contact with thermal waters.

MOST ABUNDANT SPECIES

Strata	Species
Herbaceous	Scirpus americanus

VEGETATION DESCRIPTION The Scirpus americanus community type may occur in alkaline habitats or in association with hot springs. Scirpus americanus clearly dominates with 50-90 percent cover. Low species diversity is characteristic. Minor amounts of Eleocharis palustris, Carex nebrascensis, Carex utriculata, and Aster frondosus are present in alkaline situations. Where the type occurs in association with hot springs, Eleocharis palustris is frequently replaced by Eleocharis rostellata. The forbs Helianthus nutallii and Epilobium watsonii were also noted as present in association with the type at hot springs.

WILDLIFE VALUES Scirpus species are used by muskrats for building huts and some waterfowl for constructing nests. Waterfowl may use these areas for nesting and hiding cover. Other birds such as red-winged blackbirds and yellow headed blackbirds are common (Hansen et al. 1995).

OTHER NOTEWORTHY SPECIES Information not available.

ADJACENT COMMUNITIES Adjacent communities may be dominated by Carex spp., Eleocharis sp. (palustris or rostellata), Potentilla fruticosa, Deschampsia cespitosa, or Distichlis spicata var. stricta. This type often occurs in the sagebrush-steppe zone.

CONSERVATION RANK G1 S1

SUCCESSION AND MANAGEMENT Scirpus americanus is an early colonizer and able to persist under drought conditions. Due to the rhizomatous nature of the species, few other species become established.

Trampling damage of the wet, organic soils of this association occurs readily with any livestock utilization. Livestock may graze forage plants in this association, and overgrazing can cause compositional changes to species of lower palatability. Scirpus americanus may have potential for restoration of wetlands as it is a prolific seed producer and is fairly drought tolerant once established. Dense stands function to filter sediments and stabilize soils of lake margins and streambanks. (Hansen et al. 1995).

CLASSIFICATION COMMENTS In Montana, Hansen et al. (1995) lumped all combinations of Scirpus americanus and S. pungens into a S. pungens habitat type due to

similarities in environmental conditions and management concerns. Description is based on literature review and summary of community occurs.

EDITION 96-10-23

AUTHOR M. Jankovsky-Jones

SPARTINA GRACILIS

COMMON NAME ALKALI CORDGRASS

PHYSIOGNOMIC TYPE Herbaceous

SIMILAR COMMUNITIES Not identified.

RANGE Minor type at lower elevations in central and eastern Montana and central to eastern Idaho.

ENVIRONMENTAL DESCRIPTIONS Stands occur at 2,350 to 6,400 feet in elevation. Sites are classified as temporarily flooded or overflow sites. Soils range from clay to silt loams and are generally slightly to moderately saline or alkali (pH 7.5 to 8.5).

MOST ABUNDANT SPECIES

Strata	Species
Herbaceous	Spartina gracilis

VEGETATION DESCRIPTION Vigorous rhizomes allow Spartina gracilis to occur in nearly pure stands (60 percent cover). Associated species that are sometimes present include Muhlenbergia asperifolia, Juncus balticus, Poa juncifolia, and Puccinellia nutalliana. The type occurs in temporarily flooded swales and meadows, along pond and marsh margins,and in seep areas. Substrates are frequently saline, alkaline, or of a calcareous origin (Hansen et al. 1995, Jankovsky-Jones 1997b).

WILDLIFE VALUES Type provides important shade and hiding cover for wildlife, especially deer. Birds also make limited use of this type (Hansen et al. 1995).

OTHER NOTEWORTHY SPECIES Information not available.

ADJACENT COMMUNITIES Adjacent wetter community types may be dominated by the Typha latifolia, Scirpus acutus, Carex utriculata, Deschampsia cespitosa, Juncus balticus or open water communities, while drier sites may be dominated by Agropyron smithii, Poa juncifolia, Potentilla fruticosa, or upland vegetation (Hansen et al. 1995, Jankovsky-Jones 1997b).

CONSERVATION RANK GU SU

SUCCESSION AND MANAGEMENT Spartina gracilis is an early colonizer of saline habitats and is able to persist under wet conditions. Disturbance of type can dramatically increase the amount of increaser and invader species such as Hordeum jubatum, Glycyrrhiza lepidota, and Helianthus maximiliani (Hansen et al. 1995).

Forage value for livestock is fair. Palatability of Spartina is greatest in the spring when young plants are actively growing; however, sites are generally quite wet during the spring, thereby limiting access to livestock.

CLASSIFICATION COMMENTS Classification based on 19 stands in Montana (12 of these stands may be dominated by Spartina pectinata), an unknown number of stands in the Great Plains, and 1 stand in Idaho.

EDITION 96-11-04

AUTHOR L. Williams

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Appendix C.

Summary of State Element Ranks **:** With the substitution of globally for statewide this table can be used for global rankings.

S1 Critically imperiled statewide (typically 5 or fewer occurrences or less than five percent of native range currently occupied by pristine examples of type) or especially vulnerable to extirpation from the state.

S2 Imperiled statewide because of rarity (typically 6-20 occurrences or six to twenty-five percent of native range currently occupied by pristine occurrences of type) or especially vulnerable to extirpation from the state.

S3 Rare or uncommon statewide (typically 21-100 occurrences or twenty-six to fifty percent of native range currently occupied by pristine occurrences of type).

S4 Apparently secure statewide (many occurrences, fifty-one to seventy-five percent of native range currently occupied by pristine occurrences of type).

S5 Demonstrably secure statewide and essentially ineradicable under present conditions (seventy-six to one hundred percent of native range currently occupied by pristine examples of type).

SH Of historical occurrence statewide, perhaps not verified in the last 20 years but suspected to still be extant.

SX Extirpated statewide.

SE Represents human induced community type (exotic) which has been so altered that pre-settlement condition cannot be assessed or the end result of successional processes will continue to be an altered type.

SP Purported for state. Includes types which are formally described for adjacent states, but lack persuasive documentation (i.e., plot data) for recognition as a state type.

S#? Rank followed by a ? indicates the assigned rank is inexact.

S? Type not yet ranked statewide.

GQ Synecologic status of type is unclear. Type based on classification work in a small geographical area, habitat descriptions, or field notes. Full recognition of type dependent on additional analysis.

U Plant communities with ranks as U or state ranks blank represent types whose conservation status needs to be analyzed prior to assigning a rank. This information (stand tables and community descriptions) is currently unavailable.

Appendix D.
Site summaries for wetland sites in east-central Idaho

BIRCH CREEK FEN

Directions:

Birch Creek Fen is located at the headwaters of Birch Creek in the Birch Creek Valley, approximately 4 miles north of Lone Pine along State Route 28.

Richness:

Birch Creek is located in eastern Idaho between the Lemhi Range to the west and the Beaverhead Mountains of Montana to the east. Birch Creek is fed by approximately 52 springs that emanate in the valley bottom. Birch Creek Fen is the result of the damming action of a basalt ridge, just downstream of the fen, that is oriented perpendicular to the valley. The combination of a very stable raised water table plus alkaline substrates provides habitat for many unique species and plant communities. Alkaline benches support temporarily saturated wetlands that are often dominated by Chrysothamnus nauseosus (rabbitbrush), and the graminoids Agropyron smithii (bluebunch wheatgrass), Distichlis stricta (inland saltgrass), and Elymus cinereus (basin wildrye). Chrysothamnus covers a large area and may occupy areas that historically supported the Sarcobatus vermiculatus/Elymus cinereus (greasewood/basin wildrye) community type. Grasslands are also present on the alkaline benches and are dominated by Poa juncifolia (alkali bluegrass), Spartina gracilis (akali cordgrass), Muhlenbergia richardsonis (mat muhly), and Distichlis stricta. Adjacent swales and slightly lower microsites support stands of the Potentilla fruticosa/Deschampsia cespitosa (shrubby cinquefoil/tufted hairgrass) and Juncus balticus (Baltic rush) community types. Aquatic communities are dominated by Mimulus guttatus (seep monkeyflower) and Rorippa nasturtium aquaticum (watercress) at spring heads with Potamogeton vaginatus (sheathed pondweed), Ceratophyllum demersum (coon's tail) and lesser amounts of Ranunculus aquatilis (whitewater crowfoot) forming thick mats in stream channels. Emergent wetlands occur over small areas within a complex wetland mosaic with Carex simulata (short-beaked sedge) and Eleocharis pauciflora (fewflower spikerush) as the dominant community types. Carex simulata most frequently occurs adjacent to channels on highly organic soils that are saturated throughout the year. Eleocharis pauciflora communities generally occur on quakey, unstable, marl substrates. Deschampsia cespitosa was likely very widespread at Birch Creek in the past. Currently, however, only small remnant stands remain. Willows occur near the downstream end of Birch Creek Fen and are scattered along certain spring channels within the fen.

Rarity:

Birch Creek Fen provides habitat for the following special status plant species: Scirpus rollandii, Carex idahoa, Salix pseudomonticola, Lomatogonium rotatum, Salix candida, Primula alcalina, Astragalus diversifolius, A. leptaleus, and Kobresia simpliciuscula. Endemic snails including the Birch Creek springsnail (Pyrgulopsis sp) and rustic pond snail (Stagnicola hinkleyi) and a declining

snail species, vagrant pebblesnail (Fluminicola sp), are known to occur at Birch Creek (Frest 1994).

Condition:

The Upper Birch Creek watershed has very little development but it does receive a substantial amount of recreational use. This is primarily for camping, fishing, and hunting activities. The use has been steadily growing with most of the people coming from the Idaho Falls area. The IDFG property receives especially heavy summer recreational use for fishing and camping. Commercial use of the area is primarily for season-long livestock grazing. Additionally the USFS holds a lease on a BLM tract where an outhouse, horsebarn, and small house are present at Kaufmann Guard Station. The BLM lease includes a 40 acre tract that is used for winter horse pasture.

The noxious weeds Centaurea maculosa (spotted knapweed), Hyoscyamus niger (henbane), and Cirsium arvense (Canada thistle) are known to occur in small easy to control populations. The Lemhi County Weed Management Plan identifies upper Birch Creek as a weed-free zone because of the low numbers of exotic plant species. Any exotics found are to be targeted for extirpation. Native increasers may be more of a threat to wetland and biodiversity values. Increasers include Thermopsis montanum (mountain thermopsis), Iris missouriensis (Rocky Mountain iris), and Chrysothamnus nauseousus.

Viability:

Birch Creek Valley is a rural area that has not experienced the development pressure seen in other parts of Idaho. Lands are generally held in large blocks by single landowners. Offsite impacts are of minor consequence with most of the uplands being in native vegetation. Now is likely the time to pursue protection before the flavor of the valley and/or land values change.

Other Values:

The area is habitat for antelope, sagegrouse, and at least nine species of raptors. Birch Creek Fen has high open space values with spectacular views of the Lemhi and Beaverhead Ranges. Birch Creek supports a population of naturally reproducing rainbow trout with most of the fisheries habitat in headwaters streams including the area around Birch Creek Fen. Sculpin (species yet to be determined) have been collected in Birch Creek.

Conservation Intent:

Special designation such as Area of Critical Environmental Concern or Wetland Conservation Area should be established for IDFG, BLM, and USFS owned lands. The

Nature Conservancy currently owns and manages tracts within Birch Creek Fen for wetland and botanical values. Additional privately owned tracts within the fen should be targeted for acquisition and/or conservation easements.

Management Needs:

Livestock grazing and off road vehicle use have contributed to bank instability, reduction of vegetation cover, and widening of stream channels. Restricting vehicle traffic, reducing or removing the cattle grazing, and developing a good trail system would help improve channel conditions. The aquatic snail species found on the site are thought to be sensitive to nutrient loading. Cattle grazing should be reduced or managed to improve water quality and activities (including restoration actions) should be carefully planned to prevent damage to aquatic species.

Information Needs:

Additional research is necessary to determine the habitat and process needs of rare plants and animals found on the site. Caryl Elzinga is currently (1998) working under contract with the BLM to assess the effects of livestock grazing on alkali primrose. Known cultural resources need to be formally documented and evaluated for listing on the national register.

Plant Community Occurrences:

POTENTILLA FRUTICOSA/DESCHAMPSIA CESPITOSA	G4 S3
SARCOBATUS VERMICULATUS/ELYMUS CINEREUS	G3 S2
DESCHAMPSIA CESPITOSA	G4? S3
CAREX SIMULATA	G4 S2
ELEOCHARIS PAUCIFLORUS	G4 S1
JUNCUS BALTICUS	G5 S4
MUHLENBERGIA RICHARDSONIS	GU SU
POA JUNCIFOLIA	GU SU

Rare Plant Occurrences:

ASTRAGALUS DIVERSIFOLIUS	G3 S2
ASTRAGALUS LEPTALEUS	G4 S2
LOMATOGONIUM ROTATUM	G5 S1
PHLOX KELSEYI VAR KELSEYI	G4T4 S2
PRIMULA ALCALINA	G1 S1
SALIX CANDIDA	G5 S2
SALIX PSEUDOMONTICOLA	G5? S1
CAREX PARRYANA SSP IDAHOA	G4T2 S1
KOBRESIA SIMPLICIUSCULA	G5 S1
SCIRPUS ROLLANDII	G3Q S1

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Directions:

Kane Lake Cirque is located at the northern end of the Pioneer Mountains, at the head of Kane Creek, about 13 miles (21 km) northeast of Ketchum. From Ketchum, head northeast on the Trail Creek Road (FS Road 408 in the Sawtooth NF and 208 in the Challis NF), cross Trail Creek Summit and continue to the intersection with the FS Road 134 (Kane Creek Road) a distance of approximately 20 miles (32 km). Turn right and head south on FS Road 134 to the end, about 4.5 miles (7.3 km). From this point, FS Trail 066 heads south up Kane Creek and into Kane Lake Cirque.

Richness:

Kane Lake Cirque encompasses the heavily glaciated basin at the head of Kane Creek. The cirque is underlain by crystalline rocks, including gneiss and granite. The primary feature of the area is botanical with an unusually high concentration of arctic-alpine disjunct species occur in the basin. To date, nine rare plants are known from the basin, including five that are known in Idaho only from the Kane Lake Cirque. Botanical exploration of the cirque in 1991 discovered another new species for Idaho, a yet-to-be-identified species of whitlow-grass. As compared to other alpine areas in Idaho, the Kane Lake Cirque has a high diversity of moist to wet habitats, a factor that is probably responsible for the presence of so many disjunct species. Numerous springs and at least four permanent alpine streams traverse the area, fed mainly by large, permanent snowfields. The beautiful alpine scenery present in the cirque, as well as its proximity to the Ketchum-Sun Valley area, results in high recreational use during the summer.

Rarity:

Kane Lake Cirque is of extraordinary significance in the state of Idaho. Numerous rare plant species are known from the basin. Several of these species occur nowhere else in Idaho and are disjunct from the next nearest known populations by at least 124 miles (200 km). From a global perspective, all are relatively widespread arctic-alpine species. In addition, alpine meadows in the cirque are more extensive and floristically diverse than similar communities elsewhere in the state.

Condition:

The area has received considerable use by hikers over the years, but the majority of impacts occur in the area immediately around Kane Lake.

Viability:

Lands to the north and east of Kane Lake Cirque are within Management Area 11, Pioneer Mountains, of the Challis NF. Lands to the south and west are within Management Area 3K of the Sawtooth NF. All of the surrounding area is within

the Pioneer Mountains proposed wilderness.

Other Values:
Not identified.

Conservation Intent:
Designation as a Special Interest Area for botanical values would be appropriate.

Management Needs:
Kane Lake Cirque is a popular summer destination for hikers. Although few visitors venture much beyond Kane Lake, visitor use could potentially impact sensitive plants and habitats.

Information Needs:
Vegetation of the area has not been mapped.

Plant Community Occurrences:
NOT IDENTIFIED

Rare Plant Occurrences:

ERIGERON HUMILIS	G4 S2
DRABA FLADNIZENSIS	G4 S1
RANUNCULUS GELIDUS	G4 S1
RANUNCULUS PYGMAEUS	G5 S1
PARNASSIA KOTZEBUEI VAR KOTZEBUEI	G4T4 S1
SAXIFRAGA ADSCENDENS VAR OREGONENSIS	G5T4TS2
SAXIFRAGA CERNUA	G4 S2
CAREX INCURVIFORMIS VAR INCURVIFORMIS	G4G5TS1

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SMILEY MOUNTAIN

Directions:
Smiley Mountain Research Natural Area is located at the southeastern end of the Pioneer Mountains, about 27 air miles (44 km) east of Ketchum, Idaho, and roughly 25 air miles (40.5 km) west-northwest of Arco, Idaho. From Mackay, Idaho, go southeast on U.S. Route 93 for 16 miles (26 km). Turn right on Antelope Road and travel southwest for 18 miles (29 km) to the Antelope Guard Station. Turn right on FS Road 135 and travel for 17 miles (27.5 km), crossing Antelope Pass, to the junction with FS Road 138 near the Copper Basin Guard

Station. Turn left on FS Road 138 and travel 4.5 miles (7.3 km) to Lake Creek. Park at the Lake Creek trailhead and take FS Trail 064 up Lake Creek for five miles to the point near Round Lake where the trail divides, one branch going to the south end of Long Lake and the other branch going past the north end of Long Lake and on to Rough Lake and Big Lake. The western boundary of the RNA is about 0.2 mile (0.3 km) southeast of the point where the trail divides.

Richness:

Smiley Mountain RNA is located in the southeastern extremity of the Pioneer Mountains. The area occurs on two main rock substrates, Challis volcanics and granitics, and has experienced mountain glaciation resulting in sharp and broad ridges, cliffs, ledges, talus slopes, rock glaciers, and cirque basins.

Elevations in the site range from 9440 feet (2877 m) in the southeastern corner of the RNA, where the boundary crosses the Middle Fork Bear Creek, to 11,508 feet (3508 m) on the summit of Smiley Mountain. The broad ridge crests in the RNA provide for excellent development of alpine vegetation including turfs, fellfields, grasslands, hydric habitats, and talus slopes. Subalpine stands of whitebark pine (Pinus albicaulis) occur in cirque basins. Protected slopes contain a mixture of whitebark pine, Engelmann spruce (Picea engelmannii), and subalpine fir (Abies lasiocarpa). Openings are mainly mountain big sagebrush (Artemisia tridentata ssp. vaseyana) with Idaho fescue (Festuca idahoensis). Some slopes are covered with a mixture of shrubs including species of willow (Salix spp.), common juniper (Juniperus communis), red mountain-heather (Phyllodoce empetriformis), shrubby cinquefoil (Potentilla fruticosa), currant (Ribes spp.), buffalo-berry (Shepherdia canadensis), and snowberry (Symphoricarpos oreophilus). Lower alpine levels and the alpine and subalpine cirque basins are drained by a number of streams which meander through wet meadows of planeleaf willow (Salix planifolia), Holm's Rocky Mountain sedge (Carex scopulorum), water sedge (Carex aquatilis), bladder sedge (Carex utriculata) and tufted hairgrass (Deschampsia cespitosa). Small lakes also occur in the cirque basins and the lower country is dotted with ponds, most of which are surrounded by wet meadows or riparian vegetation.

Rarity:

The site supports a diversity of alpine vegetation, extensive wetlands, and excellent subalpine stands of whitebark pine.

Condition:

Some trespass cattle grazing occurs within the RNA, and old cow sign was seen in the RNA in 1998. The site receives some recreational use, although most use occurs outside of the RNA boundaries.

Viability:

The bulk of the RNA is surrounded by USFS lands within Management Area 11, Pioneer Mountains. This area is managed to maintain water quality, enhance

fish and wildlife habitat, provide for dispersed recreation, and timber production. The southeast portion of the RNA is surrounded by USFS lands within Management Area 25, Antelope Creek. Management in this area emphasizes enhancement of fish and wildlife habitat, minerals activities, and range administration. The RNA is within two active grazing allotments. No barriers exist to exclude cattle from the RNA and some trespass does occur. Lakes below the RNA boundary receive recreational use, some of which might extend into the RNA.

Other Values:

The diverse geology of the site has resulted in the array of vegetation found there. The site supports extensive high elevation wetlands and has excellent watershed values.

Conservation Intent:

The site has been protected by designation as a USFS Research Natural Area.

Management Needs:

Fencing might be necessary to exclude cattle from the lower elevations. Use by recreationists might need to be controlled if the area begins to show impacts from recreational activities.

Information Needs:

Wetland and aquatic surveys were limited to wetlands and lakes at the headwaters of Rough Lake. Extensive wetlands that have not been surveyed are also known to occur upstream of Long Lake and Round Lake.

Plant Community Occurrences:

SALIX PLANIFOLIA MONICA/CAREX SCOPULORUM	G4	SP
ARTEMISIA TRIDENTATA VASEYANA/FESTUCA IDAHOENSIS	G5	S4
CAREX UTRICULATA	G5	S4
CAREX AQUATILIS	G5	S4
CAREX ELYNOIDES/OXYTROPIS SERICEA	G3	S3
CAREX RUPESTRIS	G4	S3
DESCHAMPSIA CESPITOSA/CALTHA LEPTOSEPALA	G4	S2
IVESIA GORDONII-ARENARIA OBTUSILOBA	G2	S2
IVESIA GORDONII-ERIOGONUM CAESPITOSUM	G2	S2
POTENTILLA DIVERSIFOLIA/ARENARIA OBTUSILOBA	G3?	S3
PHLOX PULVINATA-POA EPILIS	G3?	S3
AGROPYRON SCRIBNERI	G2?	S2
CAREX ALBONIGRA	G3?	S3
FESTUCA IDAHOENSIS (ALPINE)	G?	S4
POA EPILIS	G3	S3

Author:
J. H. Kaltenecker

SUMMIT CREEK

Directions:

Summit Creek is at the headwaters of the Little Lost River Valley. The northwest portion of the site includes Summit Creek Reservoir. The site extends for about 17 miles southeast, somewhat paralleling the Pahsimeroi Road (Summit Creek Road). The south end of the site is about 35 miles (57 km) northwest of Howe along the Pahsimeroi Road.

Richness:

Summit Creek is in a high elevation basin in southeastern Idaho tucked between the Lemhi Range to the east and the Lost River Range to the west. Summit Creek is a headwater stream of the Little Lost River. The Little Lost River is isolated from other river systems. As it reaches the lava beds near Howe, Idaho, its water disappears into subsurface flows which feed the Snake River aquifer. It is believed that in geologic history the Little Lost River flowed north into the Pahsimeroi and Salmon rivers. An uplift in the Donkey Hills area is believed to have forced the Little Lost River system to drain south, separating it from the Salmon River drainage. This connection would explain the occurrence of an isolated population of bull trout found here. The total length of Summit Creek is approximately 17 miles, beginning in springs in the Donkey Hills and continuing through a broad basin until it joins the Little Lost River. The lowest few miles of Summit Creek are not included in the site. The surrounding landscape is gently sloping valley bottom covered with low shrubs and grasses lying between rugged mountain ranges on each side. The upland community type is a sagebrush grassland with either three-tip (Artemisia tripartita) or low sagebrush (Artemisia arbuscula) as the overstory dominant. The most prevalent upland grasses are Idaho fescue (Festuca idahoensis) and bluebunch wheatgrass (Agropyron spicatum). Many of the wetland communities are dominated by Baltic rush (Juncus balticus), Nebraska sedge (Carex nebraskensis), beaked sedge (C. rostrata), Booth's willow (Salix boothii) and water birch (Betula occidentalis). In addition, large areas on benches adjacent to spring creeks are hummocked and support grasslands tolerant of alkaline conditions with a mix of the following graminoids: inland salt grass (Distichlis spicata), alkali cordgrass (Spartina gracilis), alkali bluegrass (Poa juncifolia), mat muhly (Muhlenbergia richardsonis), parry sedge (Carex parryana), and single-spike sedge (Carex scirpoidea). An overstory dominated by shrubby cinquefoil (Potentilla fruticosa) is sometimes present on the benches. Many of the known plant species of concern occur in or along the edges this habitat.

Rarity:

The unusual geohydrological features have formed the basis for unique plant communities supporting the following special status plant species: Primula alcalina, Salix candida, Salix pseudomonticola, Kobresia simpliciuscula, Scirpus pumilus, Astragalus diversifolius, Astragalus leptaleus, and Lomatogonium rotatum. In addition, the stream provides habitat for an isolated population of bull trout.

Condition:

There is one small BLM campground which is used primarily by fisherman and a moderately developed hot spring pool (Barney Hot Springs). Developments in the area are few and are limited to two buildings in the Mud Flats area, two small washed out reservoir dikes, a couple of inactive irrigation ditches and various fencelines. There are no power lines or paved roads in the area.

Exotic plant species which threaten wetland communities and rare plant populations were not noted. Barney Hot Springs has been stocked with what appear to be tilapia as well as several other smaller aquarium species.

Viability:

Unpaved roads in the area receive considerable amount of traffic and may be a source of sediment to the stream and wetlands.

Other Values:

IDFG biologists believe that the upper few miles of Summit Creek furnish most of the spawning habitat for the entire Little Lost River and that it is a major wintering area for fish escaping the harsh winter environment lower in the drainage. The area is frequented by sage grouse (a declining species), antelope, elk and numerous waterfowl species. Spotted frogs were also observed during 1997 wetland plant surveys. Summit Creek is a popular destination for campers, fishermen, and hunters. The exclosure, erected in 1975, provides excellent opportunities to study the effects of livestock grazing.

Conservation Intent:

Fee title acquisition or conservation easements should be sought on private lands within the site. Special conservation status for lands owned by the state of Idaho should also be pursued.

Management Needs:

Most of the site is under season-long grazing and there is little to no fencing of wetlands or stream corridors. This has lead to trampling of streambanks and may amplify the hummocking in wetlands. Increased hummocking and trailing may alter hydrology of wetland areas. Livestock use may have also reduced shrub cover along streams. Better grazing practices could improve streamside and wetland condition.

Information Needs:

No invertebrate work has been done at the site. Numerous aquatic snails are visible in Summit Creek and it is likely, considering the isolation of Summit Creek, that the snails may represent endemic species.

Plant Community Occurrences:

POTENTILLA FRUTICOSA/DESCHAMPSIA CESPITOSA	G4 S3
SALIX BOOTHII/CAREX UTRICULATA	G4 S4
SARCOBATUS VERMICULATUS/ELYMUS CINEREUS	G3 S2
ARTEMISIA ARBUSCULA ARBUSCULA/AGROPYRON SPICATUM	G5 S3
ARTEMISIA TRIPARTITA/FESTUCA IDAHOENSIS	G3 S1
CAREX UTRICULATA	G5 S4
CAREX NEBRASCENSIS	G4 S3
CAREX SIMULATA	G4 S2
ELEOCHARIS PAUCIFLORUS	G4 S1
JUNCUS BALTICUS	G5 S4
MUHLENBERGIA RICHARDSONIS	GU SU
POA JUNCIFOLIA	GU SU
POTENTILLA FRUTICOSA/ ALKALINE GRAMINOID	GU SU

Rare Plant Occurrences:

ASTRAGALUS DIVERSIFOLIUS	G3 S2
ASTRAGALUS LEPTALEUS	G4 S2
LOMATOGONIUM ROTATUM	G5 S1
PHLOX KELSEYI VAR KELSEYI	G4T4 S2
PRIMULA ALCALINA	G1 S1
SALIX CANDIDA	G5 S2
SALIX PSEUDOMONTICOLA	G5? S1
KOBRESIA SIMPLICIUSCULA	G5 S1
SCIRPUS ROLLANDII	G3Q S1

Rare Animal Occurences:

SALVELINUS CONFLUENTUS	G3 S3

Author:

Cindy and Lou Lunte, M. Jankovsky-Jones

SURPRISE VALLEY

Directions:

Surprise Valley RNA is located north of Standhope Peak in the Pioneer Mountains, about 19 air miles (31 km) northeast of Ketchum, Idaho. From Mackay, Idaho, travel northwest on U.S. Route 93 for 16 miles (26 km) to the junction with the

Trail Creek Road. Turn left on the Trail Creek Road and travel 19 miles (31 km) to the junction with FS Road 135. Turn left on FS Road 135 for about two miles (3.2 km), then turn right on FS Road 136 up Wildhorse Creek for about three miles (4.8 km) to the mouth of Fall Creek. Further vehicular travel up Fall Creek is prohibited. Take FS Trail 059 up Fall Creek for approximately two miles (3.2 km) to the junction with FS Trail 045. Take FS Trail 045 up Fall Creek for another mile (1.6 km) to its junction with the Moose Lake Trail 068. Shortly beyond this junction the trail separates again, with one fork continuing to Angel Lake and the east fork to Surprise Valley. Continue on the east fork of FS Trail 045 for another mile (1.6 km) to the entrance to Surprise Valley. An alternate access route to the RNA is by the Trail Creek Road (FS Road 408) from Ketchum, Idaho, to Trail Creek Summit, a distance of about 12 miles (19.4 km). At the summit the Trail Creek Road becomes FS Road 208. Continue on the Trail Creek Road down Summit Creek and the North Fork Big Lost River for approximately 10 miles (16 km) to the junction with FS Road 135. Continue as described above.

Richness:

Surprise Valley is a high-elevation, glacially-formed, hanging valley. The valley is perched about 1,000 feet above the main Fall Creek drainage and is bordered by rugged, rocky ridges, especially on the eastern boundary. The substrate is mainly granite of the Pioneer Window. Elevation varies from about 8,800 feet (2682 m) at the entrance to the valley to 11,878 feet (3620 m) on Standhope Peak. Two small lakes occur in the area. A cirque basin below Standhope Peak terminates in a moraine which has formed a lake at about alpine level. A stream from the lake cascades in a waterfall over one part of the moraine and flows down the valley to plunge over the west face to Fall Creek below. Another pond occurs in a subalpine setting near the exit of this stream. Wet meadows cover large areas of the valley. A second stream exits near the north end of the valley. A number of plant communities occur in the RNA including those dominated by subalpine fir (Abies lasiocarpa), whitebark pine (Pinus albicaulis), and limber pine (Pinus flexilis). Limber pine is the dominant timberline tree on granitic slopes at the north end of the valley. Whitebark pine dominates along the granitic east wall in the mid and southern portions of the area. Subalpine fir is the dominant timberline species on the west wall. Subalpine willow communities, subalpine wet and dry meadow communities, and alpine fellfield communities also occur in the area. The upper lake supports wetlands along inlets that are unsurveyed. A broad meadow downstream of the upper lake is a mosaic of meadow and shrub vegetation dominated by Baltic rush (Juncus balticus), water sedge (Carex aquatilis), shrubby cinquefoil (Potentilla fruticosa), and planeleaf willow (Salix planifolia). A patch of western wheatgrass (Agropyron smithii), about 100 square meters in size, is present on well drained soils in the valley bottom. The lower lake supports unique subalpine wetlands with the lake fringe dominated by mud sedge (Carex limosa), water sedge (Carex aquatilis), and localized patches of creeping spike rush (Eleocharis pauciflora). Sloped wetlands surrounding the

lake are dominated by tufted hairgrass (Deschampsia cespitosa). A small stand of Engelmann spruce/field horsetail (Picea engelmannii/Equisetum arvense) is present near the lower pond. Two small wetlands are present in association with the second stream and support stands of tufted hairgrass, water sedge, western wheatgrass, and intermediate oatgrass (Danthonia intermedia).

Rarity:

The site contains outstanding examples of a high-elevation, glacially-formed, hanging valley, subalpine and alpine plant communities, unique subalpine wetlands (including the rare Carex limosa community), and aquatic features.

Condition:

The site currently receives minimal recreational use due to difficult access.

Viability:

The RNA is surrounded by USFS lands within Management Area 11, Pioneer Mountains, and the proposed Pioneer Mountains Wilderness. Management of this area emphasizes protection of wilderness values.

Other Values:

The area contains habitat for a few mammalian species of interest including Rocky Mountain bighorn sheep (Ovis canadensis), mountain goats (Oreamnos americanus), and pikas (Ochotona princeps). The site has high watershed values.

Conservation Intent:

The site has been protected by designation as a USFS Research Natural Area.

Management Needs:

Stocking of the upper lake with fish should be discontinued. Directional and interpretive signing along the trail, as well as routing the trail around and away from seeps and wetlands, may be necessary to decrease recreational impacts. Destination camping in the RNA should be discouraged.

Information Needs:

Wetlands around the upper-most cirque lake are unsurveyed. Information on macroinvertebrates and water chemistry has been collected by Fred Rabe, but the information has not been integrated into CDC's databases.

Plant Community Occurrences:

ABIES LASIOCARPA/JUNIPERUS COMMUNIS	G5	SP
POTENTILLA FRUTICOSA/DESCHAMPSIA CESPITOSA	G4	S3
SALIX PLANIFOLIA/CAREX AQUATILIS	G5	S4
ARTEMISIA TRIDENTATA VASEYANA/FESTUCA IDAHOENSIS	G5	S4

CAREX AQUATILIS	G5	S4
CAREX LIMOSA	G3	S1
ELEOCHARIS PAUCIFLORUS	G4	S1
JUNCUS BALTICUS	G5	S4
DESCHAMPSIA CESPITOSA/CALTHA LEPTOSEPALA	G4	S2

Author:
J. H. Kaltenecker, M. Jankovsky-Jones

TEXAS CREEK

Directions:
Texas Creek is six miles south of Leadore west of Highway 28. The northern portion of the site contains the Purcell Spring area, and a wet meadow complex just north-northeast of Purcell Spring, at the head of Purcell Creek.

Richness:
Texas Creek is a perennial, spring-fed creek that gently meanders across the valley floor that lies between the spectacular Beaverhead and Lemhi mountain ranges. A mosaic of shrub and to lesser extent graminoid-dominated wetland and riparian communities occur along the flat to gently sloped subirrigated bottomlands of upper Texas Creek. Many springs occur within the wetland complex and much of it remains wet at the surface in mid-summer. Areas with hummocky microtopography are common. In many cases, hummock size has been exagerated by livestock grazing. Upland vegetation adjacent to the site supports Artemisia tridentata communities.

Rarity:
Seven plant species of concern occur within this site. The globally rare plant, Primula alcalina is known from only five other locations in the world, all of them in Idaho. Of the five locations, the population at Texas Creek is the largest and healthiest, and contains roughly 3,500 individuals of the 12,000 worldwide. Other special status plant species are Salix candida, Salix pseudomonticola, Lomatogonium rotatum, Astragalus leptaleus, Carex livida, and Kobresia simpliciuscula. An eighth plant, Phlox kelseyi var. kelseyi, which until recently (1997) was considered a special status plant species, also occurs within the site. Rana luteiventris (Columbia spotted frog) was observed during the 1997 visit.

Condition:
Texas Creek is heavily grazed by cattle during the summer season. Some ditching has occurred presumably to provide water to cattle grazing the drier land that surrounds the meadow. It is unknown if the ditches are still used. A small portion of the primrose population lies on BLM property. Portions of the BLM

owned land are fenced and excluded from cattle use.

Exotic plant species are much less of a threat than native increaser species (native species that increase under grazing). On the drier margins, meadows frequently have abundant to continuous cover of Cirsium scariosum, Trifolium repens, and Hordeum jubatum. Communities which tend to be hummocky, such as those dominated by Potentilla fruticosa or Poa juncifolia (secunda), have had the characteristic plant community replaced in some areas by Thermopsis montanum and Iris missouriensis.

Viability:

Diversion of springs could pose a problem if they seriously reduce the water input to the meadow. A gravel pit and an old railroad grade are located on the east side of State Highway 28. The proximity of this site to the highway may pose trespass problems. Weed control measures undertaken by the IDT could impact the site.

Other Values:

The area provides habitat for a variety of wildlife, sandhill cranes were heard near the headwaters of Texas Creek. Adjacent uplands and meadow margins provide habitat for sage grouse (1 hen observed in 1997). Two small owls (species unknown) were observed roosting in willow stands as well. The area also supports native ungulates and fish. The site encompasses part of the headwaters for the Lemhi River (a tributary to the Salmon River), and contributes to watershed values. The general area has extremely high scenic values with spectacular views of the Lemhi Range.

Conservation Intent:

Conservation easements or voluntary protection of private lands at Texas Creek should be the goal. The portion of the site owned by the BLM should be designated as an Area of Critical Environmental Concern.

Management Needs:

Channel and wetland condition could be enhanced by managing grazing. Regular monitoring of the rare plant populations will also be necessary. Measurement of water volume and quality in Texas Creek and at the springs would provide good baseline information from which to plan a management strategy.

Information Needs:

More information is needed to determine the response of the primary element to grazing. It is unknown what level and type of grazing is optimal, if any. Very little is known about the reproductive ecology of Primula alcalina. Stewardship planning would be enhanced if knowledge about seed production and dispersal mechanisms were acquired. In an area around Purcell Spring, only the wetlands on Salmon NF lands were visited. An adjacent 100+ acres of wetland

habitat on private land remains unsurveyed. No trespassing signs are present, so prior permission to access this land is required.

Plant Community Occurrences:

BETULA GLANDULOSA/CAREX UTRICULATA	G4? S3
POTENTILLA FRUTICOSA/DESCHAMPSIA CESPITOSA	G4 S3
SALIX BOOTHII/CAREX UTRICULATA	G4 S4
SALIX BOOTHII/MESIC GRAMINOID	G3? S3?
SALIX PLANIFOLIA MONICA/CAREX AQUATILIS-CAREX UTRICULATA	G3Q S3
CAREX UTRICULATA	G5 S4
DESCHAMPSIA CESPITOSA	G4? S3
CAREX SIMULATA	G4 S2
BETULA GLANDULOSA/CAREX SIMULATA	G2 S2
POA JUNCIFOLIA	GU SU

Rare Plant Occurrences:

ASTRAGALUS LEPTALEUS	G4 S2
LOMATOGONIUM ROTATUM	G5 S1
PRIMULA ALCALINA	G1 S1
SALIX CANDIDA	G5 S2
SALIX PSEUDOMONTICOLA	G5? S1
CAREX LIVIDA	G5 S2
KOBRESIA SIMPLICIUSCULA	G5 S1

Author:
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THE PINES

Directions:
The Pines are 15 miles south of May on the southwest side of the Pahsimeroi River, on the west side of the Pahsimeroi Valley.

Richness:
The Pines consists of spring-fed terraces near the headwaters of the Pahsimeroi River. The area has a series of broad alkaline terraces. Springs often emerge at the base of the terraces and support rich fen vegetation. Rich fen communities are dominated by Carex simulata (short-beaked sedge) and Potentilla fruticosa (shrubby cinquefoil), with scattered stems of Betula occidentalis (water birch). In addition, the rich fen provides habitat for numerous special status plant species. Spring creeks flowing through the site are lined with water birch. The alkaline terraces support a drier variant of the Potentilla fruticosa association with an understory dominated by alkali tolerant graminoids. It is

here that stands of Pinus flexilus (limber pine) are present. On drier alkaline terraces, occasional stands of Sarcobatus vermiculatus (greasewood) are present. These stands, however, have nearly been replaced by Chrysothamnus nauseosus (rabbit brush).

Rarity:

In addition to providing habitat for at least six special status plant species, the site supports the largest stand of limber pine associated with spring creeks in Idaho. The water birch community which lines spring creeks is thought to be the same as a globally rare community known from Pine Butte Swamp in Montana. The Pahsimeroi River provides critical spawning habitat for Chinook salmon, bull trout, and steelhead trout. It is unknown if The Pines provides habitat for these species or just a source of water. The area is also used by long-billed curlew.

Condition:

Cirsium arvense and Potentilla anserina are the major exotic/weedy species present. For the most part, highly alkaline areas are somewhat resistant to weed invasion.

Viability:

Livestock tend to avoid the rich fen communities due to the unstable substrate; threats to rare plants are related to factors such as hydrologic manipulation on and off site.

Other Values:

The area provides habitat for deer, spotted frogs, northern harriers, and numerous song birds. The ranch manager indicated that elk, black bear, and mountain lion are known to use the limber pine habitat.

Conservation Intent:

Conservation easements restricting hydrologic manipulation and ground disturbing activities or fee title acquisition is recommended.

Management Needs:

An existing ditch that routes water around the wetlands is present near the upper bench. This could be a factor contributing to the senescence of several limber pine. The reservoirs at the downstream end of the site may function as barriers to fish. Most of the area is used for livestock grazing; meadows are flood irrigated and fertilized to encourage forage production. The impacts of the latter items on fish may need to be assessed. Livestock grazing, which is the primary land use, has resulted in accelerated hummocking of wetlands and poor bank conditions along spring creeks.

Information Needs:

The reservoirs at the downstream end of the site may create barriers to fish migration. Hugh Horton (The Pines Grazing Association ranch manager) mentioned that small fish have been caught in the spring creeks. It would be worthwhile to determine if this area provides more than a water source (ie. habitat) for bull trout, steelhead trout, and chinook salmon.

Plant Community Occurrences:

PINUS FLEXILIS/POTENTILLA FRUTICOSA/DISTICHLIS STRICTA	G1	S1Q
BETULA OCCIDENTALIS/POTENTILLA FRUTICOSA	G2	S1
POTENTILLA FRUTICOSA/DESCHAMPSIA CESPITOSA	G4	S3
SARCOBATUS VERMICULATUS/DISTICHLIS STRICTA	G4	S1
CAREX UTRICULATA	G5	S4
CAREX SIMULATA	G4	S2
JUNCUS BALTICUS	G5	S4
POTENTILLA FRUTICOSA/ALKALINE GRAMINOID	GU	SU

Rare Plant Occurrences:

ASTRAGALUS DIVERSIFOLIUS	G3	S2
PRIMULA ALCALINA	G1	S1
SALIX CANDIDA	G5	S2
SALIX PSEUDOMONTICOLA	G5?	S1
CAREX BUXBAUMII	G5	S3
KOBRESIA SIMPLICIUSCULA	G5	S1

Author:
M. Jankovsky-Jones

CHILLY SLOUGH

Directions:
From Mackay, travel north on U.S. Highway 93 to milepost 126 near the Whiskey Springs pull-off on the west side of the highway. The Whiskey Springs pull-off provides the primary public access to the South Unit of Chilly Slough. To access the North Unit continue five miles north on Highway 93 from the Whiskey Springs pull-off to Mile Post 132. Watch for the graveled county road and follow the road west for two miles. Turn left at the first road junction for about 1/2 mile and watch for boundary signs. Park on the roadside and walk about 1/4 mile east to reach the wetland. Foot travel and/or canoeing is an easy way to explore this area. Boundary fences are present separating private land from BLM and IDFG land.

Richness:
Chilly Slough is a large, spring-fed, wet meadow-stream complex located in the Thousand Springs Valley, north of the town of Mackay, in Custer County, Idaho.

The site is surrounded by the stark, rocky peaks of the Lost River Range and the White Knob Mountains. Borah Peak, which is 12,662 in elevation, is Idaho's highest point and is located just to the east of the high mountain wetland site. Numerous springs join to form Thousand Springs Creek as it flows south from its headwaters to eventually join the Big Lost River. Surface and subsurface waters support a wide zone of water-associated plants. Shallow stagnant water supports Typha latifolia and Scirpus validus. Aquatic species in the slow flowing waters of Chilly Slough include Potamogeton filiformis, Chara sp., and Hippurus montanum. The majority of the marsh is a mosaic of Carex utriculata, Carex aquatilis, and Juncus balticus on a wet-to-dry gradient. A number of alkaline wetlands occur on benches elevated one to five feet above the main marsh. The alkaline communities commonly have hummocky topography and are dominated by the shrub Sarcobatus vermiculatus, or the graminoids Elymus cinereus, Poa juncifolia, or Spartina gracilis. Small patches of the Muhlenbergia richardsonis, Carex simulata, and Deschampsia cespitosa communities are also present. A highly productive rainbow trout fishery is present in Thousand Springs Creek in the first two miles of the Chilly Slough wetland. Large brook trout occur in the Whiskey Springs area. The waters, which are clear running and have a constant temperature, are slightly alkali and rich with aquatic macro-invertebrates.

Rarity:

Several high quality plant community occurrences are present; most notably are the Sarcobatus vermiculatus/Elymus cinereus, Spartina gracilis, and Carex simulata community types. The plant species of concern Epilobium palustre, Lomatogonium rotatum, Astragalus leptaleus, Astragalus diversifolius, and Aster junciformis are present. Long billed curlews nest at Chilly Slough. A peregrine hack site was established in 1988. Although more than eight birds were released, the hack tower was removed in 1990. At least 157 species of wildlife have been observed at Chilly Slough, including seven species of ducks which nest and rear young. The area is recognized as an important hunting and nesting area for several species of raptors including golden eagles.

Condition:

The area has a long history of use for cattle ranching operations. Wetlands are grazed in winter/spring after freeze, but poorly maintained fences permit year round grazing in some areas, resulting in degradation of soil and vegetation throughout the site. Hummocking of wetland soils is accelerated by livestock use in the Juncus balticus, Carex aquatilis, and Carex simulata communities, increasing the area of open water and reducing vegetation cover. On slightly elevated alkaline benches, livestock use has reduced shrub and graminoid diversity and potentially could be altering site hydrology. The headwaters springs are particulary degraded due to poor livestock management and ditching. Some areas are hayed in the summer. Large amounts of sediment are introduced to the wetland and stream channels. Canals divert water in some of the area,

negatively affecting spawning areas.

The headwater springs area supports several exotic species including Canada thistle. Hoary whitetop is present near the cabin in the Middle Unit.

Viability:

Seasonal to year long grazing pastures on private and public lands surround the site on all sides. During summer, the uplands are flood irrigated by water drawn from the Lost River and transported through Chilly canal. Highway 93 forms a partial boundary to the east, giving potential access to recreationists. A state highway gravel site is just within boundaries of Chilly Slough site.

Other Values:

Recreationists use Chilly Slough for canoeing, fishing, and waterfowl hunting.

Conservation Intent:

Several parcels, including the headwaters springs, are currently unprotected and should be high priority for conservation easements or fee title acquisition. Most properties acquired in fee by The Nature Conservancy have been transferred to the Bureau of Land Management or Idaho Department of Fish and Game for management. These lands are managed cooperatively as a Wetland Conservation Project Area. Some lands owned by the Bureau of Land Management are designated as Research Natural Area/Area of Critical Environmental Concern

Management Needs:

Livestock use within the primary ecological boundaries should be curtailed. Continued grazing threatens to change the nature of the vegetation and increase erosion and exotic plant introduction. Upgrading and extending fencing within the wetland would be beneficial. Recreational use should be restricted to avoid waterfowl during nesting season and to prevent soil compacting activities.

Information Needs:

Additional research is needed to identify and inventory non-game birds, mammals and invertebrates. Baseline monitoring and stewardship of hydrology, sedimentation, vegetation trends, and waterfowl nesting and brood rearing are all important. IDFG is evaluating the fishery at Chilly Slough (Kemner pers. comm. 1997).

Plant Community Occurrences:

SARCOBATUS VERMICULATUS/ELYMUS CINEREUS	G3 S2
CAREX UTRICULATA	G5 S4
SPARTINA GRACILIS	GU SU
DESCHAMPSIA CESPITOSA	G4? S3
CAREX AQUATILIS	G5 S4
CAREX NEBRASCENSIS	G4 S3

CAREX SIMULATA	G4 S2
JUNCUS BALTICUS	G5 S4
TYPHA LATIFOLIA	G5 S4
SCIRPUS VALIDUS	G4 S2
MUHLENBERGIA RICHARDSONIS	GU SU
POA JUNCIFOLIA	GU SU

Rare Plant Occurrences:

ASTER JUNCIFORMIS	G5 S1
ASTRAGALUS DIVERSIFOLIUS	G3 S2
ASTRAGALUS LEPTALEUS	G4 S2
LOMATOGONIUM ROTATUM	G5 S1
EPILOBIUM PALUSTRE	G5 S3

Rare Animal Occurrences:

FALCO PEREGRINUS ANATUM	G4T3 S1B,SZN
NUMENIUS AMERICANUS	G5 S3B,SZN

Author:
M. Jankovsky-Jones

FISHER SPRINGS

Directions:
Fisher Springs is located about 26 miles upstream of the Salmon River and Highway 93 along Fisher Creek, a tributary to the East Fork Salmon River. The site includes a series of hillside seeps that emerge above the East Fork Salmon River.

Richness:
Fisher Springs is a sloped wetland that occurs on the lower reaches of Fisher Creek (a tributary to the Salmon River). A series of springs emerge and create a shrub-dominated wetland on moss peat. The wetland interior is a large stand of bog birch and shrubby cinquefoil with small fruited sedge as the understory dominant. The margins of the wetland are a dense band of Booths and Geyer's willow with water sedge in the understory. Small stands of tufted hairgrass are present on the outer margins of the wetland. It is here that Primula incana is found.

Rarity:
The site contains a population of Primula incana and high quality low shrublands dominated by bog birch and shrubby cinquefoil.

Condition:
The area is used for livestock grazing. Livestock tend to avoid the unstable

wetland. Greatest impacts are along the margin and on Fisher Creek, which also includes portions of the Primula incana population.

Scattered stems of Poa pratensis are on the wetland margin. No other exotics were observed.

Viability:

Livestock grazing along the margins of the wetland and along Fisher Creek is the greatest threat to the wetland. Unstable substrates on the interior of the wetland limit most livestock use.

Other Values:

Not identified.

Conservation Intent:

Fencing of the springs to enhance wetland functions is desirable. If fencing were accomplished, designation as Special Interest Botanical Area would be appropriate.

Management Needs:

Fencing is the only management action needed at this site.

Information Needs:

Not identified

Plant Community Occurrences:

SALIX BOOTHII/CAREX AQUATILIS	G3 S3?
DESCHAMPSIA CESPITOSA	G4? S3
BETULA GLANDULOSA/CAREX SIMULATA	G2 S2

Rare Plant Occurrences:

PRIMULA INCANA	G4G5 S1

Author:

M. Jankovsky-Jones

IRON BOG

Directions:

Iron Bog RNA is located in the southeastern extent of the Pioneer Mountains near the Custer County/Butte County boundary. The RNA is about 40 road miles west of Arco, Idaho; 40 miles southwest of Mackay, Idaho; or about 14 miles southwest of Grouse, Idaho. Access to Iron Bog is from U.S. Route 93 between Moore, Idaho, and Darlington, Idaho. Take the Antelope Road and travel southwest to Grouse.

Continue on this road, which turns into FS Road 135, for about 14 miles (22.7 km) to the southeastern corner of the RNA.

Richness:

Iron Bog is a sphagnum peatland located within a relatively dry sagebrush-steppe ecosystem. The bog is located in a relatively flat valley bottom with steep slopes above. Elevations in the RNA range from 7000 feet (2133 m) along Iron Bog Creek at the southeastern corner of the site to 8600 feet (2621 m) on the ridge at the western corner. The hummocks in the bog support a variety of plants including beaked sedge (Carex utriculata), water sedge (C. aquatilis), bog laurel (Kalmia polifolia), labrador tea (Ledum glandulosum), and bog blueberry (Vaccinium occidentale). Bog birch (Betula glandulosa) dominates a large segment of the site with smaller scattered stands of willow (Salix boothii and S. geyeriana) and mountain alder (Alnus incana). Lodgepole pine (Pinus contorta) occur at the edge of the bog and along Iron Bog Creek where sphagnum and other moss species substrate is deeper. Lodgepole pine is also scattered throughout the bog within stands of bog birch. A band of subalpine fir (Abies lasiocarpa) borders the bog on the southwest side. The northeast-facing slope above the bog is a mosaic of Douglas-fir (Pseudotsuga menziesii) and sagebrush/grass communities, with the sagebrush/grass communities occupying the lower slopes. Subalpine vegetation occurs on the ridgetops. Black sagebrush/Idaho fescue (Artemisia nova/Festuca idahoensis) communities occur on the shallow soils of the upper ridgetops, along with scattered limber pines (Pinus flexilis). The uppermost slopes support subalpine fir and quaking aspen (Populus tremuloides) communities.

Rarity:

The occurrence of a sphagnum-dominated peatland within a dry sagebrush ecosystem is a unique occurrence.

Condition:

Some firewood cutting was reported as occurring in the area, though in 1997 no evidence of recent firewood cutting was observed. There is evidence of trespass cows.

Viability:

The RNA is surrounded by USFS lands within Management Area 25 - Antelope Creek - lands managed to enhance fish and wildlife habitat, minerals activities, and range administration.

Other Values:

Peatland communities are a rare occurrence in Idaho. This occurrence is particularly unusual due to its location in a dry ecosystem at lower timberline. The area contains a very complex geology; this, and the hydrology of the peatland have been the focus of studies performed by scientists from the University of Wisconsin - Milwaukee.

Conservation Intent:

The site has been protected by designation as a USFS Research Natural Area.

Management Needs:

The fence that was built in 1990 to exclude cattle from the RNA should be maintained. The area needs to be monitored to determine if firewood cutting is still occurring. In 1997 portions of the fence were noted that need maintenance. Maintenance should occur on an annual basis due to branches and trees falling and other possible breaches.

Information Needs:

Not identified.

Plant Community Occurrences:

PINUS CONTORTA/CALAMAGROSTIS CANADENSIS	G5Q S5
ABIES LASIOCARPA/CALAMAGROSTIS CANADENSIS, LEDUM GLANDULOSUM	G4 S3
PSEUDOTSUGA MENZIESII/ARNICA CORDIFOLIA	G4 S3
PSEUDOTSUGA MENZIESII/SYMPHORICARPOS OREOPHILUS	G5 S3
BETULA GLANDULOSA/CAREX UTRICULATA	G4? S3
ALNUS INCANA/MESIC FORB	G3G4QS1
SALIX GEYERIANA/CALAMAGROSTIS CANADENSIS	G5 S4
ARTEMISIA NOVA/FESTUCA IDAHOENSIS	G4 S2
ARTEMISIA TRIDENTATA VASEYANA/FESTUCA IDAHOENSIS	G5 S4

Author:

J. H. KALTENECKER

MERRIAM LAKE BASIN

Directions:

Merriam Lake Basin RNA is located in the Lost River Range, about one m ile south of Borah Peak and about 34 air miles (55 km) southeast of Challis. From U.S. Route 93, 46 miles (74.5 km) north of Arco or 32 miles (52 km) south of Challis, take FS Road 116 northeastward over Doublespring Pass for 10 miles to the turnoff of FS Road 117. Take 117 over Horseheaven Pass for six miles (9.7 km) to the junction with FS Road 118. Follow 118 up the West Fork Pahsimeroi River for 4.5 miles (7.3 km) to its junction with FS Road 267. Take 267 for 2.5 miles (4 km) up the West Fork Pahsimeroi River to the end of the road. The trail to Merriam Lake starts near the end of the road. Climb FS Trail 197 for about 2.25

miles (3.6 km) to Merriam Lake and follow the valley above Merriam Lake into the RNA.

Richness:

Merriam Lake Basin RNA is an outstanding alpine basin of great diversity containing an unusual number of interesting plant species and other features. The area is composed of sedimentary and metamorphic rocks with considerable folding of strata. Some of the rocks present include limestone and dolomite, sandstone, and quartzite. There is ample evidence of alpine glaciation with the upper lake in the basin now occupying a cirque with abundant quarrying, polish, and striations. Elevations in the RNA range from 9580 feet (2920 m) on the creek just above Merriam Lake, to 12,065 feet (3677 m) on the peak at the southwestern corner of the RNA. The vegetation encompassed in this area is mainly subalpine forests of Engelmann spruce (Picea engelmannii), subalpine fir (Abies lasiocarpa), whitebark pine (Pinus albicaulis), and some limber pine (Pinus flexilis), and various moist to dry alpine situations. Lakeshore meadows, braided streams, and alpine wet and dry meadows are present in association with snowmelt-fed springs and spring creeks. A single alpine lake at approximately 10,200 feet elevation is present. An unusual situation exists on level limestone bedrock just east of the alpine lake in the basin. Here is an extensive population of Saxifraga oppositifolia with no other plant species present. This particular situation has not been observed anywhere else in Idaho but is apparently typical of some high arctic tundra of the islands north of Hudson Bay, Canada. Several rare plant species are found in the area including Cymopterus ibapensis, Cymopterus douglassii, Erigeron humilis, Gentianella propinqua, Gentianella tenella tenella, Salix farriae and Saxifraga adscendens var. oregonensis.

Rarity:

The site supports a number of rare plants including Cymopterus ibapensis, C. douglassii, Gentianella propinqua, Saxifraga adscendens var. oregonensis and Salix farriae.

Condition:

Merriam Lake Basin RNA is listed as a Special Management Area in the Challis National Forest Land Resource Management Plan (1987) for its values as an RNA. The RNA is in the proposed Borah Peak Wilderness, which is managed to protect wilderness attributes. The area receives some recreational use by hikers.

Viability:

The site is entirely surrounded by USFS lands within Management Area 16, Borah Peak, and the proposed Borah Peak Wilderness. The area is managed to protect wilderness attributes.

Other Values:

The alpine lake is a rare occurrence in Idaho. The RNA contains a variety of alpine habitats and communities, including some that are similar to those of high tundra.

Conservation Intent:
The site has been protected by designation as a USFS Research Natural Area.

Management Needs:
Not identified.

Information Needs:
Not identified.

Plant Community Occurrences:

JUNCUS BALTICUS	G5 S4
CAREX SCIRPOIDEA/POTENTILLA DIVERSIFOLIA	GU SP
DESCHAMPSIA CESPITOSA/CALTHA LEPTOSEPALA	G4 S2
CAREX SUBNIGRICANS	GU SU
SALIX NIVALIS	G5 S4

Rare Plant Occurrences:

CYMOPTERUS IBAPENSIS	G4 S2
CYMOPTERUS DOUGLASSII	G3 S3
ERIGERON HUMILIS	G4 S2
GENTIANELLA TENELLA	G4G5 S2
SALIX FARRIAE	G4 S1
SAXIFRAGA ADSCENDENS VAR OREGONENSIS	G5T4TS2

Author:
J. H. Kaltenecker

WEST FORK PAHSIMEROI RIVER HEADWATERS

Directions:
West Fork Pahsimeroi Headwaters is on the east side of the Lost River Range below Leatherman Pass and Pass Lake. A high quality hiking trail (FS Trail 089) leads from the end of West Fork Pahsimeroi Road to the site (3 miles).

Richness:
The West Fork Pahsimeroi River Headwaters are in a cirque basin with three major meadows at different levels. The gently sloping meadows are fed by melting snow, groundwater, and springs emanating from talus and moraines. High ridges and peaks (12,000' plus) surround the cirque on the east, south, and west. Xeric

grasslands and Pinus flexilis/P. albicaulis woodlands surround the meadows. Meadows are dominated by the low willows Salix brachycarpa, S. farriae, and S. planifolia, and the graminoids Juncus balticus, Deschampsia cespitosa, Carex aquatilis, C. utriculata, and C. elynoides.

Rarity:

Site includes high elevation wetland communities dominated by low willows which are of rare occurrence in Idaho. The area also provides habitat for several special status plant species.

Condition:

FS Trail 198 to Pass Lake traverses the northwestern portion of the site. The trail is only lightly to moderately used. A couple of old campsites occur in the area. Site is heavily grazed by cattle, at least during some summers (cattle had not been on the site in 1997, as of August 12).

Viability:

Land uses which threaten the viabiliy were not noted.

Other Values:

The area is heavily used by elk in the summer. Bighorn sheep also use habitat in the area.

Conservation Intent:

Designation as Special Interest Area for botanical and wetland values is appropriate.

Management Needs:

The effect of cattle grazing on the wetlands needs to be addressed. There is natural hummocking, but in some areas (particularly drier margins) this seems to be accelerated by grazing. An increase in forbs such as Taraxacum and Geum trifoliatum may reflect past grazing use.

Information Needs:

Upland communities (grasslands and Pinus albicaulis/P. flexilis woodlands) need to be surveyed.

Plant Community Occurrences:

POTENTILLA FRUTICOSA/DESCHAMPSIA CESPITOSA	G4	S3
SALIX PLANIFOLIA/CAREX AQUATILIS	G5	S4
CAREX AQUATILIS	G5	S4
JUNCUS BALTICUS	G5	S4
DESCHAMPSIA CESPITOSA/CALTHA LEPTOSEPALA	G4	S2
SALIX BRACHYCARPA/CAREX ELYNOIDES	GU	SU

Rare Plant Occurrences:

CYMOPTERUS IBAPENSIS	G4 S2
ERIGERON HUMILIS	G4 S2
GENTIANELLA PROPINQUA	G5 S1
GENTIANELLA TENELLA	G4G5 S2
SALIX FARRIAE	G4 S1

Author:

R. K. Moseley and M. Jankovsky-Jones

ALKALI SPRING EXCLOSURE

Directions:

Travel Highway 93 about 7.5 miles downriver from the small town of Clayton (or about 17 miles upriver from Challis). Alkali Spring is a small tributary to the Salmon River and empties into the Salmon River near river mile 340. The Alkali Spring drainage is located on the east side of the Salmon River, and accessed by hiking up the main channel from the highway. The lower exclosure perimeter is located less than 0.2 mile from the road.

Richness:

This spring complex has water emanating from one main and several accessory springheads. Several channels converge and empty into the drainage's main channel. This main channel is subject to periodic flash flood events. The small spring channels are lined with water birch, although there may be gaps in this shrub's continuity. There are mesic graminoid meadows at or below a couple of the springheads. A white to gray to tannish crust or marly ooze in places is evidence of a calcareous substrate. Algae (several colors) occur in the water flowing below the main spring. The exclosure around the spring (about 100 acres in size) was constructed in 1996. The wetland community types are local in extent near the springheads or channels. The Juncus balticus stands/patches along the channels may be too local to be considered distinct community types. There are also Potentilla fruticosa/Mesic graminoid patches, but not large enough to qualify as an element occurrence.

Rarity:

Site is currently of general interest for wetland values. Additional surveys earlier in the growing season should be conducted for rare wetland plants and Challis endemics.

Condition:

Cirsium vulgare occurs in some moist spots. Poa pratensis and Agrostis stolonifera are locally common.

Viability:
Viability of the site is high as long as the exclosure is maintained.

Other Values:
Spotted frogs were observed in the riparian areas. Springs provide habitat for game and non-game mammals and birds, as well as water for livestock.

Conservation Intent:
The exclosure fence should be maintained. No special designation is recommended unless additional surveys reveal the presence of plant species of concern.

Management Needs:
The fence on the northeastern portion of the site has been recently constructed and is in good condition. The fence along the northwestern portion of the site (along the section line) is apparently in good condition. All fencing should be maintained to prevent livestock entry into the spring complex.

Information Needs:
A more thorough survey of upland vegetation types is needed. Both uplands and wetlands should be surveyed in the spring season for possible rare plant occurrences.

Plant Community Occurrences:

ARTEMISIA TRIDENTATA TRIDENTATA/ELYMUS CINEREUS	G2 S1
ARTEMISIA TRIDENTATA WYOMINGENSIS/POA SECUNDA	G5Q S2
BETULA OCCIDENTALIS	G3Q S2
SALIX EXIGUA/BARREN	G3? S4
SARCOBATUS VERMICULATUS/ELYMUS CINEREUS	G3 S2
CAREX SIMULATA	G4 S2
ELEOCHARIS PALUSTRIS	G5 S3
JUNCUS BALTICUS	G5 S4
SCIRPUS AMERICANUS	G1Q S1

Author:
M. Mancuso

ALLISON CREEK ISLAND

Directions:
Allison Creek Island is located about 32 miles upstream of Salmon, Idaho on the Salmon River. The island is just downstream of the Allison Creek/Salmon River confluence and river mile 296. Access to the island is by floating via raft or

canoe, though some gravel deposits may be wadeable in the fall.

Richness:

Allison Creek Island is located on the Salmon River in a wide valley bottom. The island is entirely of recent alluvium and there is little relief. Soils on the island consist of a gravelly sandy loam. The soils are shallow and well drained with a high water table. The primary feature of the area is the presence of riparian vegetation that appears to be undisturbed by grazing or fire. The island is dominated by Betula occidentalis (water birch) and Cornus sericea (red-osier dogwood) with occassional Alnus incana (mountain alder) and Juniperus scopulorum (Rocky Mountain juniper) and small localized patches of Salix exigua (coyote willow). Eleocharis palustris (common spikerush) dominates sandy channel bars and overflow channels. Other mesic species including Typha latifolia (common cattail) and Scirpus acutus (hardstem bulrush) are present in the Eleocharis palustris stands. The highest areas of the island support stands of Agropyron smithii (western wheatgrass). Cobble bars are also present near the overflow channel and as bars along the banks of the island.

Rarity:

Site provides good quality occurrences of low elevation riparian shrublands which are of rare occurrence as most have been degraded.

Condition:

The land is used only by wildlife and maybe an occasional hunter. Cirsium arvense, Poa pratensis, Agrostis stolonifera, and Phalaris arundinaceae are present and abundant in some areas. The previously mentioned species are primarily a threat to Agropyron smithii communities. One plant of Centaurea maculosa was found (and pulled). The absence of large stands of spotted knapweed is significant as it is widespread and problematic on the Salmon River corridor.

Viability:

A subdivision is planned on private land on the east bank of the Salmon River just downstream of the island.

Other Values:

A number of juvenile fish from 1.5 to 4 inches were observed in overflow channels indicating that the island is providing some rearing habitat.

Conservation Intent:

The site is recommended as a Research Natural Area/Area of Critical Environmental Concern (RNA/ACEC). This designation is complicated by the fact that ownership of the island is unclear. If the island is determined to be above the ordinary high water mark it is BLM owned and RNA/ACEC designation is appropriate. If the island is below the ordinary high water mark then it is owned by the state of Idaho and other designation would be necessary.

Management Needs:

Monitor island for spotted knapweed and lefy spurge and actively control populations.

Information Needs:

It is unclear as to who owns islands--state or BLM; work w/either to establish RNA. It does not appear that the entire island floods annually, thus it is likely under BLM administration.

Plant Community Occurrences:

BETULA OCCIDENTALIS/CORNUS SERICEA	G2G3 S2
AGROPYRON SMITHII	G3G5QS1
ELEOCHARIS PALUSTRIS	G5 S3

Author:

S. Rust, M. Jankovsky-Jones

BADGER CREEK

Directions:

Badger Creek is a tributary of the Little Lost River, located northwest of Howe, Idaho. From Howe, travel northwest on State Highway 22/33 for approximately 27 miles. Approximately one mile after the highway crosses Badger Creek, look for a gravel pit on the east side of the road. Turn onto the road that parallels the highway and make a quick turn to the east, staying on the east side of the main road (Badger Creek Road). Continue east on Badger Creek Road (high clearance vehicle recommended) for 3.5 miles. Here you will come to a Y near Badger Creek. Access is by foot and/or vehicle from this point.

Richness:

Badger Creek is a high-gradient perennial stream that is incised into the Badger Creek Bar. The creek occurs in a narrow canyon and drains the west side of Diamond Peak in the Lemhi Range. The channel trends southwest into the Little Lost River. The riparian corridor is dominated by Betula occidentalis (water birch) with occasional Populus angustifolia (narrow-leaf cottonwood) and Juniperus scopulorum (Rocky Mountain juniper) stands. A unique feature of Badger Creek is the presence of Pinus flexilis (limber pine), a conifer that is usually restricted to uplands. While limber pine is known to occasionally occur in association with subirrigated spring systems in Idaho, the Badger Creek location is one of the few known sites with several limber pine trees occurring along a low elevation riparian corridor.

Rarity:

Badger Creek supports a nearly continuous occurrence of the Betula

occidentalis/mesic forb community type. The presence of Pinus flexilis in this area is unique - it is one of the only known locations of P. flexilis stands in a riparian system. The low elevation population of limber pine could provide genetic diversity for breeding disease-resistant strains in the future (Aslett 1991). Additionally, good quality cottonwood stands are present. Badger Creek supports a population of wild rainbow trout. Bull trout were found in upper Badger Creek by Corsi and Elle in 1987. Their presence in lower Badger Creek remains an unconfirmed possibility.

Condition:

Poa pratensis and Cirsium arvense are present along the riparian corridor. However, these species are low in cover and do not pose a threat to native species.

Viability:

Badger Creek and the adjacent uplands have primarily been used for livestock grazing. A number of roads traverse the area and primitive campsites are in place. Mine sites are present on hillsides upstream of the site. It is unknown what impacts they may have on sedimentation and/or water quality. Some cutting of juniper and pine trees have occurred in the distant past; however, all age classes of the trees are present, indicating that the communities are viable.

Other Values:

Badger Creek is valuable as a reference area for stream systems crossing alluvial fans in the east-central valleys of Idaho. The stream provides a migration corridor for wildlife in an arid environment.

Conservation Intent:

Badger Creek is listed as a potential Research Natural Area/Area of Critical Environmental Concern in the 1970s management plan framework. This area could serve as a reference area for high gradient stream systems on alluvial fans.

Management Needs:

In the area where the creek is entrenched into Badger Creek Bar, the riparian vegetation is thick and livestock access and use is limited to trailing along the upper edge of the valley wall. In places where the riparian bottom is accessible, livestock have created areas of bare ground where they water along the creek or lie in the shade under the water birch. Management of grazing would allow these areas to recover.

Information Needs:

Not identified.

Plant Community Occurrences:

POPULUS ANGUSTIFOLIA/BETULA OCCIDENTALIS G1G3 S1

JUNIPERUS SCOPULORUM/CORNUS STOLONIFERA	G4	S3
BETULA OCCIDENTALIS/MESIC FORB	G3	S1

Author:
M. Jankovsky-Jones

BEAR VALLEY CREEK

Directions:

Bear Valley Creek is located in the northern part of the Lemhi Range about 12.5 miles (20 km) southwest of Lemhi, Idaho. From Lemhi, head north on State Route 28 for about one mile (1.6 km), turn left and head southwest on the Hayden Creek Road. The Hayden Creek Road is paved to the junction with Basin Road. Continue on the Hayden Creek Road for about 5 miles (8 km) to the junction with FS Road 009 which heads west and northwest up Bear Valley Creek about 4.5 miles (7.2 km) to a campground at the end of the road. The RNA is immediately west of this road end. FS Trail 179 heads west following Bear Valley Creek and bisects the RNA.

Richness:

Bear Valley Creek RNA extends from 6800 feet (2072 m) at the east boundary to 10,116 feet (3083 m) at the southwest tip. Due in part to the large elevational range, the area contains a wide variety of forest and grassland conditions typical of this part of the Lemhi Range. It contains sagebrush-grass vegetation in places on lower south-facing slopes to mostly forest vegetation of Douglas-fir (Pseudotsuga menziesii), subalpine fir (Abies lasiocarpa), and whitebark pine (Pinus albicaulis) types with increasing elevation. Several rare forest habitat types occur along the creek including Engelmann spruce/soft-leaved sedge (Picea engelmannii/Carex disperma). The area also contains alpine meadows and a mountain big sagebrush/Idaho fescue type (Artemisia tridentata ssp. vaseyana/Festuca idahoensis). Several species are at or near their southern limit here, including thimbleberry (Rubus parviflorus), twinflower (Linnaea borealis), and menziesia (Menziesia ferruginea). In addition, the RNA contains an area of land slippage and snowslide erosion, common to steep topography and deep snows.

Rarity:

A wide variety of high-quality habitat types are present including the rare Picea engelmannii/Carex disperma. The rare bryophyte Helodium blandowii has also been observed in the area.

Condition:

Livestock grazing occurs in the northeast part of the site. The site probably receives recreational use as the Bear Valley Lakes Trail bisects, but is excluded from the RNA. These uses have not been monitored recently.

No populations of exotic species have been reported for the site.

Viability:

The site is with the Forest Plan Management Area 2A-1. The emphasis of this management prescription is motorized dispersed recreation. Cattle grazing occurs adjacent to the northeast end of the RNA. The Upper Hayden and, to a lesser extent, the North Hayden allotments are adjacent to the RNA. Recreational use occurs along the Bear Valley Lakes Trail (#179) which bisects the RNA. The RNA boundaries were drawn to exclude a corridor along this trail.

Other Values:

Watershed values are high.

Conservation Intent:

The area has been protected by designation as a USFS Research Natural Area.

Management Needs:

A fence is to be constructed to restrict livestock use.

Information Needs:

Not identified.

Plant Community Occurrences:

ABIES LASIOCARPA/CALAMAGROSTIS CANADENSIS, LEDUM GLANDULOSUM	G4	S3
ABIES LASIOCARPA/LINNAEA BOREALIS	G5	S5
ABIES LASIOCARPA/STREPTOPUS AMPLEXIFOLIUS	G4?	S4
ABIES LASIOCARPA/VACCINIUM SCOPARIUM	G5	S5
PICEA ENGELMANNII/CAREX DISPERMA	G2	S2
PSEUDOTSUGA MENZIESII/CALAMAGROSTIS RUBESCENS	G5	S5
PSEUDOTSUGA MENZIESII/SYMPHORICARPOS OREOPHILUS	G5	S3
PSEUDOTSUGA MENZIESII/CERCOCARPUS LEDIFOLIUS	G4	S3
PSEUDOTSUGA MENZIESII/FESTUCA IDAHOENSIS	G5	S3
ABIES LASIOCARPA/JUNIPERUS COMMUNIS	G5	SP
ABIES LASIOCARPA/CALAMAGROSTIS CANADENSIS, CALAMAGROSTIS CANADENSIS	G5	S5

Author:

A. H. Pitner

Directions:

The area is located on the west side of the Salmon River, about 38 road miles south of Salmon, 22 air miles north of Challis, and 4 road miles northeast of Ellis. The area is easily accessible by boat across the Salmon River from U.S. Route 93. Approaches by vehicle are possible as well as roads exist in the Hat Creek, Dry Gulch, and Deer Gulch drainages to the west, but the condition of these roads is unknown.

Richness:

Cronks Canyon RNA/ACEC consists of primarily east-facing mountain slopes and basins on the west side of the Salmon River that have been cut off from livestock grazing by rock cliffs and the river. The site contains a high degree of both habitat and floristic diversity due to 2000+ feet of relief, the presence of all aspects except west-facing slopes, geologic diversity, and location with the transition zone between east-central and central Idaho sections of the northern Rocky Mountains. A variety of community types can be found including native grasses dominated by Pseudotsuga menziesii, Cercocarpus ledifolius, Juniperus scopulorum, and Artemisia spp. A narrow riparian zone along the Salmon River includes Populus trichocarpa and Salix spp. as well.

Rarity:

A high degree of both habitat and floristic diversity occurs on the site and it contains examples in excellent condition of several ungrazed sagebrush steppe types and forest community types as well.

Condition:

The area is inaccessible to livestock and shows no signs of having ever burned. As of August 1983, there have been no mineral claims filed within the area. The area was identified in the Pahsimeroi EIS as a special use area with emphasis being placed on management of habitat for bighorn sheep.

Viability:

Adjacent lands are managed by the state of Idaho and private owners. Private holdings are scattered along this section of the river, but primarily on the east bank.

Other Values:

This area is year-round range for mule deer and a relict population of bighorn sheep. Ungrazed sagebrush/grass communities are very uncommon in Idaho and useful for research. The area makes a positive contribution to the overall quality of the watershed.

Conservation Intent:

The site has been protected by designation as a BLM Research Natural Area/ Area of Critical Environmental Concern.

Management Needs:

A management plan needs to be written, but specific management needs are unknown.

Information Needs:

Riparian community types were observed through binoculars in 1997 and appear to be restricted to a narrow band of Salix exigua and Populus trichocarpa. Riparian vegetation has not been sampled. There is no documentation of a detailed site visit since May 1986.

Plant Community Occurrences:

CERCOCARPUS LEDIFOLIUS/FESTUCA IDAHOENSIS	G? S2
CERCOCARPUS LEDIFOLIUS/AGROPYRON SPICATUM	G5 S4
ARTEMISIA TRIDENTATA WYOMINGENSIS/ELYMUS AMBIGUUS	G3 S3
ARTEMISIA TRIDENTATA WYOMINGENSIS/AGROPYRON SPICATUM	G5 S3
ARTEMISIA TRIPARTITA/FESTUCA IDAHOENSIS	G3 S1
ARTEMISIA TRIDENTATA WYOMINGENSIS/FESTUCA IDAHOENSIS	G3G4 S1
PSEUDOTSUGA MENZIESII/FESTUCA IDAHOENSIS, FESTUCA IDAHOENSIS	G5 S2

Author:

A. H. Pitner

EAST FORK SALMON RIVER BENCH

Directions:

The East Fork Salmon River Bench is located along the northeast side of the East Fork Salmon River, approximately 0.5-1 mile upstream (southeast of) the confluence with the Salmon River.

Richness:

The East Fork Salmon River Bench is located just upstream of the confluence of the East Fork with the Salmon River. The combination of steep cliffs, talus slopes, and the river have resulted in the isolation and preservation of uplands on the bench and the riparian corridors. The upland portion of the terrace consists mostly of the Artemisia tridentata wyomingensis/Agropyron spicatum association, as is some of the adjacent canyon side. This association occurs on coarse substrates. A small area of A. tridentata wyomingensis/Carex filifolia occurs on sandy loam substrates. A similar area of A. tridentata wyomingensis/Sitanion hystrix occurs in a depositional area higher in clay. Talus and cliff bands occupy most of the canyon side. The East Fork Salmon River is a high gradient reach with riparian vegetation limited to small terraces in

the narrow canyon. Communities dominated by black cottonwood (Populus trichocarpa) or mixed shrubs (Betula occidentalis, Alnus incana, and Cornus sericea) occur adjacent to the river and are flooded annually. Floodwaters do not inundate the entire terrace; the outer edge, near the upland ecotone, is dominated by basin wildrye (Elymus cinereus) and sagebrush (Artemisia tridentata).

Rarity:

Site contains very high quality example of rare and common community types. Types of special interest are Artemisia tridentata wyomingensis/Carex filifolia and A. tridentata tridentata/Elymus cinereus.

Condition:

Access to the area by domestic grazing animals is only by a narrow steep chute that breeches the cliffs in the southeast quarter of section 22. As a result, grazing has had only a minor impact on the area. There are no other apparent disturbances. No mineral claims have been filed since August 1983. No roads exist or are planned.

A few exotic forbs and graminoids occur at low density on the bench and along the riparian corridor. These species do not pose a threat to the viability of the site.

Viability:

Rock mining (for landscaping use) is occurring on the hill near the northwest corner of the RNA/ACEC (elevation 5960). This activity most likely only affects wildlife use.

Other Values:

The site offers excellent examples of river terrace sedimentation in an undisturbed condition, as well as an excellent exposure of the Kinni-kinnik Quartzite. The area supports antelope, coyote, and mule deer.

Conservation Intent:

The site has been protected by designation as a Bureau of Land Management Research Natural Area/Area of Critical Environmental Concern.

Management Needs:

Not identified.

Information Needs:

Not identified.

Plant Community Occurrences:

POPULUS TRICHOCARPA/CORNUS STOLONIFERA	G3? S3
ARTEMISIA TRIDENTATA TRIDENTATA/ELYMUS	

CINEREUS	G2 S1
ARTEMISIA TRIDENTATA WYOMINGENSIS/CAREX FILIFOLIA	G1Q S1
ARTEMISIA TRIDENTATA WYOMINGENSIS/SITANION HYSTRIX	G5 S1
BETULA OCCIDENTALIS/MESIC FORB	G3 S1
ELYMUS CINEREUS	G2G3QS3
ARTEMISIA TRIDENTATA WYOMINGENSIS/AGROPYRON SPICATUM	G5 S3

Author:
A. H. Pitner

EIGHTEENMILE CREEK

Directions:

Eighteenmile Creek is a tributary of the Lemhi River that originates in the Beaverhead Mountains about 32 miles southeast of Leadore. Access is by numerous county roads. Much of the bottomlands are privately owned and landowners should be contacted for access.

Richness:

Eighteenmile Creek is a northwesterly trending stream draining unnamed peaks in the central Beaverhead Mountains. The headwaters are high gradient. At the confluence with Pass Creek, the gradient lessens and beaver activity has created a mosaic of emergent and shrub vegetation. Where valley bottoms flatten out, vegetation extends from valley wall to valley wall. Vegetation communities are dominated by shrubs (Salix boothii with lesser amounts of Salix geyeriana and S. drummondiana) and emergent sedge (primarily Carex utriculata) vegetation. As beaver dams are constructed, willows tend to die out due to inundation and are replaced with open water or Carex utriculata communities. When dams blow out, the mud substrate is pioneered by Catabrosia aquatica, Alopecurus aequilis, Carex species, and Deschampsia cespitosa. In areas with a permanent source of water, Carex communities tend to persist. In areas where water levels drop, Deschampsia cespitosa becomes established. These areas are the most susceptible to trampling due to accessibility, and tufted hairgrass may be replaced by increasers (Juncus balticus or Carex nebraskensis) and exotics (Poa pratensis, Phleum pratense, and Alopecurus pratense). Potentilla fruticosa shrublands are a minor type along Eighteenmile Creek. On upper Eighteenmile Creek, Potentilla fruticosa communites occur as sloped wetlands in association with hillside seeps. On lower Eighteenmile Creek, P. floribunda is associated with alkaline spring systems. Lower Eighteenmile Creek was little surveyed. Alkaline soils occur below 6500 feet in elevation and several special status plant species

associated with alkaline soils are present. An interesting patch of P. floribunda occurs west of the county road (T14S R27E, Section 32), with a dense graminoid layer dominated by Carex scirpoidia with lesser amounts of Spartina gracilis, Muhlenbergia richardsonis, Distichilis spicata, and Carex parryana.

Rarity:

Site contains many special status plant species, as well as extensive beaver complexes, and high quality, unique occurrences of Potentilla fruticosa shrublands.

Condition:

The upper reaches are used for livestock grazing; some diversions are also present. Lower Eighteenmile Creek is used for grazing and hayland.

Many of the drier meadows have had the native community replaced by increasers (Juncus balticus) or exotics (Poa pratensis, Phleum pratense, Alopecurus pratense). Irrigated pastures near the south end of the site have been seeded with alfalfa and/or interseeded with pasture grasses.

Viability:

Adjacent uplands are mostly in native vegetation with some areas being converted to hayground. Some water development has occurred in the middle and lower valley.

Other Values:

Site provides habitat for moose. Spotted frogs were observed in beaver complexes near the headwaters of Eighteenmile Creek.

Conservation Intent:

The BLM owns portions of the headwaters that are designated as Wilderness Study Area (WSA). The BLM continues to acquire additional parcels to be included in the WSA. Working with landowners in the lower watershed by encouraging voluntary protection, donation of conservation easements, and other actions is appropriate.

Management Needs:

Native meadow vegetation may come back in beaver complexes if livestock use is managed. Historically, willows were likely more dense along lower Eighteenmile Creek and would likely return with livestock management.

Information Needs:

Information included here is based on field surveys in T13NR28E - Sections 1,2, and 3, and in T14NR28E - Sections 33 and 34. Additionally, information on BLM lands was extracted from the Montana Wetland and Riparian Association homepage. Several parcels remain unsurveyed including those owned by Oxbow Ranch.

Plant Community Occurrences:

POTENTILLA FRUTICOSA/DESCHAMPSIA CESPITOSA	G4 S3
SALIX BOOTHII/CAREX UTRICULATA	G4 S4
SALIX BOOTHII/MESIC GRAMINOID	G3? S3?
CAREX UTRICULATA	G5 S4
DESCHAMPSIA CESPITOSA	G4? S3
CAREX SIMULATA	G4 S2
POTENTILLA FRUTICOSA/ALKALINE GRAMINOID	GU SU

Rare Plant Occurrences:

ASTRAGALUS DIVERSIFOLIUS	G3 S2
ASTRAGALUS LEPTALEUS	G4 S2
PRIMULA ALCALINA	G1 S1
SALIX CANDIDA	G5 S2
SALIX PSEUDOMONTICOLA	G5? S1

Author:
M. Jankovsky-Jones

JIMMY SMITH LAKE

Directions:
From Challis, travel about 22 miles south on Highway 93 to the confluence of the Salmon and East Fork Salmon River. Travel 13 miles on the East Fork Salmon River road to Big Lake Creek Road. Continue northwest of Big Lake Creek Road to the road end. Jimmy Smith Lake is accessed via trail and is about one mile from the trailhead. The trail continues around the north side of the lake.

Richness:
Jimmy Smith Lake is a natural lake at the confluence of Jimmy Smith, Corral, and Big Lake creeks. The lake was created by a natural landslide on Big Lake Creek. Vegetation around the steep sided lake is poorly developed except at the bays created by feeder creeks. The bays support dense bands of Salix boothii (Booth's willow) and S. geyeriana (Geyer's willow) which extends from valley wall to valley wall. The lake fringe is a near monoculture of Carex utriculata (beaked sedge). Wetlands are best developed at the Big Lake Creek bay.

Rarity:
Jimmy Smith Lake provides habitat for Bucephala islandica (Barrow's goldeneye). Thelypodium repandum (wavy-leaf thelypody) is present on the steep slopes above Jimmy Smith Lake.

Condition:
No exotics that threaten wetland habitat were observed.

Viability:

The area is currently grazed, but most of the wetlands are too wet for livestock entry.

Other Values:

Open water provides habitat for waterfowl in an arid environment. The willow stand on Big Lake Creek covers the moderately wide valley bottom and likely provides habitat for neotropical migrants.

Conservation Intent:

Area should be managed to maintain wetland habitat. No special designation is recommended.

Management Needs:

Livestock graze in the area. Some impacts to willow communities, including trampling and bare soil areas, were noted at the Corral Creek inlet. The dense willow bottom on Big Lake Creek appears to be too wet for livestock entry. Livestock use around the lake should be limited to short season or eliminated.

Information Needs:

Aquatic plants are abundant and create small mats near the inlets. Aquatic vegetation is unsurveyed. Additional information on waterfowl use would be useful as well.

Plant Community Occurrences:

SALIX BOOTHII/CAREX UTRICULATA	G4	S4
CAREX UTRICULATA	G5	S4

Rare Plant Occurrences:

THELYPODIUM REPANDUM	G3	S3

Rare animal occurrences:

BUCEPHALA ISLANDICA	G5	S3B,S3N

Author:

Mabel Jankovsky-Jones

KENNEY CREEK

Directions:

Kenney Creek RNA is at the head of the Kenney Creek drainage in the Beaverhead Mountains on the west side of the Continental Divide (the ID/MT border). The area is about 19 air miles (31 km) east-southeast of Salmon, Idaho. From the junction of State Route 28 with U.S. Route 93 in Salmon, go 15.1 miles (24.3 km) southeast on State Route 28 to a crossroads. Turn left and cross the Lemhi River

to a road on the east side of the valley. Turn right and travel south on this east-side road for two miles (3.2 km) to the junction with FS Road 185 (Lemhi Pass Road) coming in from the left. Travel 185 northeastward for 12.3 miles (19.8 km) to its junction with FS Road 184 coming in from the left. Take 184 northwestward for 5.1 miles (8.2 km) to its end. This is the end of the graded road. However, primitive roads can be traveled up the Continental Divide for another mile (1.6 km). The RNA is the basin to the north below the divide.

Richness:

Kenney Creek RNA is located on the crest of the Beaverhead Mountains along the Continental Divide. Elevations in the RNA range from 7,480 to 9,604 feet (2280 to 2927 m). The RNA features two glaciated basins on Pre-Belt quartzite of the Yellowjacket Formation. A glacial pond occurs in the western basin and the eastern basin has a series of small wetlands and wet meadows. Additional aquatic features include gentle to steep gradient streams and seep springs. Upland vegetation in Kenney Creek RNA includes at least four whitebark pine (Pinus albicaulis) habitat types, a rare Engelmann spruce (Picea engelmannii) habitat type, at least four Douglas-fir (Pseudotsuga menziesii) habitat types, and at least two subalpine fir (Abies lasiocarpa) habitat types. A cover type of lodgepole pine (Pinus contorta) was heavily infested by mountain pine beetle (Dendroctonus ponderosae) in the late 1930s resulting in heavy mortality.

Rarity:

Kenney Creek RNA contains a variety of whitebark pine, Douglas-fir, and subalpine fir habitat types. In addition, the rare Engelmann spruce/soft-leaved sedge habitat type is present. All of these type are in basins that are undisturbed by human influence.

Condition:

The site is within Forest Plan Management Area 2A-1. The emphasis of this uniform management prescription is motorized dispersed recreation; motorized use is restricted to designated routes. Recreational use of the site was assessed as light in 1989, but has not been documented recently.

Viability:

The site is within Forest Plan Management Area 2A-1. The emphasis of this uniform management prescription is motorized dispersed recreation; motorized use is restricted to designated routes. Firewood cutting occurs along the divide to the south of the RNA. Mining prospects are located to the west of the area.

Other Values:

Kenney Creek RNA is situated along a traditional interstate elk migration route and supports a wide variety of wildlife species.

Conservation Intent:

Kenney Creek has been protected by designation as a USFS Research Natural Area.

Management Needs:
Not identified.

Information Needs:
Not identified.

Plant Community Occurrences:

PINUS ALBICAULIS/VACCINIUM SCOPARIUM	G4	S4
ABIES LASIOCARPA/CALAMAGROSTIS RUBESCENS	G5	SP
ABIES LASIOCARPA/VACCINIUM SCOPARIUM	G5	S5
PICEA ENGELMANNII/CAREX DISPERMA	G2	S2
PSEUDOTSUGA MENZIESII/CALAMAGROSTIS RUBESCENS	G5	S5
PSEUDOTSUGA MENZIESII/CAREX GEYERI	G5	S5
PSEUDOTSUGA MENZIESII/SPIRAEA BETULIFOLIA	G5	S5
PINUS ALBICAULIS/CAREX GEYERI	G4	S1
PINUS ALBICAULIS/FESTUCA IDAHOENSIS	G4	S4
PINUS ALBICAULIS/JUNIPERUS COMMUNIS	G4	S2
PSEUDOTSUGA MENZIESII/FESTUCA IDAHOENSIS	G5	S3

Author:
A. H. Pitner

LAKE CREEK

Directions:
Lake Creek RNA/ACEC is in the Boulder Mountains at the head of Lake Creek on the west side of Jerry Peak. The site is about 29 air miles west-northwest of Mackay, Idaho. Access to the area is via the East Fork Salmon River Road to Herd Creek Road to Herd Lake, which is approximately 1.5 miles downstream from the site boundary.

Richness:
Lake Creek is an area in the mountains of the east-central Idaho section of the northern Rocky Mountains with a great variety of high elevation sage/grass and forest vegetation types on soils derived primarily from the Challis Volcanics. Forest types are dominated by Douglas fir, subalpine fir, and whitebark pine. Range types include dominants mountain big sagebrush, low sagebrush, black sagebrush, bluebunch wheatgrass and Idaho fescue.

Rarity:
The principal feature of the area is the presence of a great variety of high elevation sagebrush/grass and forest vegetation types. Additionally, Draba

incerta has been collected from the site.

Condition:

The lower slopes of the area receive light to moderate grazing, while the upper slopes receive light grazing. The area is very scenic and dispersed recreation such as hunting and hiking are probable uses.

Viability:

Viability or threats to viability have not been assessed.

Other Values:

The area is winter habitat for elk, mule deer and blue grouse. The streams in the area are perennial streams with resident fish only. Lake Creek is a tributary to Herd Creek, a major anadromous spawning stream. The high quality of the existing vegetation at the site makes a positive contribution to the overall watershed quality.

Conservation Intent:

Lake Creek has been proteced by designation as a BLM Research Natural Area/Area of Critical Environmental Concern. It is also within a Wilderness Study Area. The Herd Creek watershed has been recommended as an ACEC in the proposed Resource Management Plan for the Challis Resource Area (1998).

Management Needs:

Management needs are unknown. The extent of grazing taking place in the area needs to be determined.

Information Needs:

Baseline inventories of the area are needed. Becuse of the earliness of the field inventory in 1983, not all plant community types present were identified.

Plant Community Occurrences:

PINUS ALBICAULIS/FESTUCA IDAHOENSIS	G4	S4
PSEUDOTSUGA MENZIESII/AGROPYRON SPICATUM	G5	S3
ARTEMISIA TRIDENTATA VASEYANA/LEUCOPOA KINGII	G3	S3
ARTEMISIA TRIDENTATA VASEYANA/AGROPYRON SPICATUM	G4	S4
ARTEMISIA ARBUSCULA ARBUSCULA/FESTUCA IDAHOENSIS	G5	S4
ARTEMISIA ARBUSCULA ARBUSCULA/AGROPYRON SPICATUM	G5	S3
ARTEMISIA NOVA/POA SECUNDA	G3	S3
ARTEMISIA NOVA/FESTUCA IDAHOENSIS	G4	S2
ARTEMISIA TRIDENTATA VASEYANA/FESTUCA		

IDAHOENSIS	G5	S4

Rare Plant Occurrences:

DRABA INCERTA	G5	S2

Author:
A. H. Pitner

MEADOW CANYON

Directions:

Meadow Canyon RNA is located in the Lemhi Range, extending west from Bell Mountain. The RNA is about 79 miles northwest of Idaho Falls, Idaho; 70 miles west of Dubois, Idaho; or 35 miles south of Leadore, Idaho. The area is accessed from the Birch Creek Valley. From Idaho Falls, Idaho, travel north on US Interstate 15 to the intersection with State Route 28. Travel northwest on State Route 28 to the intersection with the graveled forest road to the Charcoal Kilns historic site (FS Road 541). Access is by a primitive road that takes off from the graveled road, and by trail to Meadow Canyon RNA.

Richness:

Meadow Canyon RNA contains two of the finest alpine tundra areas found in Idaho. One area is on limestone and the other on quartzite, resulting in differences in plant communities. Contact areas between the two substrates are common in the alpine country of the RNA. The elevation in the area ranges from 7700 feet (2347 m) where the boundary crosses Meadow Canyon to 11,612 feet (3539 m) at the top of Bell Mountain. Several unusual and rare plant species occur here. This is the only known location where the three species of columbine (Aquilegia formosa, A. flavescens, and A. coerulea) found in Idaho occur together. The area includes at least four Douglas-fir (Pseudotsuga menziesii) habitat types. Stands of limber pine (Pinus flexilis) and Engelmann spruce (Picea engelmannii) occur in the area, which is unusual because of the rather dry conditions resulting from the limestone substrate and climate. An Engelmann spruce/moss type occurring in the RNA is unusual because of its limited occurrence. The northern bench is covered with a grassland community of Idaho fescue (Festuca idahoensis) and bluebunch wheatgrass (Agropyron spicatum). Near the summit of Bell Mountain are alpine turf communities dominated by black-root sedge (Carex elynoides), curly sedge (C. rupestris), Ross's avens (Geum rossii), and snow willow (Salix nivalis).

Rarity:

The RNA supports a number of unusual plants including Erigeron humilis, Silene uralensis ssp. montana, and Botrychium minganense. The site supports the only known population in Idaho of Papaver kluanense.

Condition:

Meadow Canyon was listed as an established RNA in the Land Management Plan for the Targhee National Forest (1985) and the Challis National Forest Land and Resource Management Plan (1987). The site currently receives minimal recreational use due to difficult access. The lower end of the RNA has been fenced and signed to exclude grazing and most recreational use.

Viability:

The site is entirely surrounded by USFS lands. Most of the RNA is within Management Area 1 (Diamond Peak Management Area) in the Targhee National Forest Land Management Plan. The western-most portion of the RNA is within Management Area 14 in the Challis National Forest Land and Resource Management Plan. The entire RNA is within the RARE II area, Idaho 04601, Diamond Peak, which is under consideration for wilderness status.

Other Values:

The RNA has an interesting geology, including contact areas between limestone and quartzite substrates and an excellent example of overthrusting on Bell Mountain. The array of interesting plants in the RNA is a result of the geology. Several animals, indicative of the pristine nature of the area, are present including mountain goat (Oreamnos americanus), prairie falcon (Falco mexicanus), and golden eagle (Aquila chrysaetos). Mule deer (Odocoileus hemionus), pronghorn (Antilocapra americana), black bear (Ursus americanus), cougar (Felis concolor), and coyote (Canis latrans) are also present in addition to numerous small mammals, small raptors, and songbirds.

Conservation Intent:

The site has been protected by designation as a USFS Research Natural Area.

Management Needs:

Not identified.

Information Needs:

Not identified.

Plant Community Occurrences:

PICEA ENGELMANNII/HYPNUM REVOLUTUM	G2	S2
PSEUDOTSUGA MENZIESII/ARNICA CORDIFOLIA	G4	S3
PSEUDOTSUGA MENZIESII/JUNIPERUS COMMUNIS	G5Q	S3
PSEUDOTSUGA MENZIESII/SYMPHORICARPOS OREOPHILUS	G5	S3
PINUS FLEXILIS/FESTUCA IDAHOENSIS	G5	S2
PSEUDOTSUGA MENZIESII/CERCOCARPUS LEDIFOLIUS	G4	S3
ARTEMISIA TRIDENTATA VASEYANA/FESTUCA		

IDAHOENSIS	G5 S4
FESTUCA IDAHOENSIS-AGROPYRON SPICATUM	G4 S3
CAREX ELYNOIDES TURF	G3 S3
CAREX RUPESTRIS	G4 S3
DRYAS OCTOPETALA/CAREX RUPESTRIS	GU SU
GEUM ROSSII	G4G5 S3
CAREX NOVA	GU SU
SALIX NIVALIS	G5 S4

Rare plant occurrrences:

ERIGERON HUMILIS	G4 S2
SILENE URALENSIS SSP MONTANA	G4T? S1
PAPAVER RADICATUM SSP KLUANENSE	G3?Q SX
BOTRYCHIUM MINGANENSE	G4 S3

Author:

J. H. KALTENECKER

MILL LAKE

Directions:

Mill Lake RNA is located on the east slope of the Lemhi Range about 9 air miles (14.6 km) north-northeast of Patterson or about 15 air miles (24 km) west-southwest of Leadore, Idaho. From Leadore, proceed north on State Route 28 approximately 7.5 miles (12 km). Turn left (southwest) onto Cottom Lane and proceed approximately three miles (4.8 km) to the junction with FS Road 189?. Turn right, heading west about three more miles (4.8 km) to Mill Creek, and turn left (southwest) onto FS Road 006 which runs along the north/northwest side of Mill Creek. Proceed up 006 approximately five miles (8 km) to the trailhead for FS Trail 181. Follow Trail 181 about 3.5 miles (5.7 km) to the RNA boundary adjacent to Mill Lake.

Richness:

Mill Lake RNA contains subalpine and alpine habitats of the basin above Mill Lake. This basin has a predominantly quartzite substrate and contains evidence of alpine glaciation which produced steep cliffs below the crest and numerous moraines down valley. There is a small cirque lake in the upper basin just at timberline (about 10,100 ft.) and numerous shallow lakes in a basin just below the upper lake. A stream drains the south side of this basin and joins with the outlet of Mill Lake below the proposed boundaries. A subalpine forest in the area contains subalpine fir (Abies lasiocarpa) and Engelmann spruce (Picea engelmannii) with grouse whortleberry (Vaccinium scoparium) in the understory. The timberline forests contain subalpine fir with whitebark pine (Pinus albicaulis) at the upper limit and grouse whortleberry in the understory.

Subalpine meadows and alpine communities consisting of moist alpine ledges, slopes, and semi-level areas are also included in the area.

Rarity:

Mill Lake is of general interest for watershed values, alpine, and subalpine habitats.

Condition:

Mill Lake RNA is within the Salmon National Forest Plan Management Prescription 2A-1. The emphasis of this prescription is dispersed recreation with motorized use on designated routes. The RNA receives little recreational use as most use is concentrated around Mill Lake, adjacent to the RNA boundary. The site is within a grazing allotment, but is to be closed to grazing.

Viability:

Mill Lake RNA is within the Salmon National Forest Plan Management Prescription 2A-1. The emphsis of this prescription is dispersed recreation, motorized use on designated routes. Mill Lake, adjacent to the RNA, receives recreational use by fishermen. Land to the south and west is in the Challis NF Management Area 20, North Lemhi. Current uses in this area include livestock grazing, mineral exploration, firewood harvest, and recreational uses.

Other Values:

Watershed values are high.

Conservation Intent:

Mill Lake is protected by designation as a USFS Research Natural Area.

Management Needs:

Not identified.

Information Needs:

The exact location of the Phacelia lyallii population needs to be determined. The current location description puts the population just barely outside of the RNA boundaries.

Plant Community Occurrences:

PINUS ALBICAULIS-ABIES LASIOCARPA	GU	S3
ABIES LASIOCARPA/VACCINIUM SCOPARIUM	G5	S5

Rare Plant Occurrences:

AGOSERIS LACKSCHEWITZII	G4	S2

Author:

A. H. Pitner

ROCK CREEK CIRQUE

Directions:

Rock Creek Cirque proposed Special Interest Botanical Area is located below the north face of Borah Peak in the central Lost River Range, about 17 miles northwest of Mackay, Idaho.

Richness:

The Rock Creek Cirque consists of a large, glaciated basin at the head of Rock Creek on the west slope of the Lost River Range. The predominant physical feature of the Rock Creek Cirque is the nearly 2,000 foot north-facing headwall. This north face of Borah Peak, the highest point in Idaho, has a large permanent snowfield that feeds several springs at the base of the large talus slopes. Although there are no glacial lakes, it is a relatively moist cirque, as compared with others in the Lost River Range, due to the north-facing orientation and large snowfields. Elevations of the area range from about 9,400 feet at timberline, to 12,662 feet on Borah Peak. Much of the basin is comprised of talus and bedrock slopes that are either non- or lightly vegetated. Isolated stands of subalpine fir occur as high as 9,800 feet on ledges away from avalanche and debris flow paths. A majority of the floristic diversity of the cirque is centered around wet areas, such as seeps on cliffs, springs, rivulets, and streams. Wetland vegetation associated with these habitats not only contain the largest number of species, but also four rare arctic-alpine disjunct species: Erigeron humilis, Parnassia kotzebuei var. kotzebuei, Saxifraga adscendens var. oregonensis, and Saxifraga cernua. A fifth rare species, Cymopterus douglassii, is endemic to the central Lost River and Lemhi ranges. The alpine communities support Salix arctica, S. nivalis, Carex subnigucans, C. elynoides, and Juncus balticus. An east-central Idaho endemic, yellow marsh marigold (Caltha leptosepala var. sulfurea), is locally dominant on lightly vegetated muck around springs.

Rarity:

Rock Creek Cirque provides habitat for the plant species of concern Cymopterus douglassii, Erigeron humilis, Parnassia kotzebuei var. kotzbuei, Saxifraga adscendens var. adscendens, and Saxifraga cernua.

Condition:

Some recreational use by hikers occurs in the area.

Viability:

Cliffbands have protected the wetlands from past and current livestock activity. The site is entirely surrounded by USFS lands within Management Area 16 and the proposed Borah Peak Wilderness. The area is managed to protect

wilderness attributes.

Other Values:
Not identified.

Conservation Intent:
Designation as Special Interest Botanical Area is appropriate.

Management Needs:
Not identified.

Information Needs:
Vegetation of the area has not been mapped.

Plant Community Occurrences:

JUNCUS BALTICUS	G5 S4
SALIX ARCTICA/CAREX SUBNIGRICANS	GU SU

Rare Plant Occurrences:

CYMOPTERUS DOUGLASSII	G3 S3
ERIGERON HUMILIS	G4 S2
PARNASSIA KOTZEBUEI VAR KOTZEBUEI	G4T4 S1
SAXIFRAGA ADSCENDENS VAR OREGONENSIS	G5T4TS2
SAXIFRAGA CERNUA	G4 S2

Author:
R. K. Moseley

TRAIL CREEK, LEMHI COUNTY

Directions:
Trail Creek is on the east side of the crest of the Lemhi Range along the upper reaches of Trail Creek, about 13 miles west of Lemhi, Idaho.

Richness:
Trail Creek is in an area isolated by difficult access, steep terrain, and dense stands of lodgepole pine with extensive downfall in the understory around the perimeter of the area. As a result of this isolation, the area contains undisturbed high elevation riparian, aquatic, and upland types. The subalpine fir/bluejoint reedgrass habitat type is present in the riparian zone with two phases: bluejoint reedgrass phase and Labrador tea phase. Community types in the riparian zone are dominated by brook saxifrage, beaked sedge, water sedge, bluejoint reedgrass, planeleaf willow, and seep-spring arnica. The area contains a low gradient stream and a moderate gradient stream, plus associated aquatic

communities. Two climax subalpine fir habitat types occur as upland communities with understories dominated by elk sedge and grouse whortleberry. Seral stands of lodgepole pine are also present. A small inclusion of big sagebrush/Idaho fescue occurs on the south slope of Peak 8881 along the northern boundary of the area. Pink agoseris (Agoseris lackschewitzii), a BLM Sensitive plant species, occurs in the Arnica longifolia and sedge-dominated community types.

Rarity:

This site harbors a diversity of high elevation riparian communities in excellent ecological condition. Additionally, a population of Agoseris lackschewitzii is present.

Condition:

Isolated, old cow sign was noted in 1997. It appears that livestock use is infrequent and light. Should this use intensify, drier wetland margins may become dominated by increasers (Trifolium longipes, Fragaria virginiana) and stream banks may become impacted.

Viability:

USFS and BLM land surround the area. Livestock grazing takes place below the area in the Trail Creek and Basin Creek drainages.

Other Values:

Watershed values are high. The area has been described as having premiere elk habitat and is suspected to support a rich diversity of wildlife as well. Elk use the area intensively for calving, as spring and summer range and as a rutting area during the fall.

Conservation Intent:

The BLM managed portions of the site are protected by designation as Research Natural Area. Designation of adjacent USFS lands as Research Natural Area would be appropriate.

Management Needs:

Not identified.

Information Needs:

Not identified.

Plant Community Occurrences:

ABIES LASIOCARPA/CAREX GEYERI	G5	S5
ABIES LASIOCARPA/CALAMAGROSTIS CANADENSIS, LEDUM GLANDULOSUM	G4	S3
ABIES LASIOCARPA/STREPTOPUS AMPLEXIFOLIUS	G4?	S4
ABIES LASIOCARPA/VACCINIUM SCOPARIUM	G5	S5

SALIX PLANIFOLIA MONICA/CAREX AQUATILIS-CAREX UTRICULATA	G3Q S3
ARTEMISIA TRIDENTATA VASEYANA/FESTUCA IDAHOENSIS	G5 S4
CAREX UTRICULATA	G5 S4
CAREX AQUATILIS	G5 S4
ABIES LASIOCARPA/CALAMAGROSTIS CANADENSIS, CALAMAGROSTIS CANADENSIS	G5 S5
ARNICA LONGIFOLIA	GU SU

Rare Plant Occurrences:

AGOSERIS LACKSCHEWITZII	G4 S2

Author:
A. H. Pitner

BIG LOST RIVER

Directions:

The Big Lost River macrosite is mostly located in Custer County, with a small portion of the site extending into Butte County. The site consists of floodplains on either side of the river, from a point about 0.5 miles south of the Big Lost River/Pinto Creek confluence (in the vicinity of Highway 75 and Bartlett Road junction), and continues downstream for approximately 45 miles through the Big Lost River Valley, including Mackay Reservoir, and continuing on to the Moore Diversion.

Richness:

The upper reaches of the Big Lost River above "the bend" have characteristics of a braided channel due to the amount of bedload that is being carried and deposited from high mountain tributaries. The channel is naturally entrenched up to 6 meters into the valley floor. This section of the Big Lost River is very dynamic due to movement of sediments and deposition of coarse woody debris. The vegetation is dominated by stands of cottonwood (both narrow-leaf and black), willows, and alder. Along the middle reaches of the Big Lost River, above Mackay Reservoir, the river has created a broad floodplain. Several areas of the river have been leveed. Inside the levee, cobble bars and sandbars support graminoids and coyote willow. Cottonwood seedlings were observed on these bars as well. The floodplain of the middle Big Lost River includes cottonwood forests, riparian shrublands, and native meadows in areas that have been too wet for cultivation. Most cottonwood stands surveyed along the Big Lost River lacked structural diversity and consisted of two layers: tall tree and low shrub or graminoids. Several spring creeks and smaller channels are present downstream of "the bend". The spring creek channels are typically lined with willows (Salix

lasiandra, S. lutea, S. boothii, S. geyeriana) or alder (Alnus incana). Wet meadows between the spring creek channels support sedge (Carex utriculata, Carex nebraskensis) and rush (Juncus balticus) meadows. Alkaline benches are of occasional occurrence and are vegetated with greasewood (Sarcobatus vermiculatus) and graminoids (Carex simulata, C. nebraskensis, and Juncus balticus). The plant species of concern, meadow milkvetch (Astragalus diversifolius), was found on an elevated alkaline bench along the middle Big Lost River.

Downstream of Mackay Reservoir stands of cottonwood with a structurally diverse understory were found with the shrubs red-osier dogwood (Cornus sericea), alder (Alnus incana), water birch (Betula occidentalis), and willows (Salix spp.). These stands typically occur in confined areas or on channel bars that have been allowed to develop without extreme grazing pressure. Native species were dominant and reproducing in these stands. Cottonwood stands with Wood's rose and non-native graminoids are much more common than stands with high shrub diversity on the Big Lost River. Willow shrublands and sedge meadows as well as occasional stands of aspen are also present on the floodplain.

The lower reaches of the Big Lost River, downstream of Darlington Sinks, occur in a wide valley bottom that historically supported a floodplain at least one half a mile wide. The river corridor includes sloughs with emergent and aquatic vegetation, dense stands of willows, and cottonwoods. The banks of sloughs as well as portions of the river corridor support emergent communities dominated by Baltic Rush (Juncus balticus), Nebraska sedge (Carex nebraskensis), and common spikerush (Eleocharis palustris). Common aquatic species in the sloughs include water speedwell (Veronica anagallis-aquatica), aquatic buttercup (Ranunculus aquatilis) simple-stem bur-reed (Sparganium emersum), and common mare's-tail (Hippuris vulgaris). A notable feature of the valley bottom along the lower Big Lost River are the extensive shrublands which support at least four species of willows. Willow habitats were not thoroughly surveyed, but stands seem to be consistently dominated by Coyote willow (Salix exigua). Other shrub species present include whiplash willow (Salix lasiandra), Booth's willow (S. boothii), Geyer's willow (S. geyeriana), red-osier dogwood (Cornus sericea), and Wood's rose (Rosa woodsii). In addition to stands of willows, occasional young willows or sprouts were also observed. Cottonwood stands are also present on the lower Big Lost River, but are unsurveyed.

Rarity:

Upstream of Mackay Reservoir the Big Lost River supports cottonwood stands with a relatively intact hydrologic regime. Many stands are fragmented by agricultural activities or have high concentrations of non-native species. High quality stands are of occasional occurence and examples are present upstream of the bend.

Condition:

Exotic species along with noxious weeds are present along the Big Lost River corridor. Quack grass (Agropyron repens), Common timothy (Phleum pratense), creeping bentgrass (Agrostis stolonifera), and Kentucky bluegrass (Poa pratensis) are present in temporarily flooded meadows. The noxious weeds Canada thistle (Cirsium arvense) and Leafy spurge (Euphorbia esula) are also present.

Viability:

Hydrologic manipulation, livestock grazing and unpermitted stream alterations are threats to wetland and riparian habitat on the Big Lost corridor. Seasonal high water and overbank flooding create conditions suitable for development of riparian forests and shrublands along the Big Lost River corridor. Water diversions, dams, and channelization have altered the natural hydrologic regime; however, regeneration of flood dependent species was observed, so current flows may be adequate to maintain the stands as long as ground disturbing activities or water manipulation does not eliminate seedlings.

Other Values:

Cottonwood forests and shrublands provide habitat for neotropical migrants. Spotted frogs and western toads were observed in wetlands along the river.

Conservation Intent:

Opportunities to protect tracts via voluntary agreements and conservation easements should be pursued with highest priority given to habitat that is structurally diverse and dominated by native plant species.

Management Needs:

Regeneration of both cottonwoods and willows was observed on all surveyed reaches of the Big Lost River. A parcel, along the lower Big Lost River, that has been little grazed supports extremely dense shrublands and provides a stark fenceline contrast illustrating potential site conditions with grazing management. Grazing management which promotes regeneration and survival of woody species may reduce the cover of weedy species such as Canada thistle via shading. Populations of leafy spurge should be identified and actively controlled.

Information Needs:

Areas surveyed included a cursory survey on BLM lands downstream of Garden Creek, the Gates-Wood and San Felipe tracts upstream of the reservoir, the Philbin and Ellwein tracts downstream of Mackay Reservoir, and the Stennent tract downstream of Darlington. Other areas are unsurveyed.

Plant Community Occurrences:

POPULUS TRICHOCARPA/ALNUS INCANA	G3	S3
POPULUS TRICHOCARPA/CORNUS STOLONIFERA	G3?	S3

ROSA WOODSII	G5 S4
ALNUS INCANA/MESIC FORB	G3G4QS1
BETULA OCCIDENTALIS/CORNUS STOLONIFERA	G2G3 S2
SALIX EXIGUA/BARREN	G3? S4
SALIX EXIGUA/MESIC GRAMINOID	G3Q S3?
SARCOBATUS VERMICULATUS/ELYMUS CINEREUS	G3 S2
CAREX UTRICULATA	G5 S4
CAREX NEBRASCENSIS	G4 S3
CAREX SIMULATA	G4 S2
JUNCUS BALTICUS	G5 S4
POPULUS TRICHOCARPA/RECENT ALLUVIAL BAR	G? SP
POPULUS TRICHOCARPA/ROSA WOODSII	G4 S3
SALIX LUTEA	G? S3

Rare Plant Occurrences:

ASTRAGALUS DIVERSIFOLIUS	G3 S2

Author:

M. Jankovsky-Jones

BIG LOST RIVER SINKS

Directions:

Located within the INEEL, a restricted access area. The Big Lost River Sinks covers an estimated 920 acres in the west-central portion of the INEEL. The northern edge of the Sinks are located about one mile south of Highway 22, approximately 7.5 miles east of Howe, Idaho. Access is via a two-track road that trends southwest approximately 0.4 mile east of the junction of Highways 22 and 23. It leads to a powerline road. Spurs off the powerline road lead to different portions of the Sinks. These roads are all impassable when wet.

Richness:

Big Lost River Sinks is an extensive depression feature in an area of generally minor topographic relief supporting a mosaic of graminoid-dominated wetland plant communities. The two main community types are Eleocharis palustris, best expressed in areas that are wet (standing water, or saturated to super-saturated soils), and the Agropryon smithii community. There are generally sharp demarcations between the wetland and upland vegetation. The adjacent uplands support Artemisia tridentata wyomingensis vegetation. The main channel of the Big Lost River along with a system of secondary channels course through the Sink. The channel is only imperceptibly lower than adjacent landforms.

Rarity:

The Big Lost River Sinks supports one of the most extensive Agropyron smithii

communities in the state.

Condition:

The INEEL is a large nuclear industrial research complex. Livestock grazing is the prevalent land use of the Sinks at the present time.

Exotic weeds and "weedy" native plant species are abundant in places, although many areas have minimal weed problems.

Viability:

Water rights, instream flows, and aquifer pumping are all big and contentious issues regarding the Big Lost River system up river from the sinks..

Other Values:

The wetland is in a portion of the state that is dominated by extensive dry, upland vegetation types of the Snake River Plain. Wetlands provide habitat for a large population of Great Basin spadefoot toads and are recognized as an important waterfowl area. The invertebrate biota is in process of being assessed. The Sinks are an infiltration zone for Big Lost River water into the aquifer. Archeological sites occur throughout the INEEL and are likely present in the Sinks area.

Conservation Intent:

The area should be managed by INEEL to maintain wetland habitat functions including waterfowl nesting and herp habitat.

Management Needs:

Not identified.

Information Needs:

Only a few selected sites were visited in 1997; the playas just south of Highway 22 are unsurveyed. Portions of the Sinks apparently supported cattail (Typha latifolia) stands in the past. Is the absence of these stands cyclical or not? Many question remain regarding the plant and animal biota of the Sinks, and the areas's general ecology.

Plant Community Occurrences:

AGROPYRON SMITHII	G3G5QS1
ELEOCHARIS PALUSTRIS VERNAL POOL	GU SU

Author:

M. Mancuso

BIRCH CREEK VALLEY MACROSITE

Directions:

Birch Creek Valley is approximately 40 miles south of Leadore, Idaho. Access to Birch Creek Fen is at Kaufman Access area four miles north of Lone Pine. Numerous access points to the lower valley include Birch Creek Hydro mitigation sites just north of Lone Pine and the John Day campground eight miles south of Lone Pine.

Richness:

Birch Creek is a spring fed stream system in the valley between the Lemhi and Beaverhead Mountain ranges. The main flows of Birch Creek emanate from springs at Birch Creek Fen. Birch Creek Fen provides habitat for several special status plant species and supports a number of high quality and/or rare plant commmunity occurrences. Information on Birch Creek Fen is summarized in a separate record housed at Idaho Conservation Data Center. Downstream of the fen, Birch Creek forms a high gradient channel. Floodplain development is minimal and limited to occasional channel bars and islands. Birch Creek supports a nearly continuous band of Betula occidentalis (water birch) for approximately 14 miles. Channel bars and islands along Birch Creek support near monocultures of the sedges Carex utriculata (beaked sedge) and C. simulata (short-beaked sedge) near the waters edge; on elevated banks, water birch is again present with a rich assortment of native mesic graminoids. The condition of the water birch stands reflects past and current land uses with some stands having a native forb and graminoid understory to stands with a barren, trampled understory to other stands with a significant exotic species component. Upstream of Lone Pine, alkaline soils are present providing habitat for several special status plant species.

Rarity:

The valley contains Birch Creek Fen and Mud Creek. Birch Creek Fen provides habitat for several plant species of concern, and habitat for endemic and declining snails. Native grasslands and a few plant species of concern are known from Mud Creek. Alkaline-dependent plant species including the special status plant species Primula alcalina, Epilobium palustre, Astragalus diversifolius, and Salix pseudomonticola, occur occasionally along Birch Creek downstream of the narrows to just upstream of Lone Pine. The site contains 14 miles of Betula occidentalis stands, some of which represent high quality occurrences of the Betula occidentalis/Mesic forb community type.

Condition:

Centaurea maculosa (spotted knapweed) is present on margins to the uplands along much of the riparian corridor. Euphorbia esula (leafy spurge) is of occassional occurrence and populations should be manageable. Chenopodium alba (lambs quarter) and other exotics have become established in uplands left fallow; Centaurea repens (Russian knapweed), Cardaria draba (white top), Hyoscyamus niger (henbane), and several other exotic plant species are present around old

homesteads. Helianthus petiolaris (prairie sunflower) is widespread along lower Birch Creek.

Viability:

Uplands are generally used as grazing land with some pasture (alfalfa and hay) development. Pastures left fallow have a significant number of exotics; revegetation with desirable plant species may be appropriate.

Other Values:

The macrosite has very high open space values with spectacular views of the Lemhi Range and Beaverhead Mountains. Birch Creek provides a vegetated, relatively unfragmented migration corridor for ungulates and birds in a very arid landscape. Birch Creek supports a naturally reproducing rainbow trout fishery with the highest density of fish in the headwaters (Corsi and Elle 1989). Recreation values are high for family camping and fishing.

Conservation Intent:

Birch Creek Fen is of high priority for wetland protection by both agencies and conservation groups. Lower Birch Creek represents an opportunity to protect riparian habitat where both the headwaters and uplands are generally intact.

Management Needs:

Weed control and management of grazing and recreation are the primary management needs.

Information Needs:

A number of the Betula occidentalis shrubs have mature stems that are dead. It is unknown if this is from old age, herbivory, change in the water regime, insect infestation, or disease. The plants are vigorously sprouting which should sustain stands. Snail surveys are limited to Birch Creek Fen and it is unknown if lower Birch Creek provides habitat for endemic snails or other snail species of concern.

Plant Community Occurrences:

BETULA OCCIDENTALIS/MESIC FORB	G3	S1
CAREX UTRICULATA	G5	S4
CAREX SIMULATA	G4	S2
JUNCUS BALTICUS	G5	S4

Rare Plant Occurrences:

EPILOBIUM PALUSTRE	G5	S3

Author:

M. Jankovsky-Jones

CANYON CREEK, LEMHI COUNTY

Directions:

Canyon Creek is located alongside State Highway 29, approximately eight miles northeast of Leadore, Idaho. The downstream portion of the site is located near the confluence of Canyon and Cruikshank creeks and continues upstream along Canyon Creek for about one mile. A small disjunct segment of the site occurs along Cruikshank Creek, 0.6 mile upstream from the Canyon Creek confluence, along Road 130.

Richness:

A wet meadow complex occurs in an area where Canyon Creek courses through relatively broad and gently sloped bottomlands upstream of Railroad Canyon. The meadow is largely dominated by the Carex simulata community type. Willow stringers (primarily Salix geyeriana, with lesser amounts of S. boothii) and small willow stands are associated with segments of the Canyon Creek channel, the steep slope interface on the east side of the meadow, and former channels. There are dry vegetation inclusions, and the western portion of the site near the highway supports large patches of upland vegetation. Adjacent upland slopes support sagebrush (Artemisia tridentata, A. arbuscula) vegetation. A small (ca 3 acres) disjunct Carex simulata community along Cruikshank Creek is consistently hummocky and occupies a sloped position. Soils throughout the wetland vary from damp at the surface to super saturated and quaking when walked on.

Rarity:

The site supports the rare plant Astragalus leptaleus, and a large, high quality Carex simulata community.

Condition:

The old railroad grade leading to Bannock Pass cuts through the site. There is a water ditch along the old grade (at least in places) and other diversion features also likely occur. There is a dirt road and corral in the northern section of the meadow.

Patches of weedy species occur in drier areas. Sagebrush and grassland upland inclusions are grazing-modified.

Viability:

Threats to viability have not been identified.

Other Values:

The wetlands function to reduce downstream flood flows.

Conservation Intent:

Voluntary protection of wetlands and stream corridors should be encouraged.

Management Needs:
Not identified.

Information Needs:
More data regarding willow recruitment within the site would be desirable. Mancuso notes there were many dead and decadent shrubs and minimal regeneration. The upstream one-third of the wetland complex was not visited, but appears to be largely a continuation of downstream plant communities. It is unknown if rare plants or other elements of conservation concern occur in this upper segment. A more thorough survey of the Cruikshank Creek segment to help clarify its conservation attributes is needed.

Plant Community Occurrences:

SALIX GEYERIANA/CAREX UTRICULATA	G5	S4
CAREX SIMULATA	G4	S2
JUNCUS BALTICUS	G5	S4

Rare Plant Occurrences:

ASTRAGALUS LEPTALEUS	G4	S2

Author:
M. Mancuso

DEADWATER

Directions:
Deadwater is located about 25 miles (40.5 km) northwest of Salmon, Idaho, along the south side of the Salmon River. From Salmon, head north on U.S. Route 93 to the town of North Fork, about 21 miles (34 km). Turn left and head west on FS Road 030 about four miles (6.5 km) to the Deadwater Campground. From here, a boat is needed to cross the river and head a little upstream to the islands.

Richness:
Deadwater consists of islands in a slackwater area on the south side of the Salmon River. The area is noted for forming ice jams in the winter that back up the river, occasionally flooding portions of the town of Salmon. This ice may play an important role in determining the distribution of the vegetation on the islands. Natural flows of the Salmon may inundate the site during spring runoff. The site contains a diversity of riparian vegetation including quaking aspen (Populus tremuloides), black cottonwood (Populus trichocarpa), water birch (Betula occidentalis), box elder (Acer negundo), red-osier dogwood (Cornus stolonifera), and willow species (Salix spp.). The islands contain both nesting and wintering habitat for bald eagles (Haliaeetus leucocephalus).

Rarity:
The area provides nesting and wintering habitat for bald eagles.

Condition:
Over 60% of the vegetation in the area is non-native. The most common exotics include Canada thistle, leafy spurge, white top, water hemlock, vine nightshade, and reed canary grass.

Viability:
The site is within Forest Plan Management Prescription 6B. This prescription is for components of the National Scenic River System.

Other Values:
The area is recognized as a Watchable Wildlife Viewing Area. The pools and braided channels provide habitat for waterfowl. Black bear tracks were observed on islands in 1997.

Conservation Intent:
Designation as a Special Interest Area for habitat and geological values is appropriate.

Management Needs:
Not identified.

Information Needs:
Not identified.

Plant Community Occurrences:

POPULUS TREMULOIDES/CORNUS STOLONIFERA	G4 S4
POPULUS TRICHOCARPA/CORNUS STOLONIFERA	G3? S3
SALIX EXIGUA/BARREN	G3? S4
SALIX EXIGUA/MESIC GRAMINOID	G3Q S3?
PHALARIS ARUNDINACEA	G4 S5

Rare animal occurrences:

HALIAEETUS LEUCOCEPHALUS	G4 S3B,S4N

Author:
A. H. Pitner

LEMHI RIVER

Directions:

In the general vicinity of Highway 28, southeast of Salmon, Idaho between the Lemhi and Beaverhead mountain ranges.

Richness:

The Lemhi River basin is a broad glaciated valley squeezed between the Beaverhead Mountains to the north and the Lemhi Range to the south. It is characterized by a broad flood plain with cottonwood riparian forests in the lower elevations and large wetland meadows in the higher elevations.

Rarity:

Contains the Lemhi River which provides habitat for the chinook salmon (Oncorhynchus tschawytscha), bull trout (Salvelinus confluentus), and steelhead trout (Oncorhyncus mykiss). Cottonwood forests along the river provide habitat for bald eagle (Haliaeetus leucocephalus). The site also contains wetlands at Texas Creek and Eighteenmile Creek with the rare alkali primrose and other state sensitive plant species.

Condition:

The Lemhi River is used for grazing and farming operations. Small areas were also mined for gravel and lead. There are numerous residences in the area as well as one of the oldest homestead sites. Many irrigation diversions are present along the Lemhi River for flood irrigation of both pastures and farmland.

Viability:

Threats to viability are not identified.

Other Values:

The area provides habitat for raptors, sandhill cranes, and numerous shorebirds. Spotted frogs were observed along the lower Lemhi River.

Conservation Intent:

Private conversation orginizations such as The Nature Conservancy should work with private landowners to protect the Lemhi River corridor by encouraging the donation of conservation easements and/or critical parcels. In the Texas Creek area direct purchase of critical wetland areas with possible transfer of these to appropriate federal or state agencies is appropriate. The Lemhi Model Watershed group, a consortium of private and federal agencies, is actively involved in pursuing steps to prevent or delay losses to anadromous fish migration.

Management Needs:

Management considerations should include modification or elimination of irrigation diversions located along the river. Fencing of cottonwood and other riparian areas may be desirable in the near future.

Information Needs:

Vegetation inventories on the lower Lemhi River were very cursory and limited to public access points and a 0.25 mile reach near Salmon. Additional surveys would be beneficial to search for native meadows, spring fed shrublands, and high quality cottonwood and shrub stands.

Plant Community Occurrences:

SALIX EXIGUA/BARREN	G3? S4
TYPHA LATIFOLIA	G5 S4
POPULUS TRICHOCARPA/ROSA WOODSII	G4 S3

Author:

Idaho Field Office, The Nature Conservancy

MUD CREEK

Directions:

Mud Creek is approximately 23 air miles south-southeast of Leadore, Idaho. From Leadore, travel approximately 26 miles south on State Highway 28 to a ranch road (ca 8.5 miles south of Gilmore Summit). Travel northeast on the ranch road past the first set of buildings to a road that follows along the base of the hills on the west side of Mud Creek. Access to the site is via this road and by foot.

Richness:

Mud Creek extends from its confluence with Cottonwood Creek (which supports few cottonwood trees) downstream about 1.5 miles. The area also includes the broad sub-irrigated meadows along middle reaches of Cottonwood Creek. The area supports broad, sub-irrigated, mostly native meadows with Juncus balticus, Deschampsia cespitosa, and Carex nebraskensis as the dominant species. Cottonwood Creek and other tributaries entering the valley from the northeast are lined with Salix boothii and Salix geyeriana. The wetland fringe along channels, where willows are absent, and areas around springs support Carex utriculata, Potentilla fruticosa, and Juncus balticus. Small stands of Carex simulata and Eleocharis pauciflorus are also present. Vernally wet areas in swales on uplands and on slightly elevated benches in wetlands support stands of Artemisia cana.

Rarity:

The area includes a large native meadow system where hydrology is intact (aside from grazing impacts). The special status plant species Carex parryana ssp. idahoa and Kobresia simpliciuscula occur within the site.

Condition:

Livestock use in the area is the major land use. Exotics which threaten wetland functions were not observed.

Viability:
Uplands are mostly in native vegetation. Minor amounts of ditching have occurred in the site.

Other Values:
Northern harriers, coyote, and sage grouse were observed in the area.

Conservation Intent:
Voluntary protection of stream corridors and wetlands should be encouraged.

Management Needs:
Not identified.

Information Needs:
Not identified.

Plant Community Occurrences:

ARTEMISIA CANA/FESTUCA IDAHOENSIS	G3 S2
POTENTILLA FRUTICOSA/DESCHAMPSIA CESPITOSA	G4 S3
SALIX BOOTHII/CAREX NEBRASCENSIS	G4G5 S3?
SALIX BOOTHII/CAREX UTRICULATA	G4 S4
CAREX UTRICULATA	G5 S4
DESCHAMPSIA CESPITOSA	G4? S3
CAREX NEBRASCENSIS	G4 S3
CAREX SIMULATA	G4 S2
JUNCUS BALTICUS	G5 S4

Rare Plant Occurrences:

CAREX PARRYANA SSP IDAHOA	G4T2 S1
KOBRESIA SIMPLICIUSCULA	G5 S1

Author:
M. Jankovsky-Jones

PAHSIMEROI VALLEY

Directions:
Pahsimeroi Valley; about 15 miles north of Challis on Highway 93. The northwest portion of the site begins at the confluence of the Pahsimeroi River and Salmon River (town of Ellis), and extends southeast for about 28 miles, somewhat paralleling the northside of the Pahsimeroi Valley Road. The southeast portion of the site is located near the junction of Pahsimeroi Valley Road and Doublespring Pass Road.

Richness:

The site lies in the Pahsimeroi River Valley, a relatively narrow, mid-elevation semi-arid valley bordered by the 10,000 foot peaks of the Lemhi and Lost River mountain ranges. The Pahsimeroi River, a tributary to the Salmon River, meanders through shrub/grasslands and irrigated pastureland providing a ribbon of riparian habitat in the otherwise treeless valley floor. Riparian shrublands are dominated by Salix boothii (Booth's willow), S. geyeriana (Geyer's willow), S. exigua (coyote willow), and Betula occidentalis (water birch). Mesic meadows and low areas are present supporting Carex simulata (short-beaked sedge), C. utriculata (beaked sedge), and Typha latifolia (common cattail). The two sedge species are frequently present on channel bars as well. Low shrublands which are maintained by small seeps and/or adjacent irrigation have Potentilla fruticosa (shrubby cinquefoil) and Rosa woodsii (Wood's rose). Populus trichocarpa (black cottonwood) are present along canals and portions of natural channels; these areas were not surveyed. The river provides critical spawning habitat for several special status fish species - bull trout, steelhead trout, and chinook salmon as well as habitat for wintering bald eagles and nesting curlews. The river and its riparian areas support numerous wildlife species and several resident fish species. The site is mostly level in the valley bottom along the Pahsimeroi River with the sides sloping gradually up to the foothills of the mountain ranges on the east and west sides.

Rarity:

The site contains one of the few remaining rivers where wild chinook salmon still spawn naturally within the state of Idaho. It also supports an excellent population of bull trout. The Pahsimeroi River provides spawning habitat for steelhead trout and for a productive wild rainbow trout population. Bald eagle winter in the Valley; the area provides nesting habitat for curlews as well. The Pines, a B1 wetland supporting rare plants and a disjunct population of Limber pine, is located in the Upper Pahsimeroi Valley.

Condition:

Landuse in the Pahsimeroi Valley is dominated by agricultural activities including cattle grazing and irrigated pasture development. Some recreational homesite development is underway but is limited thus far. The rural agricultural nature of the valley provides an opportunity to protect this very important resource that could quickly be destroyed by development. However, current practices of grazing cattle in the river and of diverting large quantities of water for irrigation have impacted the riverine and wetland systems. Fish screens have been installed on most of the major diversions, but much work still needs to be done to protect sensitive river and riparian habitats and water quality from cattle grazing and farming too close to the river and wetlands.

The aquatic system is in good shape and the IDFG is carefully monitoring and

protecting the river to ensure no exotic fish species that would compete with the native endangered species are introduced. Several exotic weed species including Cirsium arvense (Canada thistle), Centaurea maculosa (spotted knapweed), Cardaria draba (white top), and Linnaria dalmatica (Dalmation toad flax) are present in the valley. These exotics may not impact the riparian and wetland flora directly, but may have incidental impacts upon the Pahsimeroi River system if herbicide application or other such uses are implemented.

Viability:

Activities in the watershed could impact water quality of the river or its tributaries. Currently the grazing and minimal logging in the watershed are not likely to substantially impact the river. Most of these lands are owned by the federal government and will likely remain undeveloped with minimal water diversion. Development of groundwater and additional conversion of upland areas to agriculture could also affect the ecological aspects of the Pahsimeroi.

Other Values:

The Pahsimeroi River valley is largely undeveloped and this coupled with its relatively moderate winter climate provide an area of important winter habitat for wildlife. With its numerous wetlands the valley hosts abundant and diverse waterfowl species. Excellent hunting, fishing and wildlife watching opportunities exist in the valley. Two IDFG Hatcheries on the river raise millions of steelhead and Chinook fry each year.

Conservation Intent:

Opportunities to protect any tracts within the primary site boundary from activities that would degrade the critical aquatic habitats of the endangered fish species should be pursued. Actions should focus on conservation easements, cooperative agreements and, to a very limited extent, purchase or fee title.

Management Needs:

Management needs include monitoring of easement restrictions, monitoring of grazing impacts within the riparian corridor where grazing continues, and management consultation to help landowners that have granted conservation easements or who are interested in working with TNC to protect the river.

Information Needs:

Vegetation inventories were limited to a small area of the Pahsimeroi River including the Wilmerding conservation easement upstream of the bridge crossing near the hatchery. A small area near Hooper Lane supporting Potentilla fruticosa was also surveyed for communities and rare plants; this area was very degraded (weedy) and community types were not sampled. No rare plants were found. There is potential that rich fen habitat is present in the middle Pahsimeroi Valley in areas where springs emerge. Populus habitat in the Pahsimeroi Valley remains unsurveyed (cottonwoods are a somewhat minor type and most stands

occur along canals, yet stands still provide structure and are important wildlife habitat).

Plant Community Occurrences:

ROSA WOODSII	G5 S4
SALIX BOOTHII/MESIC GRAMINOID	G3? S3?
SALIX EXIGUA/MESIC GRAMINOID	G3Q S3?
SARCOBATUS VERMICULATUS/DISTICHLIS STRICTA	G4 S1
CAREX NEBRASCENSIS	G4 S3
CAREX SIMULATA	G4 S2
TYPHA LATIFOLIA	G5 S4

Rare animal occurrences:

NUMENIUS AMERICANUS	G5 S3B,SZN
SALVELINUS CONFLUENTUS	G3 S3

Author:

Idaho Field Office, The Nature Conservancy

SALMON RIVER BOTTOMS

Directions:

The Salmon River Bottoms site extends upstream from Shoup Bridge (5 miles south of Salmon, ID) to Red Rock (about 11 miles north of Salmon, ID). Access is via boat, vehicle, and/or foot.

Richness:

The Salmon River Bottoms include the floodplain (and islands) along the Salmon River both upstream and downstream of the town of Salmon. Vegetation is characterized by a mosaic of cottonwood forests (with localized patches of quaking aspen) and shrublands dominated by willow, alder and birch. Graminoid and emergent wetlands with cattails, sedges, spikerush, and wheatgrass are associated with sloughs, side channels, and areas with recent sedimentation.

Rarity:

The Salmon River provides habitat for steelhead, chinook, and sockeye salmon.

Condition:

Livestock grazing, hay production, and development (homes and roads) are the primary land use on the Salmon River.

A number of exotic plant species are established on the Salmon River. The exotic species seem to have highest concentrations in graminoid dominated openings and in cottonwood stands with a park-like structure. Non-native graminoids that have

become established include Agropyron repens (quack grass), Poa pratensis (Kentucky bluegrass), Phalaris arundinacea (reed canarygrass), Bromus inermis, and others. The noxious weeds Centaurea maculosa (spotted knapweed), Euphorbia esula (leafy spurge), Linaria dalmatica (Dalmation toadflax) and Cirsium arvense (Canada thistle) are also present. Numerous other exotics were noted, but are less of a threat to native communities. Of the previously mentioned species, spotted knapweed and leafy spurge should be the immediate targets for weed control programs. Non-native shrubs on the Salmon River include Elaeagnus commutata (Russian olive), Fraxinus pensylvanica (ash), and Acer negundo var. violaceum (box elder).

Viability:

Livestock grazing, hay production, and development (homes and roads) occur offsite as well as onsite.

Other Values:

Backwater sloughs and other open water provide waterfowl habitat. White-tailed deer were abundant in areas surveyed. An active osprey nest is present downstream of Shoup Bridge.

Conservation Intent:

Protection of tracts from activities that would degrade critical aquatic habitats of endangered fish species should be pursued.

Management Needs:

Most areas where leafy spurge was found are localized and controllable. Spotted knapweed is much more widespread and will require considerable effort for control.

Information Needs:

Vegetation surveys were limited to a two mile reach near Shoup Bridge, an approximate three mile reach near the confluence with Tower Creek, and public access points. Acer negundo creates a large stand near Tower Creek; collected material keys out to Acer negundo violaceum. Fred Johnson (1996) indicates that the native species (A. negundo var. interius) is also present near Salmon. The Tower Creek stand would constitute an element occurrence only if it happens to be the native species, Acer negundo var. interius.

Plant Community Occurrences:

POPULUS TRICHOCARPA/ALNUS INCANA	G3 S3
POPULUS TRICHOCARPA/CORNUS STOLONIFERA	G3? S3
BETULA OCCIDENTALIS/CORNUS STOLONIFERA	G2G3 S2
SALIX BOOTHII/CAREX UTRICULATA	G4 S4
SALIX EXIGUA/BARREN	G3? S4
SALIX EXIGUA/MESIC GRAMINOID	G3Q S3?

SALIX LUTEA/CAREX UTRICULATA	G4 S4
CAREX UTRICULATA	G5 S4
AGROPYRON SMITHII	G3G5QS1
CAREX NEBRASCENSIS	G4 S3
ELEOCHARIS PALUSTRIS	G5 S3
TYPHA LATIFOLIA	G5 S4
POPULUS TRICHOCARPA/RECENT ALLUVIAL BAR	G? SP
POPULUS TRICHOCARPA/ROSA WOODSII	G4 S3
POPULUS TRICHOCARPA/SALIX LUTEA	G? S2

Author:
Mabel Jankovsky-Jones

THE SWAMPS

Directions:
Copper Basin is at the headwaters of the East Fork Big Lost River.

Richness:
The Swamps are spring fed wetlands at the headwaters of the East Fork Big Lost River. A wide bench, fed by springs that emerge along the toe of upland slopes, support meadow and low shrub communities. Meadows are dominated by near monocultures of Juncus balticus, Carex aquatilis, and C. simulata. Low shrublands are dominated by Salix wolfii, S. brachycarpa, and Pentaphylloides floribunda. Slightly elevated lobes or benches support Artemisia cana. The tall willow Salix geyeriana, with lesser amounts of S. boothii, line channels and are often present at spring heads. Small springs emerging in draws support willows at the spring heads and mesic forbs and graminoids in the drainage way. The draws are merely saturated and do not support a channel.

Rarity:
The area is of general interest for wetland values.

Condition:
The Swamps is within an active grazing allotment. The site is within Copper Basin, which formerly had some mining activity; currently, recreation and grazing are the major land uses.

Poa pratensis is present in mature, drier willow stands; exotic species were not noted in the interior of the meadow. Taraxacum officinale occurs in drier areas and near the channel.

Viability:
The Swamps is upstream of numerous prospecting sites; these activities should

have little effect on site quality.

Other Values:
Elk sign and deer bedding areas were noted. The area is home to raptors.

Conservation Intent:
Grazing plans for allotments in this area should consider practices which will maintain wetland functions at The Swamps.

Management Needs:
Not identified.

Information Needs:
Not identified.

Plant Community Occurrences:

ARTEMISIA CANA/FESTUCA IDAHOENSIS	G3 S2
SALIX BOOTHII/CAREX AQUATILIS	G3 S3?
SALIX GEYERIANA/MESIC GRAMINOID	G2G3QS5
CAREX AQUATILIS	G5 S4
CAREX SIMULATA	G4 S2
JUNCUS BALTICUS	G5 S4

Author:
L. Williams

SURVEY NOTES ON OTHER SITES

NOTE: Most of the descriptions here are from surveys for *Spiranthes diluvialis* conducted on U.S. Forest Service managed lands (Mancuso 1997).

Pahsimeroi River drainage

Middle Fork Lawson Creek
Plant communities
Populus tremuloides unclassified
*Salix exigua/*Mesic graminoid
Rosa woodsii

Description - This is a small, moderate-gradient creek with a narrow to fairly broad band of riparian vegetation consisting of sandbar willow/Kentucky bluegrass, aspen/Wood's rose, and Wood's rose community types. Stinging nettle (*Urtica dioica*) is the most abundant forb and Canada thistle (*Cirsium arvense*) is well established. Bank sheering, creek entrenchment, and general riparian zone degradation are problems along this creek. These problems are worse on

sections of BLM land downstream from the National Forest boundary.

Blind Fork Trail Creek
Plant communities
*Salix boothii/*Mesic graminiod
Rosa woodsii

Description - This is a small, moderate to steep, entrenched stream. The narrow riparian zone is dominated by a dense band of shrubs representing the Booth's willow/Kentucky bluegrasss and Wood's rose community types. Geyer's willow (*Salix geyeriana*) is the main willow species, while sandbar willow, Missouri gooseberry (*Ribes setosum*), and golden currant (*Ribes aureum*) are other common shrubs. Kentucky bluegrass is the dominant graminoid. There is one small (ca. 10 x 10 m) subirrigated mesic graminoid opening containing some redtop.

Trail Creek
Plant communities
*Salix boothii/*Mesic graminoid
Salix exigua/Rosa woodsii
Rosa woodsii

Description - Steep upland slopes come right down to the creek just upstream of the BLM and National Forest boundary line. At this point the riparian zone becomes very narrow, more rocky, and the gradient steepens. A strip of chokecherry (*Prunus virginiana*) with a Wood's rose understory lines the creek along this lower Forest segment. Because of the lack of potential orchid habitat most of the identified target stretch on Forest land was not surveyed. Instead, approximately two creek miles on BLM land were surveyed enroute to the Forest boundary. The riparian zone along the BLM segment is generally narrow and with Wood's rose the most ubiquitous and abundant shrub. Booth's willow/mesic graminoid, sandbar willow/Wood's rose, and Wood's rose are the main communities types. Kentucky bluegrass is the primary graminoid in many places and stinging nettle is also common.

Morse Creek
Plant communities
Populus trichocarpa/Cornus sericea

Description - The creek flows through a steep, narrow canyon before opening onto a large alluvial fan near the lower Forest Service boundary. The black cottonwood/red-osier dogwood ct. occurs along the entire survey length. Associated shrubs include whiplash willow (*Salix lasiandra*), Booth's willow, yellow willow (*Salix lutea*), thinleaf alder, Missouri gooseberry, stinking currant (*Ribes hudsonianum*), thimbleberry (*Rubus parviflorus*) and Wood's rose. Aspen are also fairly common. Overall, the cottonwood riparain vegetation is in good ecological condition, with community structure and composition, and stream processes intact. No livestock use was observed.

Patterson Creek
Plant communities
Populus trichocarpa/Cornus sericea
Betula occidentalis/Cornus sericea

Description - This creek flows through a narrow to moderately broad valley below steep mountain slopes. The riparian vegetation is dominated by a black cottonwood/red-osier dogwood community. Water birch is common along the creek and sections without cottonwood support the water birch/red-osier dogwood ct. Aspen are locally common and Booth's willow and yellow willow are ubiquitous. The herbaceous layer is a mix of native and introduced grass and forb species. The riparian zone ranges from narrow to fairly wide, with stretches of floodplain and overflow and abandoned channels. There are many gravel/cobble bars and the creek appears to be quite dynamic overall. Although some local road or old mining impacts occur, riparian habitats and hydrological processes are generally intact. Further downstream on private land old mining impacts are more severe.

Big Creek
Plant communities
Betula occidentalis/Cornus sericea

Description - Big Creek flows through a very steep, narrow cut downstream from the confluence of the North and South forks. Water birch mixed with willows and some thinleaf alder and red-osier dogwood forms a thin riparian ribbon through this cut. Black cottonwood communities occur downstream of the National Forest boundary.

South Fork Big Creek
Plant communities
none identified

Description - The creek runs through a narrow, steep canyon starting at its confluence with North Fork Big Creek. Of the approximately four miles of identified stream target, only the lowermost 0.2 mile of the canyon were directly surveyed. This section supports a narrow band of mixed deciduous shrubs including thinleaf alder, Booth's willow, whiplash willow, water birch, and red-osier dogwood, along with a few widely spaced black cottonwood trees. Further upstream, the riparian corridor is very narrow and often not discrete from the adjacent rocky or forested slopes. From select vantage points high above the creek, willows or other riparian species appear restricted to a fringe immediately along the bank. Douglas-fir (*Pseudotsuga menziesii*), or mountain big sagebrush (*Artemesia tridentata vaseyana*), or rock and talus slopes descend to the creek throughout the canyon. The willow bottoms located about four miles upstream from the mouth of the creek where not visited, but are likely similar to the willow communities described for the North Fork Big Creek.

North Fork Big Creek
Plant communities
Populus trichocarpa/Alnus incana

*Salix boothii/*Mesic graminoid
Carex utriculata

Description - This creek flows through a narrow to moderately broad canyon bottom surrounded by forested slopes. A thin band of the black cottonwood/water birch ct. occurs along about the lower 0.2 stream mile. Versions of the Booth's willow/mesic graminoid ct. occur upstream of the cottonwood community. The vegetation is quite variable along this segment and lodgepole pine (*Pinus contorta*) encroaching from the adjacent woods blurs the riparian distinction in places. Broad willow bottoms start about two miles upstream of the mouth. The Booth's willow/mesic graminoid community in this area is mostly in high quality condition. There are also inclusions where beaked sedge is abundant. No evidence of livestock use was observed during the survey.

Little Lost River drainage

Little Lost River (Sawmill Creek)
Plant communities
*Salix boothii/*Mesic graminoid
Salix boothii/Carex nebrascensis
Salix boothii/Carex utriculata
Carex nebrascensis
Juncus balticus

Description - This low-gradient section of the river flows through a wide valley and is confined to one main channel except for a few short stretches with two or more braids. The river supports well developed riparian vegetation along most of its length, although sagebrush vegetation comes right up to the river bank in some places where the river is entrenched. The Booth's willow/mesic graminoid ct. is the most common riparian community along the river. Inclusions of Booth's willow/beaked sedge and Booth's willow/Nebraska sedge communities are found in areas of beaver dam activity, and the Booth's willow/Kentucky bluegrass community type in dry terraced areas. Geyer's willow is widespread and locally dominant, while whiplash willow or sandbar willow can also be common in places. There are interspersed patches or scattered individuals of black cottonwood and aspen along the river. Large portions of the extensive meadow system upstream of Fairview Guard Station are dominated by pasture grasses, mainly Kentucky bluegrass, smooth brome (*Bromus inermis*), and some common timothy (*Phleum pratense*). Wetter, subirrigated areas support Nebraska sedge or small Baltic rush communities. The riparian zone is intensively grazed by livestock and in many places it was very diffucult to distinguish many of the herbaceous species from one another.

Mill Creek (a tributary to the upper Little Lost River)
Plant communities
*Salix boothii/*Mesic graminoid
Salix boothii/Carex utriculata

Description - This is a small tributary stream with a low gradient along the section surveyed. The

willow-dominated vegetation is influenced by extensive beaver activity. Excellent representatives of the Booth's willow/beaked sedge and Booth's willow/mesic graminoid communities occur. Timothy is locally common with the willows along the drier fringes. Adjacent uplands support mountain big sagebrush vegetation that is grazed by livestock.

Bear Creek
Plant communities
Populus trichocarpa/Alnus incana
*Salix boothii/*Mesic graminoid
Salix boothii/Carex utriculata

Description - This is another small, low-gradient tributary to the Little Lost River. Segments influenced by beaver activity contain high quality Booth's willow/beaked sedge and Booth's willow/mesic graminoid community types. Geyer's willow, along with lesser amounts of planeleaf willow (*Salix planifolia*) and thinleaf alder also occur in the drainage. The aspen/Kentucky bluegrass ct. prevails downstream of the beaver activity zone. It is impacted by livestock grazing, unlike the willow communities which are too wet for more than light livestock use.

Squaw Creek
Plant communities
*Salix boothii/*Mesic graminoid
Salix boothii/Carex utriculata

Description - A small tributary stream with a low gradient as it approaches its confluence with the Little Lost River. The mostly narrow band of riparian vegetation supports a Booth's willow/mesic graminoid community, along with inclusions of Booth's willow/beaked sedge in wetter, and Booth's willow/Kentucky bluegrass in drier segments. There is a side channel (perhaps a ditch routing water to the Fairview Guard Station) lined with a fringe of mesic graminoids, including abundant redtop.

Upper Badger Creek
Plant communities
Betula occidentalis

Description - Badger Creek flows through a narrow valley in the survey area. The riparian vegetation along this moderate-gradient section is characterized by a mosaic of water birch-dominated communities differentiated along a hydrologic gradient. The wettest areas support a water birch/mesic graminoid ct. with Nebraska sedge as the primary understory graminoid, while drier, more disturbed portions have Kentucky bluegrass. Intermediate situations contain a mix of mesic and dry graminoids. Booth's willow can be common in these communities, but is definetly subordinate to water birch.

Fowler Spring
Plant communities
Populus trichocarpa/Rosa woodsii

Rosa woodsii

Description - This area consists of two small springs. The upper spring (marked Fowler Spring on the USGS 7.5' topographic quadrangle) is located along the lower slope of a fairly steep draw. It contains a patch (ca. 10 x 30 m in size) of aspen, with Wood's rose and Rocky Mountain juniper (*Juniperis scopularum*) in the understory. The mostly sparse herbaceous layer is a mix of Kentucky bluegrass and mesic forb species such as stinging nettle. Further uphill the draw contains a dense shrub thicket dominated by Wood's rose along with scattered willows. The nearby lower spring is located in an open lower slope where the mountains transition to a large alluvial fan. Much of the spring vegetation is contained within an exclosure and consists of a small patch of the black cottonwood at the lower end, followed by dense bands of sandbar willow and/or Wood's rose. A small amount of surface water was present at both springs.

South Creek
Plant communities
Populus trichocarpa/Betula occidentalis
Betula occidentalis

Description - This small creek enters a canyon near the lower Forest boundary. The riparian zone is narrow along most of its length except for portions of the cottonwood communities. The black cottonwood/water birch ct. occurs along the lowermost 0.2 mile of the canyon, then resumes intermittently starting about 1.2 miles further upstream. Where there is no cottonwood, the riparian vegetation is characterized by a water birch/Wood's rose community with great basin wildrye common in the understory. The riparian zone is commonly less than 5 m broad. Basin big sagebrush (*Artemisia tridentata tridentata*) is common alongside the riparian strip.

Horsethief Canyon
Plant communities
none identified

Description - There is no riparian development along the small watercouse in this drainage, only a thin herbaceous greenline rarely more than 1 m wide. The channel varies from a small narrow depression nearly level with the sagebrush vegetation, to downcut sections 3 to 4 m below the adjacent bench. At the time of the survey, a small amount of water was present from a point downstream of a spring near the 6,200 ft. contour, to near the mouth of Hurst Canyon. The channel more or less disappears upstream of the spring area and the section near the lower Forest boundary looks like it is dry most of the time.

Wet Creek
Plant communities
*Salix boothii/*Mesic graminoid
Salix boothii/Carex utriculata

Description - This is a fairly low gradient stream along the areas surveyed and beavers are active in some sections. The riparian vegetation is dominated by the Booth's willow/mesic graminoid ct.

Inclusions of the Booth's willow/beaked sedge and Booth's willow/Kentucky bluegrass types also occur. The streambanks are sheering and in poor condition in places, although some spots are healing. It is common for the adjacent mountain big sagebrush vegetation to come right to the edge of the streambank where entrenchment is exacerbated. Mesic graminoid openings are widespread.

Pine Creek (a tributary of Wet Creek)
Plant communities
Salix boothii/Mesic graminoid

Description - A small creek that is likely ephemeral during dry years. The lower stream segment through BLM land is entrenched, with extensive raw to partly raw banks, and without a well developed riparian zone. Basin big sagebrush and Wood's rose are the primary shrubs associated with the creek. Great basin wildrye, Kentucky bluegrass, and wheatgrasses (*Agropyron* spp.) are the main graminoids, and several "increaser" forb species are common. Similar vegetation continues upstream, through a small canyon, and onto Forest Service land. A narrow Booth's willow/mesic graminoid community begins where the channel entrenchment ends.

Big Lost River drainage

Big Lost River Forest Service Parcel
Plant communities
Alnus incana

Description - There is a small segment of National Forest land along the river near the Twin Bridges landing strip. The riparian zone supports a mix of thinleaf alder- and willow-dominated vegetation. Cottonwood stands do not occur until further downstream.

North Fork Big Lost River
Plant communities
Alnus incana
Salix boothii/Mesic graminoid

Description - Upstream for approximately one mile from its confluence with the East Fork, the North Fork Big Lost River is confined by rock walls with the narrow riparian strip dominated by thinleaf alder. Associated shrubs include willows, bog birch (*Betula glandulosa*) and shrubby cinquefoil (*Potentilla fruiticosa*). Further upstream the river is less confined and the width of the riparian vegetation varies from a couple of shrubs thick, to well over 35 m. The riparian vegetation is dominated by the Booth's willow/Kentucky bluegrass ct., with Geyer's willow being the most common willow species in many places. Sandbar willow is another widespread shrub, as are Wood's rose and Missouri gooseberry. Inclusions of the Booth's willow/mesic graminoid ct. are present. Livestock graze the riparian zone hard wherever it is accessible. This made it very difficult to distinguish many herbaceous species from one another. The survey area included a short section of Summit Creek as well.

East Fork Big Lost River
Plant communities
Alnus incana
*Salix boothii/*Mesic graminoid

Description - The lower segment of this river flows through a moderate to wide valley bottom and is low gradient. The riparian vegetation varies from narrow, to wide in places influenced by beaver activity. Booth's willow/Kentucky bluegrass is the most common riparian community. There are also inclusions of the Booth's willow/mesic graminoid ct. Geyer's willow is often the most abundant willow, while bog birch is widespread and locally common. Shrubby cinquefoil is another common shrub, especially in a narrow strip along the willow-sagebrush interface. An open mosaic of willow shrubs, basin big sagebrush and herbaceous-dominated patches characterizes some river stretches. Livestock graze the riparian vegetation wherever it is accessible along this part of the river. In many places the vegetation was mowed due to grazing. This made it impossible to distinguish herbaceous species from one another.
Approximately 0.7 mile downstream of the confluence with Wildhorse Creek the river becomes more confined and the riparian vegetation changes. The river corridor begins to support a narrow strip of thinleaf alder vegetation near the rocky high water mark. The thinleaf alder ct. and the thinleaf alder/willow spp. ct. are both represented.

Wildhorse Creek
Plant communities
*Salix boothii/*Mesic graminoid

Description - The lower segment of this creek flows through a wide valley bottom and has a low gradient. The width of the riparian zone ranges from 1 to 10 m, averaging about 5 m. Booth's willow/Kentucky bluegrass is the most common riparian community type. The Booth's willow/mesic graminoid ct. is less common. Bog birch and shrubby cinquefoil are widespread and can be locally common. Sagebrush vegetation comes right to the edge of the streambank in some places. Livestock grazing occurs along the riparian zone and much of the herbaceous component was closely cropped as a result. This made it impossible to distinguish many herbaceous species from one another.

Lehman Creek
Plant communities
Populus tremuloides unclassified
*Salix boothii/*Mesic graminoid
Salix boothii/Carex utriculata

Description - This is a small creek with a series of scattered, small beaver dams. The riparian zone is narrow except in segments influenced by beaver. Beaver areas support the Booth's willow/mesic graminoid ct., along with small patches of the Booth's willow/beaked sedge ct. Other stream segments are dominated by a band of aspen, usually with a single row of willows right along the creek. These segments represent the aspen/Kentucky bluegrass ct., along with some examples of the aspen/Wood's rose ct. Livestock graze the riparian area. BLM land enroute

to the Forest boundary was also surveyed.

Cliff Creek
Plant communities
Populus tremuloides unclassified

Description - This is a steep gradient creek with moderate to steep slopes on either side. The aspen-dominated riparian strip averages approximately 30 m wide and represents the aspen/Wood's rose ct. Kentucky bluegrass is the most abundant understory grass.

Willow Creek
Plant communities
Salix boothii/Carex utriculata

Description - Freighter Springs marks the beginning of perennial flow for this creek. An exclosure (ca. 5 acres in size) protects the springs and adjacent hillside. The localized wetland around the spring supports a patch of the Booth's willow/beaked sedge ct., while an open area with slowly moving water contains a dense sward of brookgrass (*Catabrosa aquatica*). Patches of lush Kentucky bluegrass occur in adjacent drier sites. Downstream of the springs, the willows disappear and the creek is lined by a narrow (mostly less than 1 m wide) mesic fringe dominated by redtop. Kentucky bluegrass dominates drier sections. A small spring-fed tributary to Willow Creek supports a mix of Geyer's willow, Bebb's willow and water birch, one or two shrubs wide. There is a dense understory of Wood's rose associated with this strip. All of Willow Creek is bordered by sagebrush vegetation. Livestock use is intensive along Willow Creek and no tall shrub recruitment was observed along the small tributary stream.

Pass Creek
Plant communities
Populus trichocarpa/Cornus sericea
Salix boothii/Mesic graminoid
Cornus sericea

Description - Below Pass Creek Gorge the riparian vegetation supports a narrow ribbon of the black (?) cottonwood/red-osier dogwood ct. The riparian vegetation within the most narrow section of the gorge is dominated by a dense growth of red-osier dogwood. The dogwood is mixed with willow (mainly Booth's willow) in some segments, or with Douglas-fir along the banks in other places. The Booth's willow/Kentucky bluegrass ct. or patches of cottonwood occur along more open segments of the gorge. Upstream of Pass Creek gorge the creek gradient moderates as it passes through posted private land supporting a relatively wide willow-dominated bottomland. Forest Service land resumes near lower Methodist Creek. Upstream of Methodist Creek the riparian vegetation is characterized by a narrow band of the Booth's willow/mesic graminoid ct. Geyer's willow is common and bog birch and shrubby cinquefoil are widespread in this area. In places where the willows extend away from the creek Kentucky bluegrass becomes the characteristic graminoid. The gradient steepens above about Lion Creek. Upstream of this point aspen becomes common with the willows and the mesic graminoid openings disappear.

Livestock graze along the creek. In places, this made it impossible to distinguish the herbaceous species from one another.

Mud Lake Canyon
Plant communities
*Salix boothii/*Mesic graminoid

Description - This is a small ephemeral creek. Only the lower approximately 0.2 mile has water through the summer. This lower section supports a narrow fringe of the Booth's willow/mesic graminoid ct. Cattle use is heavy along this small riparian area making it difficult to distinguish the herbaceous species from one another.

Bear Creek
Plant communities
Populus tremuloides unclassified

Description - This is a low gradient creek as it crosses the valley floor to its confluence with Pass Creek. The riparian zone supports a band of the aspen/Wood's rose ct., except for a small segment of the Booth's willow/Kentucky bluegrass ct. at the lower end. There are a few tiny mesic graminoid patches along the creek.

Ramshorn Canyon
Plant communities
none identified

Description - There is no surface water and no riparian vegetation associated with this canyon. Various sagebrush communities characterize the canyon floor.

Antelope Creek
Plant communities
Populus trichocarpa/Alnus incana
*Alnus incana/*Mesic forb
*Salix boothii/*Mesic graminoid
Salix boothii/Carex utriculata

Description - This relatively large creek flows through a fairly wide valley downstream from the confluence of Iron Bog Creek. Upstream of this point the valley bottom narrows and the gradient steepens. Riparian vegetation downstream from the Antelope Creek Guard Station supports a mosaic of several alder- or willow-dominated communities. The short section of Forest Service land upstream of the guard station supports a black cottonwood/thinleaf alder community along the channel, and a mix of cottonwood along with willow species and Wood's rose on adjacent terraces. Kentucky bluegrass is probably the most common graminoid in this mix. Similar vegetation continues on adjacent private land. Spotted knapweed was found at the "campsites" just upstream of the Guard Station.

There is a narrow riparian zone along Antelope Creek downstream from the confluence of Iron Bog Creek dominated by the black cottonwood/thinleaf alder ct. Gaps in the cottonwood support patches of thinleaf alder- or willow-dominated vegetation. Mountain big sagebrush vegetation comes right to the streambank in some places. Extensive beaver activity begins about 0.3 mile upstream from the confluence of Iron Bog Creek and willow-dominated vegetation spreads across most of the bottomlands. Booth's willow/mesic graminoid is the most common community type, intermixed with lesser amounts of the Booth's willow/beaked sedge and Booth's willow/Kentucky bluegrass types. Active bank sloughing and other stability problems are occurring downstream of the beaver dams. Livestock mowed the herbaceous vegetation along Antelope Creek making it difficult to distinguish many of the herbaceous species from one another.

Iron Bog Creek downstream of Iron Bog RNA
Plant communities
*Alnus incana/*Mesic forb
*Salix boothii/*Mesic graminoid

Description - In the vicinity of Iron Bog RNA the wetland/riparian vegetation is a mosaic of several shrub-dominated communities. Areas further downstream are largely dominated by the Booth's willow/mesic graminoid ct., with Kentucky bluegrass or common timothy dominating the understory in some areas. Despite some local livestock and recreational impacts, the stream and riparian vegetation are in good ecological condition.

Horsethief Creek
Plant communities
*Salix boothii/*Mesic graminoid
Salix boothii/Carex nebrascensis
Salix boothii/Carex utriculata

Beaver activity is common within the drainage and this is where the willow communities are best developed. The riparian vegetation is comprised mainly of the Booth's willow/mesic graminoid ct. Wetter areas associated with beaver ponds support inclusions of the Booth's willow/beaked sedge and Booth's willow/Nebraska sedge community types. Geyer's willow is often the dominant willow in these communities. Stream entrenchment appears to be increasing and bank sloughing and sheering are common. These bank instability problems have likely been exacerbated by recent(?) beaver dam blowouts in at least two places. This stream is a good candidate for management review to improve stream and riparian features. Recent cattle grazing made it difficult to distinguish many of the herbaceous species from one another.

Leadbelt Creek
Plant communities
*Salix boothii/*Mesic graminoid
Salix boothii/Carex nebrascensis
Salix boothii/Carex utriculata
Carex nebrascensis

Description - Downstream from near the confluence of Deep Creek to the lower Forest Service boundary the channels were dry in August 1997. This seems to be typical. This stretch is characterized by shrubby cinquefoil with a mixed graminoid-dominated understory. The riparian area further downstream on private land supports willow and aspen vegetation as surface water reappears. Upstream of the Deep Creek confluence surface water was flowing and beaver activity prominent. Intact beaver structures occur, but many dams are recently(?) blown out and the ponds drained. Where beaver dams are intact water extends across most of valley bottom, while blowout areas contain a lot of exposed ground. The Booth's willow/mesic graminoid ct. is common. There are also inclusions of Booth's willow/Nebraska sedge and Booth's willow/beaked sedge communities in the wettest areas. Subirrigated meadows are dominated by Nebraska sedge. These meadows and other mesic graminoid openings received nearly 100% utilization in 1997, making it difficult to distinguish many of the herbaceous species from one another.

Deep Creek (a tributary to Leadbelt Creek)
Plant communities
*Salix boothii/*Mesic graminoid

Description - This is a small creek confined by the adjacent moderately steep upland slopes. The riparian vegetation is often less than 5 m wide and represents a version of the Booth's willow/Kentucky bluegrass ct. Intermixed are a couple of small aspen patches. Livestock disturbances have impacted the riparian vegetation.

Dry Canyon
Plant communities
none indentified

Description - There are no wetlands or areas with riparian vegetation within Dry Canyon. The valley floor supports sagebrush-dominated vegetation.

Bear Creek
Plant Communities
Populus tremuloides/Cornus stolonifera
Alnus incana
*Salix boothii/*Mesic graminoid
Carex nebrascensis

Description - The riparian vegetation along Bear Creek ranges from only a couple shrubs wide, to extensive shrub-dominated valley bottom floodplains influenced by beaver. Common riparian communities include the thinleaf alder/mesic graminoid (Kentucky bluegrass is usually the main graminoid), Booth's willow/mesic graminoid, and Booth's willow/Kentucky bluegrass community types. The upper end of the survey area contains a large aspen/Wood's rose community associated with the alder type. Intermittent patches of silver sage/Kentucky bluegrass ct. and Nebraska sedge ct. are found along downstream segments. Bank sloughing and downcutting are problems along several lower sections of the creek. Intensive livestock use in many places made it difficult to distinguish the herbaceous species from one another.

Death Canyon (a tributary to Bear Creek)
Plant communities
*Salix boothii/*Mesic graminoid
Salix boothii/Carex nebrascensis
Salix boothii/Carex utriculata

Description - This is a small low-gradient drainage located in a moderately wide valley. Areas influenced by beaver activity are interspersed with sections unaffected by beavers. The riparian vegetation is a mosaic of several Booth's willow community types (Booth's willow/mesic graminoid; /Nebraska sedge; /beaked sedge), although Geyer's willow is usually the most abundant willow species. A few local wet meadow areas contain versions of the Nebraska sedge ct. The ground is hummocked in some of these openings. There is also a grazing-modified dry meadow community characterized by abundant Kentucky bluegrass and blue flag (*Iris missouriensis*). It occurs as a narrow to broad band between the wetlands and sagebrush-dominated upland communities.

Burnt Hollow
Plant communities
Carex nebrascensis

Description - This is a tiny creek coursing through a narrow (1 to 5 m wide) swale 1 to 2 m below the surrounding sagebrush bench and slopes. The subirrigated swale is dominated by Nebraska sedge along with a mix of several other mesic graminoid species such as Baltic rush. Shrubby cinquefoil is widely scattered along the swale. Willows are uncommon and browsed hard. There are occasional patches of silver sage/Kentucky bluegrass adjacent to the swale. The drainage is grazed by livestock and most of the herbaceous vegetation in and around the watercourse was mowed. This made it difficult to distinguish many of the herbaceous species from one another.

Cherry Creek
Plant communites
Alnus incana
*Salix boothii/*Mesic graminoid

Description - Upstream from the National Forest boundary, Cherry Creek flows through a fairly wide valley bottom until near the Middle Fork where it becomes more narrow. From the Forest boundary to the confluence of the Left Fork there is widely scattered beaver activity and the riparian zone is usually less than 10 m wide. The vegetation is dominated by the thinleaf alder/mesic graminoid ct. However, some stretches support a mix of Booth's willow types. Downcutting is a problem in some sections. Beaver activity is more pronounced upstream of the Left Fork junction and the width of the riparian zone fluctuates accordingly. Riparian areas below the Middle Fork junction are dominated by the Booth's willow series. A few small, subirrigated Nebraska sedge meadows also occur. Further upstream the riparian vegetation is dominated by versions of the thinleaf alder/mesic graminoid ct. Kentucky bluegrass is often the most common graminoid beneath the alder. Intensive cattle grazing along the bottomlands made it difficult to

distinguish many of the herbaceous species from one another.

Middle Fork Cherry Creek
Plant communities
Alnus incana

Description - The narrow bottoms of this creek are influenced by beaver activity. Riparian vegetation along the lower segment is a continuation of the thinleaf alder/mesic graminoid community found in confluent Cherry Creek. Areas further upstream were not surveyed.

Left Fork Cherry Creek
Plant communities
Alnus incana

Description - The riparian zone averages less than 25 m wide in most places and generally fills the narrow valley bottom. Beaver activity is widespread and alder dominates the riparian vegetation except near the mouth of the creek where willows are also common. Thinleaf alder/mesic graminoid is the main community type. The mesic graminoid layer can be dominated by either Kentucky bluegrass or a mix of native sedges, rushes and grasses.

Lemhi River drainage

Hayden Creek
Plant communities
Populus trichocarpa/Salix lutea ?

Description - There is a small parcel of Forest Service land along lower Hayden Creek. This is a relatively large creek with low terraces extending away from the downcut channel on both sides. The cottonwood-dominated riparian vegetation averages more than 30 m broad in most places. A black cottonwood/willow community with a mixed graminoid understory is widespread. Several introduced grasses are common in the understory. Drier portions of the terrace have Kentucky bluegrass beneath the cottonwood. The riparian area is heavily grazed by cattle and weedy species are common.

Hoods Gulch
Plant communities
*Salix boothii/*Mesic graminoid
Carex nebrascensis

Description - This is a small creek opening into a broad valley bottom upstream from its confluence with Canyon Creek. Riparian vegetation is limited to a narrow band, usually not more than a few meters wide. Geyer's willow is the main riparian shrub and occurs with either a Nebraska sedge or mixed mesic graminoid understory. Swaths of the Nebraska sedge ct. are found along segments lacking willow cover. A portion of the riparian area is protected by an

exclosure.

Jakes Canyon
Plant communities
none identified

Description - This is mostly a steep, rocky, narrow and dry canyon. Surface water is ephemeral above a spring located about 0.2 mile upstream from the mouth of the canyon. The lower part of the canyon is BLM land. The canyon narrows further at the Forest Service boundary. Upcanyon of this point the dry channel area is largely a mix of Douglas-fir and Rocky Mountain juniper with a basin big sagebrush and bunchgrass understory. These tree species are found on the adjacent slopes as well. BLM land below the Forest boundary was also surveyed.

Big Eightmile Creek
Plant communities
Picea engelmannii unclassified
*Salix boothii/*Mesic graminoid
Salix boothii/Carex utriculata

Description - There is extensive beaver activity and associated willow bottoms in the upper end of the survey area. These willow bottoms extend for over one mile and average more than 50 m wide. The Booth's willow/beaked sedge and Booth's willow/mesic graminoid communities tend to give way to the Booth's willow/Kentucky bluegrass ct. towards the margins of the bottomlands. The gradient steepens and the channel becomes more confined further downstream. An Engelmann spruce community follows this part of the creek. Continuing downstream the valley broadens somewhat again and the narrow riparian strip is mostly a mixture of willows and spruce, along with aspen and deciduous shrubs.

Hawley Creek
Plant communities
*Salix boothii/*Mesic graminoid
Salix boothii/Carex utriculat

Description - This is a medium-size creek with fairly steep slopes rising above the narrow valley bottom. The riparian strip ranges from less than 2 m, to about 15 m wide. Booth's willow/mesic graminoid and small inclusions of Booth's willow/beaked sedge communities line the creek where the gradient is relatively moderate. Where the gradient steepens the banks are cut a little deeper/steeper and there is a discontinuous strip of water birch and willows beneath a canopy of Douglas- fir.

Reservoir Creek
Plant communities
*Salix boothii/*Mesic graminoid
Salix boothii/Carex aquatilis
Salix boothii/Carex utriculata

Description - Beaver activity along the lowermost stretch supports a mosaic of Booth's willow community types. Further upstream the valley narrows and there are scattered old beaver works. Some formerly wet areas are beginning to dry out. The riparian width varies, but averages about 10 m broad. The vegetation along this stretch also contains a mosaic of Booth's willow types.

Big Bear Creek
Plant communities
*Salix boothii/*Mesic graminoid

Description - This creek cuts through a narrow valley bordered by mountain slopes. Douglas-fir forests come down to near the creek edge along much of the south bank. I surveyed only the lowermost 0.2 mile due to an obvious lack of potential habitat further upstream. The riparian vegetation along this section is dominated by a band of the Booth's willow/mesic graminoid ct. In places where Douglas-fir descends to the creek there is merely a fringe of water birch or willows adjacent to the creek.

Nez Perce Creek
Plant communities
*Salix boothii/*Mesic graminoid

Description - This is a small spring-moderated creek. Riparian vegetation is restricted to a narrow strip along the creek. Near the lower Forest Service boundary the riparian vegetation is not well developed. There is an open canopy of scattered aspen and Rocky Mountain juniper, plus a few Douglas-fir and limber pine (*Pinus flexilis*) trees. There is a section of Booth's willow/mesic graminoid ct. further upstream. Along much of the creek, the graminoid herb layer is dominated by Kentucky bluegrass. At Nez Perce Spring there is a patch of aspen.

East Fork Salmon River drainage

Bowery Hot Springs
Plant communities
Eleocharis rostellata

Description Several springs emanate from a bench above the East Fork Salmon River and flow across the bench, down slopes, and eventually into the East Fork Salmon River. Eleocharis rostellata is the most common community on the flats and on moderate to steep slopes. Other communities include Eleocharis pauciflora and Scirpus americanus. Quaky, organic substrates are common on the flats. There is also an extensive unvegetated area with a thin layer of surface water and yellow-brown algae near the source springs. Small patches of Geyer's willow and shrubby cinquefoil also occur within the wetland.

East Fork Salmon River
Plant communities

Betula occidentalis/Cornus sericea
Populus trichocarpa/Alnus incana
Populus trichocarpa/Betula occidentalis
Populus trichocarpa/Salix lutea
Populus trichocarpa/Recent alluvial bar
Alnus incana/Mesic graminoid
Salix lasiandra/Mesic forb

Description-Surveys along the East Fork Salmon River were limited to lands in public ownership from near Spar Canyon to Big Lake Creek. The river supports a narrow floodplain that historically was not much greater than 0.5 miles wide. The flood plain is mosaic of Populus trichocarpa, Populus tremuloides, Salix geyeriana, Salix lasiandra, Salix lutea, Alnus incana, and Betula occidentalis. Both mature and young stands of cottonwood were noted along the river. On higher gradient reaches vegetation is confined to narrow bands of Betula occidentalis and Salix spp. Exotic herbaceous plants including Agropyron repens, Agrostis stolonifera, Bromus inermis, Phleum pratense, Poa palustris, Poa pratensis, and Cirsium arvense are abundant in the understory of cottonwood and willow stands. Most of the impacts along the East Fork Salmon River are related to agricultural activities. Alteration to the hydrology along the East Fork is limited to diversions for irrigation. On reaches of the East Fork Salmon River that have been straightened, the river has become entrenched and steep banks vegetated with graminoids remain.

Appendix E.

Taxonomy, range, status and management of rare plant species in east-central Idaho wetlands.

Agoseris lackschewitzii D. Henderson and B. Moseley

CURRENT STATUS
BLM - Sensitive
USFS R4 - Sensitive
USFWS - None
Idaho Native Plant Society - Sensitive
CDC Rank - G4 S2

TAXONOMY

Family: Asteraceae (Aster)

Common Name: Pink agoseris

Citation: Systematic Botany. 15(3). 1990.

Technical Description: From Henderson et al. (1990); Plants perennial herbs with simple or branched caudex and a slender taproot, producing a basal rosette and 1-3 scapes. Leaves thin, oblanceolate, (4)6-20(27) cm long, 0.7-2.2 (3.1) cm wide; blade margins entire to rarely distantly toothed, both surfaces glabrous, the apex acute, slightly revolute, with a purple mucro, the base attenuate; petiole broadly to narrowly winged, a to ½ the length of the leaf, sheathing at the base, the margins villous with spreading multicellular hairs with clear cross-walls. Scape 6-29 cm high, villous at base, becoming tomentose below the solitary head. Involucre campanulate remaining so in fruit, 1.1-1.9 cm long in flower, up to 2.5 cm long in fruit; phyllaries mostly imbricate in 3-4 series, light green with a dark purple median stripe and light to heavy purple scarious margins, the outer similar or slightly broader and obtuse, densely villous basally, less so towards the apex, the trichomes eglandular, translucent or occasionally with some purple pigment. Receptacle slightly convex up to 7 mm broad, chaffy. Flowers all ligulate, perfect, 50-70 per head, pink at anthesis, drying to deep pink; ligules 5-10mm long, 1.5 mm wide, 5-toothed, glabrous distally, pubescent proximally with few, multicellular hairs; tube 6.5 mm long; anthers 1.2-1.8 mm long, the apical appendages lanceolate, 0.2-0.3 mm long; style column 8-9 mm long, purple, scabrous; style branches 0.4-0.8 mm long, stigmatic for entire length, the abaxial surface scabrous, the apex rounded. Achenes terete, the body 6-8 mm long, 10 ribbed, minutely scabrous on the ribs, glabrous to sparsely pubescent with short unicellular hairs between the ribs, gradually tapering to a slender obscurely nerved or nerveless beak shorter than the body, the beak 4.2-6.6 mm long. Pappus double; capillary bristles numerous, white, minutely scabrous, 6-12 mm long.

Nontechnical Description: Agoseris lackschewitzii is a herbaceous perennial plant with milky juice and a taproot. Plants may have one or more stems topped by a pink head. Stems reach 6-49 cm (2.5-19 in) in height and are hairy along their entire length. The leaves of this plant are all basal, 6-20 cm (2.5-8 in) long and 0.7-2.5 cm (0.3-1 in) wide, without hairs. Leaves may be entire or have a few small teeth. Dark purple spots may irregularly fleck the leaves. Flowering heads have may (50-70) perfect florets with pink rays, 5-10 mm (0.2-0.4 in) long, 1.5 mm (0.06 in) wide. Bracts beneath the heads are in two or several series. These are green with a dark colored strip down the middle, and may be purple dotted on the outer surface; the inner series have membrane like edges. The beak of the achene is shorter than the length of the body. Achenes are roundish with 10 ribs on the body and 6-8 mm (0.2-0.3 in) long. The body tapers gradually into a beak, 4.2-6.6 mm (0.1-0.2 in) long. Very white, capillary bristles top the beak. Plants flower in July and August (rarely June), depending on elevation and climate (Pavek and Schassberger 1990).

Distinguishing Features and Similar Species: The flower color of Agoseris lackschewitzii is always pink at

anthesis, neither yellow with pinkish tinges, nor burnt orange. No color intergradations have been found with either A. aurantiaca or A. glauca, nor have pinkish forms of A. glauca been found within the region.

DISTRIBUTION

Range: Mountainous areas of southwestern Montana (Beaverhead, Deerlodge, Madison, and Park counties) and adjacent Idaho (Fremont and Lemhi counties).

Habitat and Associated Species: Agoseris lackschewitzii occurs in open moist meadows containing forbs, grasses, sedges and rushes, and in ecotones between wet meadows and forest. Dominant overstory species, when present, are Abies lasiocarpa, Picea engelmannii, Pinus albicaulis, and Pseudotsuga menziesii.

MANAGEMENT

Threats: Human caused threats to Agoseris lackschewitzii include trails and associated maintainance or erosion and from grazing by sheep and cattle.

Management implications: Agoseris lackschewitzii populations will respond favorably to management actions to prevent trampling or other mechanical soil damage in moist to wet meadow sites. These management actions include restricting grazing and routing trails around wet areas to more suitable dry sites. If trails cannot be relocated, trails through wet areas should be built to a high standard to prevent wide, multiple paths from developing as users attempt to avoid muddy conditions.

Populations should be considered in any habitat alteration projects on U.S. Forest Service lands. Detailed surveys should precede proposed disturbances in or near populations. Mitigation measures should be developed to reduce or eliminate the impacts of management activities.

***Aster junciformis* Rydb.**

CURRENT STATUS
BLM - None
USFS R4 - None
USFWS - None
Idaho Native Plant Society - Sensitive
CDC Rank - G5 S1

TAXONOMY

Family: Asteraceae (Aster)

Common Name: Rush aster

Citation: Bull. Torrey Club 37:142. 1910.

Technical Description: (From Hitchcock 1955) Slender perennial from creeping rhizomes seldom over 2 mm thick; stem 1.5-8 dm tall, glabrous below, becoming puberulent in lines upwards; leaves linear or nearly so, commonly 2-5 (rarely 9) mm wide, usually slightly clasping, entire or subentire, the lowermost sometime reduced and subpetiolate, but then soon deciduous; inflorescence usually short and broad, sometime more elongate, or the heads solitary in reduced plants; heads rather small, the disk 7-13 mm wide; involucre 5-7 mm high glabrous, its slender, mostly acute bracts more or less imbricate, often with purple tips and margins;

rays commonly 20-50, white or pale bluish, 7-15 mm long.

Nontechnical Description: Information not compiled.

Distinguishing Features and Similar Species: Information not compiled.

DISTRIBUTION

Range: Alaska, Yukon, and British Columbia to Quebec, south to Idaho, Colorado, South Dakota, Minnesota, New Jersey. In Idaho it is known from six populations in north Idaho and single populations from Custer and Teton counties.

Habitat and Associated Species: Occurs in moist wetlands. Associated species include Carex aquatilis, C. nebrascensis, C. simulata, and C. utriculata.

MANAGEMENT

Threats: The population at Chilly Slough is in a saturated area near Whiskey Springs that is generally too wet for livestock grazing or other ground disturbing activities. Offsite impacts including water development and actions which result in altered hydrology are the largest threat to the viability of populations.

Management implications: Portions of Chilly Slough are within a Wetland Habitat Area managed to maintain wetland habitat and functions. Opportunities to continue to work with private landowners or public agencies which preserve wetland functions should be pursued. Efforts should focus on livestock management and elimination of ground disturbing activities in areas that are hydrologically connected to known populations.

***Astragalus diversifolius* Gray**

CURRENT STATUS
BLM - Sensitive
USFS R4 - Sensitive
USFWS - None
Idaho Native Plant Society - Global Priority 2
CDC Rank - G3 S2

TAXONOMY

Family: Fabacea (Pea)

Common Name: Meadow milkvetch

Citation: Flora of North America 1:351.

Technical Description: Diffuse, or prostrate, perennial herbs, the weak, slender, sparsely leafy, simple or several-branched stems radiating from the shallowly buried root-crown, the foliage strigulose with apressed basifixed hairs but green or greenish, the long, dimorphic, the lowest amplexicaul and connate into a scarious bidentate or subentire cup, the upper one herbaceous, either shortly-connate opposite the petiole or free, the ovate-triangluar blade deflexed; leaves 1.5-6(7) cm long, variable in form, 1-5(7)-foliolate, the leaf-stalk up to 2(2.5) cm long, the leaflets either all or mostly linear or linear-oblanceolate, acute-acuminate and grasslike, or the lateral ones (especially in some early leaves) ovate, the terminal leaflet always longest and continuous

with the leaf stalk, 10-40(65) x 1-5 mm, the lateral leaflets (absent in many distal leaves) 4-25 mm long, either decurrent on the rachis or obscurely petiolate; peduncles (2)4-8(15) cm long; racemes loosely (1)2-8-flowered, the flowers spreading-ascending, the axis becoming 0.5-3 cm long; calyx (3.5)4-6.5 mm long, either white- or black-strigose, the campanulate tube 3-4.5 mm white- or black-strigose, the broadly subulate or deltate-triangular teeth 0.7-2 mm long; petals either whitish, faintly lilac-tinged or -tipped, or ochroleucous, the strongly recurved banner 7-13 mm long, the keel 5.5-11 mm long, its blades either obtuse or obliquely subacuminate; ovary strigulose; ovules (10)12-16; pod variably oriented, loosely refracted or ascending-humistrate, sessile and persistent on the receptacle, in profile narrowly oblong, (10)12-17 x 3-4 mm, straight or slightly decurved, plano-compressed but the faces low-convex at maturity, the thin green valves becoming papery, stramineous or ultimately fuscous, not inflexed or inflexed as a rudimentary septum up to 0.4 mm wide; dehiscence apical and downward through both sutures, the valves coiling (Barneby 1989).

Nontechnical Description: Plants solitary or forming entangled masses; procumbent stems from a thick tap root; few cream-white to light yellow flowers on loose racemes; calyx distinctively reddish with white to (mostly in Idaho) black strigulose hairs; plants sparsely leafy, the terminal leaflet longer than the rest; the lateral leaflets sometimes absent on lower and middle leaves; the leaves generally look grasslike.

Distinguishing Features and Similar Species: Difficult to distinguish from Astragalus convallarius by one consistently effective morphologic character. It has often been misinterpreted as a foliose form of A. convallarius; A. diversifolius has broader leaflets, as well as broader and shorter pod. Collectively, the distinctive morphological features of A. diversifolius, seen in relation to a physiological adaptation to a moist meadow habitat, are amply diagnostic. The superficial appearance of an A. diversifolius population is so striking that the species has been redescribed twice since Nuttall by botanists long familiar with its common xerophytic counterpart, A. convallarius (Barneby 1964; 1989).

DISTRIBUTION

Range: Intermontane valleys of east-central Idaho and the upper Snake River Plain near Springfield, Idaho; remotely disjunct at the southwestern edge of Salt Lake Desert in western Juab County and southwestern Toole counties, UT, and in the Spring Valley in southern White Pine County, NV. In the early days of botanical collection in the West, it was collected twice, by Nuttall and Geyer, from vague locations, but possibly in the Green River Basin and upper North Fork Platte River, WY. It has never been collected in WY in recent times and the correctness of the old labels has been questioned (Barneby 1964). However, the early travelers of the arid West followed streams and river valleys and camped within reach of grass and water, and must have had opportunities, now lost forever, of seeing the mesophytic vegetation of the bottom lands in pristine condition (Barneby 1964). In other words, it would be rash to discount these reports.

In Idaho occurs in the Big Lost River Valley including Chilly Slough, Pahsimeroi River Valley, Little Lost River Valley (Summit Creek), Lemhi Valley (Texas Creek, Eightenmile Creek, and historical collections in the lower Lemhi), Birch Creek Valley. Also an historical collection is known from Springfield in Bingham County, near the head of American Falls Reservoir.

Habitat and Associated Species: Moist alkaline, generally hummocky meadows along spring-fed creeks. Associated with Juncus balticus, Astragalus leptaleus, Glaux maritima, Sisyrinchium idahoense, Poa pratensis, and Senecio debilis.

MANAGEMENT

Threats: Many of the meadows inhabited by A. diversifolius are heavily grazed by livestock. Although it is poisonous to sheep and chickens, at least (Williams and James 1974; 1975), it is grazed by cows; it becomes very prosrate and lack vigor (lower biomass and reproductive output) when heavily grazed. Ungrazed plants are vigorous and more or less upright. A real tangle of stems. Considerably more flowers are produced in ungrazed situations, based on limited observations by Moseley (1991). Inventories should be conducted to gain a better understanding of its distribution, ecology, and conservation status.

Management implications: Most populations are probably grazed to some degree and most are probably on private land. This makes management of those that do occur on public land especially important.

Astragalus leptaleus Gray

CURRENT STATUS
BLM - Sensitive
USFS R4 - None
USFWS - None
Idaho Native Plant Society - Monitor
CDC Rank - G4 S2

TAXONOMY

Family: Fabacea (Pea)

Common Name: Park milkvetch

Citation: Proc. Am. Acad. 6:220. 1884

Technical Description:Weak, delicate, diffuse, with a slender taproot and widely branching subterranean caudex, thinly strigulose with fine, appressed hairs up to 0.2-0.5 mm long, the stems and herbage bright green, the leaflets glabrous above, the inflorescence commonly nigrescent; stems loosely tufted, in old plants very numerous and entangled, 5-20 (30) cm long, arising singly or few together from buds on the slender, buried caudex-branches, branched at the first emersed, usually congested nodes, floriferous upward from near or from well below the middle; stipules 2-5 mm long, thinly herbaceous or submembranous, usually several-nerved, the lowest becoming papery in age, all glabrous dorsally, fully amplexicaul and connate, the lowest into a short bidentate sheath, the upper ones longer, united through half their length or less, sometimes only at the very base, with lanceolate free blades; leaves 2.5-10 cm long, petioled but the uppermost shortly so, with subfiliform rachis and (9) 15-23 (27) narrowly elliptic or lanceolate and subacute, or (in the lower leaves) often ovate and obtuse, thin-textured leaflets 3-15 mm long; peduncles filiform, ascending, 2-5.5 cm long, shorter than the leaf; racemes loosely 1-5 (commonly 2- or 3-) -flowered, the flowers ascending at anthesis, declined thereafter, the axis up to 1 cm long in fruit; bracts membranous, lanceolate or lance-ovate, 1.3-3.3 mm long; pedicels at anthesis straight, 1.2-2.1 mm long, in fruit arched outward, 1.4-2.5 mm long; bracteoles 0-2, minute when present; calyx 4-5.7 mm long, densely to quite thinly black- or rarely white-strigulose, the somewhat oblique disc 0.3-1 mm deep, the campanulate tube 2.7-3.4 mm long, 1.9-2.4 mm in diameter, the subulate or lance-subulate teeth 1.1-2.5 mm long; petals white, the keel-tip maculate with dull bluish-purple; banner recurved through 45°, ovate-cuneate, notched, 8.5-11.8 mm long, 4.8-7.2 mm wide; wings 7.2-9.5 mm long, the claws 2.7-3.8 mm, the obliquely obovate, oblong-oblanceolate or -elliptic, obtuse or emarginate blades 4.9-6.5 mm long, 1.8-2.9 mm wide; keel 6-7.3 mm long, the claws 2.8-3.9 mm, the obliquely half-obovate blades 3.2-3.9 mm long, 1.8-2.3 mm wide, incurved through 85-120 ° to the bluntly deltoid apex; anthers 0.3-0.5 mm long; pod pendulous, obscurely stipitate or subsessile, the stipe not over 1.5 mm long, often reduced to a narrow neck, the body oblong-, lance-, or subclavate-elliptic in dorsiventral view, 8-14 mm

long, 2.5-4 mm in diameter, slightly decurved, shortly subulate- or cuspidate-beaked, obcompressed and bluntly trigonous, with obtuse lateral angles and low-convex lateral faces, keeled ventrally by the prominent, convexly arched suture, flattened or shallowly and openly sulcate dorsally, the thin, green, sparsely black- or white-strigulose valves becoming stramineous and papery, not inflexed; ovules 6-10; seeds brown, smooth, lustrous, 1.8-2.1 mm long (Barneby 1964).

Nontechnical Description: Delicate perennial from a deeply buried taproot and creeping underground caudex. Stems 5-20 cm long, bearing flowers from near or well below the middle; flowers white, tip of the keel purplish. Leaflets 15-27, bright green, thinly hairy, mostly lanceolate and acute. Pod 8-14 mm long, oblong-ellipsoid, somewhat obcompressed, with thin, black and white hairs (Caicco and Henderson 1981).

Distinguishing Features and Similar Species: (From Moseley 1991) Park milkvetch has a delicate habit, has bright green leaflets, has only two or sometimes three white flowers at the middle of the stem, and most distinguishing, has slightly obcompressed, one-celled pods that are not visibly stipitate. The stipe, if present, is concealed by the calyx. In our area, park milkvetch is most similar to Astragalus alpinus, but at least three other milkvetches and an Oxytropis also occur in the riparian communities of the region that could be confusing. The following key, modified from Hitchcock (1961a), will help distinguish park milkvetch from similar-looking riparian legumes of east-central Idaho:

A. Keel of the corolla abruptly narrowed to a beaklike point; plants without leafy stems .... Oxytropis deflexa

A. Keel of the corolla not abruptly beaked; plants with leafy stems.

B. Terminal leaflet is confluent (continuous) with the rachis; plants robust with prostrate stems from a taproot; flowers white; calyx red ..... Astragalus diversifolius

B. All leaflets jointed to the rachis, including the terminal one.

C. Banner (measured along the curvature of the midvein) over 15 mm long; flowers purple, strongly erect, crowded into ovoid heads; stems arising from a buried rootcrown ..... A. agrestis

C. Banner not over 15 mm long; flowers not strongly erect or crowded into ovoid heads.

D. Keel petals 2.5-6 mm long; herbage dark green; flower deep purple; pods pendulous ..... A. eucosmus

D. Keel petals over 6 mm long.

E. Stipe of the pod 1.4-3.5 mm long, the valves inflexed as a narrow but evident septum 0.2-0.7 mm wide; racemes (5) 7-23-flowered, occurring at the ends of the stems and usually exceeding the leaves; petals lavender..... A. alpinus

E. Stipe of the pod not over 1.5 mm long, often obscure and reduced to a narrow stipe-like neck, the valves not inflexed; racemes mostly 2-3, rarely 5-flowered, occurring at about the middle of the stem,

the leaves far surpassing the raceme; petals white, with purple keel tip ..... A. leptaleus

DISTRIBUTION

Range: (From Moseley 1991) Park milkvetch is endemic to the Rocky Mountains, where it occurs sporadically and apparently never in abundance. It is most widespread in Colorado, with several disjunct stations north in the Rockies to western Wyoming, east-central Idaho, western Montana, and reportedly from Alberta (Hitchcock 1961; Barneby 1964; Isley 1985). At least three collections of park milkvetch were made in Idaho during the 1940's, all were along the Big Lost River, between Mackey and Chilly. Steve Caicco "rediscovered" the species in 1981, along the North Fork Big Lost River, as part of an evaluation of rare plants on the Lost River Ranger District, Challis NF (Caicco and Henderson 1981; Caicco et al. 1983). In 1988, Caryl Elzinga extended the known Idaho range of park milkvetch to the East Fork Salmon River drainage, with the discovery of three populations along Road Creek.

Results of surveys by Moseley in 1991, increased the number of known populations in the Big Lost and East Fork Salmon drainages, and extended the known distribution in the state 50 miles to the east, with the discovery of populations along Birch Creek and along Texas Creek, in the Lemhi Valley. As of 1998, park milkvetch is known from 22 extant sites in Idaho. It is locally abundant, but the areal extent of the extant populations generally range from a few square feet to about three acres. The Lower Wildhorse Creek population is an exception, however, covering approximately 50 acres.

Habitat and Associated Species : (From Moseley 1991) The habitat of park milkvetch is best characterized as being the mesic ecotone between saturated riparian communities and dry, upland sagebrush-steppe. This can occur in at least two settings (1) the tops and sides of hummocks and (2) the dry fringe of Geyer's willow/bluegrass or graminoid-dominated communities. The substrate is loamy, mineral soil that, in August, was dry at the surface, but somewhat moist just below the surface. Soil of the hummocky sites was generally white and alkaline-looking. All sites were more or less flat and open, although park milkvetch sometimes occurs in the partial shade of Geyer's willow and occasionally Booth's willow.

Except for Geyer's willow (Salix geyeriana) and Booth's willow (S. boothii), most associated species are low growing. The most common/plentiful associates include Poa pratensis, Juncus balticus, and Sisyrinchium idahoense. Others include Oxytropis deflexa, Astragalus eucosmus, A. agrestis, A. alpinus, A. diversifolius, Hordeum brachyantherum, Trifolium longipes, Zizia aptera, Antennaria anaphaloides, A. microphylla, Glaux maritima, Haplopappus uniflorus, Senecio debilis, Phlox kelseyi, Ranunculus cymbalarioides, Iris missouriensis, Trichlochin maritimum, Deschampsia cespitosa, Salix brachycarpa, Polygonum viviparum, Potentilla fruticosa, Thalictrum alpinum, Pedicularis groenlandica, Betula glandulosa, and Hesperochiron pumilus.

MANAGEMENT

Threats: Most sites are grazed by cattle. Moseley (1991) noted that two occurrences along Road Creek appear to be grazed the heaviest, followed by the Lower Wildhorse and Whiskey Springs occurrences. Very little flower and fruit production was seen at the two Road Creek occurrences in 1991, possibly resulting from very heavy and constant cattle grazing. The riparian zone is very narrow at these two sites and the adjacent upland vegetation is very xeric. In contrast, the dense and vigorous Lower Wildhorse occurrence, while being heavily grazed, occurs in a very wide riparian zone surrounding by relatively mesic sagebrush-steppe communities. It appeared that cattle disperse widely throughout the valley bottom, as compared to Road Creek where the

cattle were concentrated in the narrow riparian corridor. The long-term affects of livestock grazing on these populations is unknown, however, research on another rare Astragalus (Sugden 1985) found that livestock grazing may have considerable long-term effects on population viability. Undoubtedly, these practices have been taking place for may years.

Road building is another threat to park milkvetch populations. Several roads have undoubtedly impacted populations in the past, but the full extent of this is unknown because the habitat is already destroyed. Road building represents a direct threat to a population, in contrast to cattle grazing with its more subtle, indirect effects.

Management implications: (From Moseley 1991) The direct impacts of road building, or other similar types of habitat destruction, can easily be prevented by conducting ground clearances for park milkvetch during the early planning stages of the project. If cattle grazing is having an impact on population viability, the effects would be more subtle and is observable only over the long-term. Selected populations of park milkvetch should be monitored to determine population trends and assess long-term viability as part allotment management planning.

***Botrychium minganense* Victorin**

CURRENT STATUS
BLM - Sensitive
USFS R4 -None (listed Sensitive for R1 and R6)
USFWS - None
Idaho Native Plant Society - Sensitive
CDC Rank - G4 S3

TAXONOMY

Family: Ophioglossaceae (Grape fern)

Common Name: Mingan moonwort

Citation: Wagner and Lord 1956

Technical Description: (From Achuff 1992) Stems form a short erect rhizome, producing one frond per season; fronds mostly 6-18 (30) cm long; sterile and fertile portions erect and equal in the hairless bud; fertile portion 1.5-10 cm long, paniculate; sterile poertion 1.5-10 cm long on a short, less than or equal to 5 mm long stalk, oblong, 0.5-2.5 cm wide, truncate at the base and rounded at the apex, with (2) 3-6 (7) pairs of pinnae; pinnae 4-7 mm wide, subflabellate, cupped or spatulate rather than flat, the margins entire but frequently shallowly incinsed, not overlapping or touching (adapted form Cody and Britton 1989, Kuijt 1982, Lellinger 1985, Taylor 1973, Wagner and Lord 1956).

Nontechnical Description: (From Achuff 1992) Botrychium mingnanense is a small, herbaceous, somewhat fleshy perennial fern usually 2.5-7 inches tall although occasionally up to 12 inches tall. The plants consist of a single stem, 1.5-4 inches tall, that bear two "leaves," one sterile and one fertile. The sterile portion is attached to the main stem by a short (up to 0.2 inch) stalk and is divided into numerous, wedge-shaped segments (pinnae) that do not overlap or touch. The pinnae are 0.2-0.3 inches wide, commonly cupped or spoon-shaped rather than flat and frequently have shallowly incised edges. The fertile portion is 0.5-6 inches long, paniculate, and bears rounded sporangia along the margins.

Distinguishing Features and Similar Species : (From Achuff 1992) Botrychium minganense can be confused with the more common Botrychium lunaria. But in Botrychium minganense the pinnae are 4-7 mm wide, broadly cuneate and not overlapping or touching versus, in B. lunaria, the pinnae are 10-12 mm wide, fan-shaped to semicircular and overlapping or nearly so.

DISTRIBUTION

Range: Botrychium minganense occurs widely in North America from Labrador to British Columbia and Alaska, and south to New York, Michigan, Wisconson, North Dakota, Montana, Idaho, Utah, Nevada, Oregon, and California (Cody and Britton 1989, Lellinger 1985).

In Idaho B. minganense is known from over 50 occurrences in the northern part of the state and single disjunct population over 200 miles away in Lemhi County.

Habitat and Associated Species : Botrychium minganense is reported from a wide variety of habitats in North America ranging from low elevation meadows, riverbanks, sand dunes and woods to high elevation alpine meadows (Cody and Britton 1989, Lellinger 1985).

The population in east-central Idaho is on sloping (40%) subirrigated alpine turf of Carex nova, Dryas octopetala, and Salix nivalis. Organic soil is present for the top few cm over quartzite gravel and bedrock. Associated species include Potentilla diversifolia diversifolia, Trifolium haydenii, Lloydia serotina, Festuca ovina, Erigeron humilis, Poa alpina, and Solidago multiradiata.

MANAGEMENT

Threats: No threats to the population in east-central Idaho are known.

Management implications: Current management of the area as a Research Natural Areas is compatible with the long-term existence of the single population in the east-central valleys.

***Carex buxbaumii* Wahl.**

CURRENT STATUS
BLM - None
USFS R4 - None (R1 Sensitive)
USFWS - None
Idaho Native Plant Society - Sensitive
CDC Rank - G5 S3

TAXONOMY

Family: Cyperaceae (Sedge)

Common Name: Buxbaum's sedge

Citation: Svenska Vet.-Akad. Handl. 24:163. 1803.

Technical Description : (From Cronquist 1977a) Culms arising singly or few together from well-developed creeping rhizomes, mostly 3-10 dm tall, strongly aphyllopodic, not surrounded by old sheaths from previous years; leaves glabrous, elongate, mostly 2-4 mm wide; spikes mostly 2-5, approximate or somewhat remote,

erect or closely ascending, sessile or (especially the lower) with more or less well-developed peduncle, the terminal spike gynaecandrous, 1-3 cm long, the lateral ones pistillate, about the same length or somewhat shorter; bract subtending the lowest spike sheathless or nearly so, from distinctly shorter to somewhat longer than the inflorescence; pistillate scales lanceolate to lance-ovate, brown to purplish black with a usually paler midrib, surpassing the perigynia, tapering to an awn-tip 0.5-3 mm long; perigynia 2.7-4.3 mm long, beakless or very shortly beaked, rather narrowly elliptic to sometimes elliptic-obovate or elliptic-ovate, up to barely over half as wide as long, firm-walled, not strongly flattened, light gray-green, densely papillate all over, with prominent marginal nerves and 6-8 inconspicuous or obscure nerves on each face; stigmas 3; achene trigonous, 1.4-1.9 mm long, somewhat narrower and much shorter that the perigynial cavity.

Nontechnical Description: Stems arising singly or few together from well-developed creeping rhizomes, mostly 1-3 feet in height, lowest leaves strongly reduced to scales; new stems are not surrounded by old sheaths from previous years (though old sheaths can be found separately from the new stems). Leaves are smooth and 2-4 mm in width. Spikes mostly 2-5, borne erect or closely ascending, and loosely sessile on the stem. Terminal spike, pistillate flowers are borne above the staminate flowers; the lateral spikes are entirely pistillate. Bract which subtends the spike is sheathless, and will sometimes exceed the inflorescence (Caicco 1988).

Distinguishing Features and Similar Species: Buxbaum's sedge is a well-marked and distinct species. The light-gray green, densely-papillate perigynia give the inflorescence a distinctive coloration that makes field inventory for flowering stems rather easy. The plants retain this distinctive aspect until the perigynia cure to a pale straw color, which makes them more difficult to spot at a distance. The awned-tipped scales are also quite distinguishing.

DISTRIBUTION

Range: Buxbaum's sedge is distributed throughout the boreal regions of the Northern Hemisphere; although it is widespread, it is relatively uncommon and infrequently collected. In the western United States it reaches as far south as Colorado, Utah, and central California, but is not recorded for Nevada. In Washington, it is known only from seven recent sightings in widely scattered locations. The Northern Region Forest Service Ecosystem Classification Handbook (USDA Forest Service 1987) lists it as occurring within the Northern Region in Montana, Idaho, and North Dakota.

In east-central Idaho Carex buxbaumii is known from one population at The Pines in the upper Pahsimeroi Valley.

Habitat and Associated Species: Throughout its range Buxbaum's sedge can be found in peat bogs, marshes, wet meadows, and other wet places (Cronquist 1977a). In east-central Idaho it occurs in an area that is saturated to surface by multiple springs which emerge along the toe slope of alkaline bench. Associated species include Carex simulata, Potentilla fruticosa, Triglochin maritima, and Eriophorum polystachion.

MANAGEMENT

Threats: The population in east-central Idaho occur in an area that is too unstable for direct ground disturbing activities. Impacts to hydrology due to water developments at springs or other causes including compaction are a potential threat.

Management implications: The areas where this species occurs in east-central Idaho is mostly privately owned high priority fens. Opportunities at the fen to work with private landowners or public agencies which

preserve wetland functions should be pursued. Efforts should focus on livestock management and elimination of ground disturbing activities in areas that are hydrologically connected to known populations of this and other rare plant species.

***Carex livida* (Wahl.) Willd.**

CURRENT STATUS
BLM - Sensitive
USFS R4 - None
USFWS - None
Idaho Native Plant Society - Priority 1
CDC Rank - G5 S2

TAXONOMY

Family: Cyperaceae (Sedge)

Common Name: Pale sedge

Citation: Sp. Pl. 4:285. 1805.

Technical Description: (Cronquist 1977a) Stems arising singly or few together from slender, creeping rhizomes, 1-4 dm tall, phyllopodic and with some old basal sheaths persistent; leaves mainly basal, firm, narrow, often channeled, 1-3.5 mm wide; terminal spike staminate, 1-2.5 cm long; lateral spikes 1-3, approximate or somewhat remote, slender, pistillate, 1-2.5 cm long, 5- to 15-flowered, erect, the short peduncle not much if at all exceeding the sheath; bract subtending the lowest spike with a fairly well-developed sheath mostly 5-15 mm long and a narrow setaceous but green blade seldom as much as 7 cm long; pistillate scales equaling or somewhat shorter than the perigynia, with a broad, pale green midstripe which seldom reaches the usually rather blunt tip, and with broad, hyaline-scarious, brown or dark brown margins; perigynia elliptic or rather narrowly rhombic, short-stipitate, less than twice as long as wide, tapering to the beakless or very shortly (to 0.2 mm) beaked tip, 3.5-4.5 mm long, distended by the achene but empty distally, scarcely compressed, light green, densely papillate-glaucous, with 2 marginal nerves, otherwise obscurely few-nerved or nerveless; stigmas 3; achene trigonous 2.2-2.5 mm long, jointed to the style.

Nontechnical Description: Stems arising singly or few together from slender, creeping rhizomes, mostly 1-4 dm in height, with well-developed lower leaves; some new stems may be surrounded by basal sheaths from previous years. Leaves are mainly basal, firm and narrow, channeled, and from 1-3.5 mm in width. Terminal spike has only staminate flowers and is 1-2.5 cm in length; 1-3 lateral spikes are slender and bear 5-15 pistillate (only) flowers. Bract which subtends the lowest spike is narrow and bristle-like, but is green and may be up to 7 cm in length; it also has a well-developed sheath 5-15 mm.

Distinguishing Features and Similar Species: Pale sedge is quite distinctive with its relatively short, basal leaves that are pale-green in color, falcate in shape, and stiff and channeled. It is somewhat similar to the taller, more robust Carex aquatilis. Water sedge, however, has larger, more lax leaves that are folded but do not have a prominent, stiff central groove. The inflorescence is also considerably larger.

DISTRIBUTION

Range: Pale sedge is distributed interruptedly throughout the boreal regions of the Northern Hemisphere. In the western part of the North American continent, it reaches south along the coast to Oregon and California.

In the northern Rocky Mountains, it is known from Idaho, Montana, and Wyoming. It is known from four widely disjunct areas in Idaho: 1) the Priest Lake area of Bonner County; 2) Sawtooth Valley - Stanley Basin area of Custer and Blaine counties; 3) upper Lemhi River in Lemhi County; and 4) Yellowstone NP and East Shore Henrys Lake in Fremont County and Woods Creek Fen, Teton County.

Habitat and Associated Species: Pale sedge occurs in somewhat diverse peatland habitats. Most frequently it occurs on organic peat soils but may occur on mineral substrates associated with calcareous springs. Carex lasiocarpa and Carex buxbaumii are frequent associates.

MANAGEMENT

Threats: The population in east-central Idaho occurs in an area that is too unstable for direct ground disturbing activities. Impacts to hydrology due to water developments at springs or other causes including compaction are a potential threat.

Management implications: The area where this species occurs in east-central Idaho is a mostly privately owned high priority fen. Opportunities at the fen to work with private landowners or public agencies which preserve wetland functions should be pursued. Efforts should focus on livestock management and elimination of ground disturbing activities in areas that are hydrologically connected to known populations of this and other rare plant species.

***Carex parryana* Dewey ssp. *idahoa* (Bailey) Murray**

CURRENT STATUS
BLM - Sensitive
USFS R4 - None
USFWS - None
Idaho Native Plant Society - Global Priority 2
CDC Rank - G4T2 S1

TAXONOMY

Family: Cyperaceae (Sedge)

Common Name: Idaho sedge

Citation: Brittonia 21:73.

Technical Description: (From Hermann 1970) Loosely cespitose from prolonged, scaly, horizontal rootstocks; culms 2-3.5 dm high, much exceeding the leaves, somewhat fibrillose and reddish-brown tinged at the base, the dried leaves of the previous year conspicuous; leaves 5-10, clustered near the base, the thin blades flat but with more-or-less revolute margins, 2-4 mm wide, long-attenuate, the ventrally very thin hyaline sheaths concave at the mouth, the ligule about as wide as long; spikes usually 3, often all pistillate, linear oblong to cylindric, erect on short, stiff and scabrous peduncles, approximate, forming a narrow head 3.5-5 cm long, the terminal spike 2-3 cm long, 6-8 mm wide, the lateral 1-2 cm long, 4-6 mm wide, the numerous perygynia appressed ascending; bracts sheathless, usually not over 1 cm long and much shorter than the spikes; pistillate scales ovate to ovate lanceolate, long-acute to acuminate, brown with a conspicuous lighter center and very narrow hyaline margins, wider and 2-3 times as long as the perigynia; peryginia obovoid, obtusely trigonous, somewhat flattened on one side, 3 mm long, 1.5 mm wide, glabrous, puncticulate, two-ribbed but otherwise nerveless or essentially so, substipitate, yellowish-green, rounded and

abruptly short-beaked at the apex, the beak brownish-red, 0.5 mm long, emarginate or shallowly bidentate; achenes obovoid, 2 X 1.25 mm, trigonous with concave sides, sessile, granular, and abuptly apiculate.

Nontechnical Description: (From Lesica 1998) Idaho sedge forms small clumps that arise from short rhizomes. The stems are 20-35 cm (8-14 in) high with most leaves crowded near the base. Leaves are flat and 2-4 mm wide. Flowers are clustered in 3 (usually) oblong-cylindrical spikes, 1-3 cm (0.5-1 in) long, with the uppermost larger than the others. Male flowers are absent or scattered among the female flowers (peryginia) on the largest spike. Spikes form a narrow, interrupted head, subtended by small leaf-like bracts, at the top of the stems. The narrowly oval scales are brown with membranous margins and a distinct pale center. Glabrous, egg-shaped peryginia are yellow-green and ca 3 mm long with a short beak. There are 3 stigmas and the seed is 3-sided.

Distinguishing Features and Similar Species : (From Lesica 1998) The large oblong terminal spike and the long female scales that are at least twice as long as the perigynia, giving the spikes a ragged appearance, are distinctive and separate this plant form other varieties of C. parryana. Subspecies parryana has a cylindrical terminal speik, lateral spikes nearly as long as the terminal, and pistillate scales ca as long as the peryginia. Subspecies hallii has pistillate scales as long or only slightly longer than the peryginia.

Carex norvegica has smaller (6-14 mm long) terminal spikes. Carex buxbaumii has broader lateral spikes (6-10 mm wide) and occurs on organic soils.

DISTRIBUTION

Range: Carex parryana ssp. idaho occurs in the high valleys of southwest Montana and adjacent southeast Idaho. It has been collected in the Beaverhead, Gallatin, Madison, Powell and Silver Bow counties, Montana and Caribou, Bannock, Clark, and Lemhi counties, Idaho (CDC data base 1998, Lesica 1998)

Habitat and Associated Species : Carex parryana ssp. idahoa most frequently occurs in areas transitional between riparian shrublands and meadows and sagebrush steppe. Communities may be dominated by Carex praegracilis, Juncus baliticus, Potentilla fruticosa and Artemisia cana. Other associated specis may include Carex parryana parryana, C. nebrascensis, Deschampsia cespitosa, Hordeum brachyantherum, Aster occidentalis, and Potentilla gracilis.

MANAGEMENT

Threats: Most of the Idaho populations of Carex parryana ssp. idahoa are within active grazing allotments. Additionally phosphate mining is a threat to the population in Caribou county. In the east-central valleys the population of Carex parryana ssp. idahoa at Birch Creek Fen is within lands managed by Idaho Department of Fish and Game and trespass grazing is the only threat. The other known population is on private land that is currently grazed.

Management implications: Studies monitoring the effects of livestock grazing on Carex parryana ssp. idahoa have not been conducted. However, it is reasonable to assume that the species will decline with heavy grazing (Lesica 1998).

***Epilobium palustre* L.**

CURRENT STATUS BLM - Sensitive
USFS Region 4 - None

USFWS - None
Idaho Native Plant Society - Monitor
CDC Rank - G5 S3

TAXONOMY

Family: Onagraceae (Evening-primrose)

Common Name: Swamp willow-weed

Citation: Sp. Pl. 348. 1753.

Technical Description: (From Hitchcock 1961b) Simple to branched perennial 1-4 (8) dm tall, from slender rhizomes which often end in small turions, finely canescent-strigillose throughout or only sparsely so below; leaves mainly opposite, sessile or subsessile, entire to slightly denticulate, obtuse, linear to lanceolate or narrowly oblong, (1) 2-6 cm long, mostly 4 (8) mm broad; inflorescence loosely racemose to paniculate; pedicels slender, 1-4 cm long; free hypanthium 1-1.5 mm long, the sepals about twice as long; petals white to pinkish, notched, 3-5 mm long; styles shorter than the petals; stigma about 1 mm long, 4-lobed, but the lobes usually completely coalescent; capsule linear, 3-6 cm long, usually canescent; seeds minutely papillate, the coma white to tawny.

Nontechnical Description: Swamp willow-weed has an erect, simple to few-branched stem that is approximately 1 to 1.5 feet tall. Turions (small white bulbs) are present at the lower stem/upper root interface. The flowers are small, generally light pink to white, and are borne on the end of the branches and stem. The leaves are narrow and somewhat revolute (margins rolled downward). The entire plant has a pale appearance due to a fine covering of small, straight, appressed hairs all pointing in the same direction.

Distinguishing Features and Similar Species: Swamp willow-weed is readily distinguished from other willow-weeds occurring in wetlands of the study area by its grayish-strigillose appearance in combination with the presence of turions.

DISTRIBUTION

Range: Swamp willow-weed is distributed from Alaska to the Cascades of central Washington, east to the Atlantic coast and south in the Rockies to Colorado. In the Northern Region of the Forest Service, the Ecosystem Classification Handbook (USDA Forest Service 1987) lists it as occurring in Idaho, Montana, and South Dakota.

In the survey area swamp willow weed is known from Bowery Hot Springs, Whiskey Springs at Chilly Slough, and lower Birch Creek.

Habitat and Associated Species: All populations occur in open wetland communities with a saturated organic substrate. Associated species include Carex nebrascensis, C. aquatilis, C. simulata, C. rostrata, C. canescens, Eleocharis rostellata, Salix pseudomonticola, and Epilobium watsonii.

MANAGEMENT

Threats: No threats were readily apparent to populations in the east-central valleys.

Management Implications: Current management of the population at Whiskey Springs is compatible with long-term viability. Populations at Lower Birch Creek and Bowery Hot Springs are currently unprotected and opportunities to work with private landowners and/or managing agencies to prevent ground disturbing activities should be pursued.

***Epipactis gigantea* Dougl. Ex Hook.**

CURRENT STATUS
BLM - Sensitive
USFS R4 - None
USFWS - None
Idaho Native Plant Society - Monitor
CDC Rank - G4 S3

TAXONOMY

Family: Orchidaceae

Common Name: Giant helleborine

Citation: Fl. Bor. Am. 2:202, pl. 202. 1839.

Technical Description: (From Hitchcock et al. 1969a) Stems 1 to many from short rhizomes, mostly 3-7 (up to 12) dm tall leaves numerous, sheathing, the lowest blades almost lacking, gradually enlarged upwards, almost glabrous to scabridulous-puberulent, bradly elliptic-lanceolate, mostly 7-14 (19) cm mong and 1.5-5 (7) cm brad; flowers 3-15 rather showy, raceme usually secund, bracts usually reduced upwards, but even the uppermost one usually exceeding the ovary; sepals coppery-green, lightly brownish-veined, 2-16 mm long; petals similar to the sepals but thinner, and (at least venation) more brownish-purple; lip 15-20 mm long, the sac with prominent, raised purplish lines leading to the base, three lobed, outer (basal) lobes prominent, porrect, the blade (central lobe) about as long as the basal lobes, curved downward somewhat, triangular-ovate, tip flattened but with uprolled margins, greenish-yellow, the margins thickened and erect, with numerous callosities leading into the sac; column 6-9 mm long; anther 4-5 mm long; capsule reflexed, 2-3.5 cm long.

Nontechnical Description: Giant helleborine is a tall orchid with leafy stems, which reach 3 feet in height. Abundant sword-shaped leaves, up to 8 inches long, clasp the tall, usually unbranched stems. Numerous flowers are borne in a leafy-bracted inflorescence at the tops of the stems. Flowers have a sac-like lip petal that is reddish-brown. The two upper lance-shaped petals are also reddish-brown, but with a greenish tinge. Three lance-shaped sepals subtend the flowers and are light green with a brownish tinge. Epipactis gigantea is a perennial plant that grows from a rhizome each year (Schassberger 1988).

Distinguishing Features and Similar Species: Epipactis gigantea is distinguished by its tall leafy stems and numerous-flowered racemes. The reddish-green flowers blend in with background vegetation and are not easily noticed. Except for Epipactis helleborine, no other species resembles E. gigantea. E. helleborine has escaped from cultivation in Montana. It is unknown if this has occurred in Idaho. E. helleborine is distinguished from E. gigantea by its smaller flowers and a smaller unlobed lip (Schassberger 1988).

DISTRIBUTION

Range: Epipactis gigantea is widely distributed from British Columbia south to Baja California, east to the

Rocky Mountains and south to Mexico.

Habitat and Associated Species: Epipactis gigantea occurs in moist areas along streambanks, lake margins, seeps and springs especially near thermal waters. Associated species include Carex flava, Panicum occidentale, Juncus ensifolius, Eleocharis rostellata, Scirpus sp., Smilacina stellata, Epilobium angustifolium, and Mimulus guttatus.

MANAGEMENT

Threats: In Idaho, habitat at almost all known sites has been altered and several populations are known to be extirpated or at critically low numbers. Hot springs development has been the main source of habitat loss.

Management Implications: Monitoring of recreational impacts should occur so appropriate management can be prescribed.

***Erigeron humilis* Graham**

CURRENT STATUS
BLM - None
USFS R4 - None
USFWS - None
Idaho Native Plant Society - Monitor
CDC Rank - G4 S2

TAXONOMY

Family: Asteraceae (Aster)

Common Name: Low fleabane

Citation: New Phil. Journ. 1828: 175

Technical Description: (From Hitchcock 1955) Perennial, 2-25 cm high, loosely villous, or the leaves glabrate; basal leaves mostly oblanceolate, up to 8 cm long and 11 cm wide; cauline leaves reduced, linear or lance-linear, acute to attenuate; heads soilitary, the disk 10-20 mm wide; involucre 6-9 mm high, woolly villous, the hairs with dark purple or blackish crosswalls; involcral bracts mostly subequal, generally heavily tinted with blackish purple; rays mostly 50-150, white to purplish, usually 3.5-6 mm long and 0.5-1 mm wide; disk corollas 3.4-4.8 mm long; pappus obscurely double, the inner of 20-30 bristles.

Nontechnical Description: Perennial herb usually much less than 10 cm in height, with oblanceolate basal leaves and cauline leaves reduced upward to the single flower head.

Distinguishing Features and Similar Species: This is a distinct Erigeron and should not be confused with any other species.

DISTRIBUTION

Range: Circumpolar, south to northwest Montana; in Idaho known only from the Lost River and Lemhi ranges and the Pioneer Mountains (Caicco and Henderson 1981).

Habitat and Associated Species: Occurs in moist to wet meadows and ledges at high elevations. Associated species include Deschampsia cespitosa, Poa alpina, Carex nova, Carex elynoides, Erigeron simplex, Geum rossii, and Salix nivalis.

MANAGEMENT

Threats: No threats are known to the Idaho populations.

Management implications: The remoteness of habitat for this species makes special management practices unnecessary.

***Gentianella propinqua* Gillett**

CURRENT STATUS
BLM - None
USFS R4 - None
USFWS - None
Idaho Native Plant Society - Monitor
CDC Rank - G5 S1

TAXONOMY

Family: Gentianaceae (Gentian)

Common Name: Four-parted gentian

Citation: Ann. Mo. Bot. Gard. 44:236 1957.

Technical Description: (From Hitchcock 1959) Annual, glabrous throughout or the upper leaves and calyx lobes very minutely scabrous-ciliolate; stems angled, freely branching to simple, usually with many smaller branches and very much reduced flowers from near the base; basal leaves oblanceolate, 5-20 mm long; cauline leaves rather numerous, ovate-lanceolate, usually cordate-based, 1-4 cm long; flowers loosely cymose, 4-merous, closely to distantly subtended by foliaceous bractlets, upper flowers 15-22 mm long, lower ones often less than half that size; calyx 1/3-1/2 the length of the corolla, not membranous-lined within, usually lobed over half the length, the lobes unequal, lanceolate-acuminate; corolla light purple, salverform but quickly closing, the lobes ovate, decidedly acuminate, sinuses not at all plicate; stamens about equaling, and attached above midlength of the corolla tube, the adnate portion very slightly winged below, flattened; anthers oblong, 1-1.5 mm long, bluish purple; ovary nearly sessile; style very short; stigmatic lobes flattened, oblong-rounded; capsule about equaling the corolla; seeds ovoid, pale yellow, nearly smooth, about 0.7 mm long.

Nontechnical Description: Information not compiled.

Distinguishing Features and Similar Species: Gentinella propinqua has been confused with other species in the genus including G. prostrata and G. affinis. The toothed corolla lobes of G. prostrata contrast with those of G. propinqua. G. affinis is a perennial species and the corolla is frequently greater than 2 cm long and may approach 4-4.5 cm long.

DISTRIBUTION

Range: Alaska south in the Rocky Mountains to British Columbia, Idaho, and Montana. In Idaho occurs in

Custer and Fremont counties.

Habitat and Associated Species: Occurs in high elevation meadows including those dominated by alpine turf and along streambanks. Soils are usually moist until late in the summer due to snow melt. Associated species include Carex rupestris, Carex elynoides, Poa alpina, Erigeron simplex, Gentiana prostrata, and Lloydia serotina.

MANAGEMENT

Threats: No threats are currently known.

Management implications: The remoteness of habitat for this species makes special management practices unnecessary.

***Gentianella tenella* Rottb.**

CURRENT STATUS
BLM - None
USFS R4 - None
USFWS - None
Idaho Native Plant Society - State Priority 2
CDC Rank - G4G5 S2

TAXONOMY

Family: Gentianacea (Gentian)

Common Name: Slender gentian

Citation: Acta Hafn. 10:436. 1770.

Technical Description: (From Hitchcock 1959)Glabrous annual 4-15 cm tall; stems simple to freely branched near the base, very slender, 4-angled; basal leaves usually several, oblanceolate, 3-10 mm long, cauline leaves few, oblanceolate, 5-15 mm long; flowers 8-15 mm long 4(5) merous, single and terminal on long naked peduncles, or few to many from the lower leaves on elongate pedicels as much as 10 cm long; calyx half the length of the corolla or longer, lobes nearly distinct, slightly gibbous-based, the outer 2 broader and shorter than the inner, usually more rugose and with membranous margins; corolla white to bluish purple, tubular, not plicate in the sinuses, lobes about 1/3 the length of the tube, filaments rather broad, not wing-margined below the point of insertion; anthers sagittate-cordate; ovary sessile; style very short, stigmatic lobes oblong; capsule slightly exceeding the corolla, seeds yellow, ovoid, nearly smooth.

Nontechnical Description: Information not compiled.

Distinguishing Features and Similar Species :Other species of Gentian may be found growing in association with Gentialla tenella including Gentianella prostrata, G. amarella, and Gentiana affinis.

DISTRIBUTION

Range: Circumpolar, south in the Rocky Moutains to Colorado and in central Idaho (Custer County).

Habitat and Associated Species :Moist subalpine and alpine meadows and fellfields. Associated species include Poa alpina, Carex elynoides, Carex subnigricans, Juncus balticus, Deschampsia cespitosa, Caltha leptosepala, Lloydia serotina, Pedicularis groenlandica, Salix brachycarpa, and Salix farriae.

MANAGEMENT

Threats:No threats are currently known.

Management implications: The remoteness of habitat for this species makes special management practices unnecessary.

***Juncus hallii* Engelm.**

CURRENT STATUS
BLM - None
USFS R4-None
USFWS - None
BLM-None
Idaho Native Plant Society - Review
CDC Rank - G4G5 S2

TAXONOMY

Family: Juncaceae (Rush)

Common Name: Hall's rush

Citation: Trans. Acad. Sci. St. Louis 2:446. 1866.

Technical Description: (From Cronquist 1977b) Densely tufted perennial; stems numerous, terete, 1-4 dm. tall; basal sheaths bladeless or with a reduced bristle like blade, but one or two leaves a little above the base with an evident, slender, somewhat channeled blade 4-20 cm long; inflorescence either evidently terminal or seemingly lateral near the summit, the lowest involucral bract sometimes but not always more or less erect and like a continuation of the stem, up to ca 5 cm long; flowers mostly 2 to 7 fairly closely clustered, generally at least some of them evidently short-pedicellate, each closely subtended by two hyaline or subchartaceous bracts; tepals subequal or the outer a little longer, 4-5 (5.5) mm long, lanceolate, acute or acuminate, mostly brownish or castaneous and hyaline-margined; stamens 6, the anthers scarcely 1 mm long or a bit more, the whitish membranous appendage at each end about half as long as the body.

Nontechnical Description: Densely tufted perennials; stems slender, terete, 20-40 cm tall; roots fibrous. Leaves basal and and on the lower fifth of the stem; the lowest sheaths brownish, bladeless or with a bristlelike blade; the upper with terete blades, channeled toward the base, 5-15 cm long and less than 1 mm wide. Involucral bract scarious and caudate to awned or elongate and leaflike with the scarious margins projecting into auricles, scarcely exceeding the inflorescence. Inflorescence closely cymose, congested, 1.7 cm long; flowers 2-7; pedicels 1-8 mm long. Flowers subtended by a pair of ovate to orbicular prophylls. Perianth segments lanceolate, acute, usually with greenish centers and purple, hyaline margins, the outer segments slightly longer than the inner. Stamens 6, anthers about equalling the filaments. Capsules oblong linear, finely striate, long caudate at each end, medium brown about 1 mm long (Hurd et al. 1994).

Distinguishing Features and Similar Species : *Juncus parryi* resembles *Juncus hallii* in having few flowered

inflorescences and upper leaves generally with well-developed blades. Capsules of *J. parryi* are acute; seed appendages equal or exceed the body in length. The distribution of *Juncus hallii* is restricted while *J. parryi* is more widespread in mountains in the region (Hurd et al 1994).

DISTRIBUTION

Range: Southwestern Montana to Colorado. Locally common in meadows in the spruce-fir zone of Utah's Tushar and Aquarius Plateaus and Uinta Mountains. Occurs in Owyhee, Lemhi, Clearwater, Bonneville and Fremont counties in Idaho.

Habitat and Associated Species: Dry to wet boggy meadows, ponds, lakes streams and wooded rocky slopes at upper elevations.

MANAGEMENT

Threats: Information not available.

Management Implications: Special attention should be paid to the maintenance of natural processes operating to perpetuate wetlands where Juncus hallii occurs.

***Kobresia simpliciuscula* (Wahl.) Mackenzie**

CURRENT STATUS
BLM - None
USFS R4 - None
USFWS - None
Idaho Native Plant Society - State Priority 2
CDC Rank - G5 S1

TAXONOMY

Family: Cyperaceae (Sedge)

Common Name: Simple kobresia

Citation: Bull. Torrey Bot. Club 50:349. 1923.

Technical Description: Much like Kobresia bellardii, averaging more robust, not infrequently up to 4 or 5 dm tall, and with the leaves up to about 1 mm wide; leaf sheaths of the previous year, or many of them, still bearing conspicuous dried blades at flowering time; spikes several, commonly 3-12, 5 -15 mm long, each subtended by a scarious bract (or the lowest bract more elongate and leaflike), forming an inflorescence 1.5 to 4 cm long and mostly (2) 3-7 mm thick; spikelets in each spike few, the terminal one(s) staminate, the others uniflorous and pistillate, or biflorous and androgynous (Hitchcock 1969b) .

Nontechnical Description: Information not compiled.

Distinguishing Features and Similar Species: Superficially Kobresia looks like a sedge and may be overlooked as it grows with several other graminoids including Carex simulata, Eleocharis pauciflora, and Scirpus rollandii. The open peryginia of Kobresia with unsealed margins differentiates it from others in the genera in the Cyperaceae.

DISTRIBUTION

Range: Circumboreal, extending s. in Am. to Newf., Que., B.C., and irregularly to Colo., Ida., and Oreg. In Idaho known from a historic collection in Teton county and extant populations in Clark, Custer, and Lemhi counties.

Habitat and Associated Species: Bogs, wet meadows, edges of beaver ponds and other wet places in the mountains. In east-central Idaho the species occurs near spring heads where upwelling of water create saturated conditions. Associated species may include Eleocharis pauciflora, Eriophorum polystachion, Carex simulata, Scirpus rollandii, Triglochin palustre, T. maritimum, and Salix candida.

MANAGEMENT

Threats: The populations occur in areas that are too unstable for direct ground disturbing activities. Impacts to hydrology due to water developments at springs or other causes including compaction are a potential threat.

Management implications: All of the areas where this species occur except Mud Creek are considered high priority fens. Opportunities at the fens to work with private landowners or public agencies which preserve wetland functions should be pursued. Efforts should focus on livestock management and elimination of ground disturbing activities in areas that are hydrologically connected to known populations.

***Lomatogonium rotatum* (L.)**

CURRENT STATUS
BLM - Sensitive
USFS R4 - None
USFWS - None
Idaho Native Plant Society - State Priority 1
CDC Rank - G5 S1

TAXONOMY

Family: Gentianaceae (Gentian)

Common Name: Marsh felwort

Citation: Fries ex Nyman, Consp. Fl. Eur. 3:500. 1881

Technical Description: Lomatogonium rotatum has an erect, branched or unbranched stem, 0.3 to 2.5 dm tall, and strongly ascending capillary branches. The leaves are opposite entire, slightly fleshy; the lower ones spatulate and the middle and upper linear-lanceolate, sharp pointed, and 0.4 to 3 cm long. The flowers are borne singly at the tops of branches or the axils of leaves. The sepals number 2-5 and are similar to the median leaves, nearly equalling to much exceeding the corolla. They are conspicuous features both in flower and fruit. The corolla is rotate, porcelain-blue and relatively conspicuous. Each petal is sharp pointed, ranges between 0.5-1.5 cm long, and has at its base pairs of distinctive scale-like, fringed nectar producing appendages. The stamens are borne on the short corolla tube. The stigmatic surface is decurrent along the sides of the narrowly egg shaped ovary. The fruit is an oblong capsule (0.5 to 1.7 cm) somewhat acute, which contains numerous small seeds. This species flowers in Maine from mid-August to late September and early October (Famous 1985).

Nontechnical Description: This species is a small annual or biennial herb with an erect, branched or unbranched stem.

Distinguishing Features and Similar Species: This is a distinctive species that should not be confused with other plants.

DISTRIBUTION

Range: This species has a circumpolar distribution; Hudson Bay to Alaska, south in mountains to Colorado, west to northeastern Asia, northern Europe, Iceland, Greenland, in eastern North America from Labrador to Maine. In the Rocky Mountains known from Idaho and Wyoming to New Mexico.

Habitat and Associated Species: Wet often saline or alkaline soil. Stream edge and saturated wetlands on mostly organic substrates. Associated species include Carex nebrascensis, Carex simulata, Carex utriculata, Deschampsia cespitosa, and Eleocharis pauciflora.

MANAGEMENT

Threats: All of the populations in the east-central valleys are quite large and site quality is assessed as good to excellent at 3 out of 4 of the populations.

Management implications: All of the areas where this species occur are considered high priority fens. Wetland conservation projects are in place at three of the four fens. Opportunities at the fens to work with private landowners or public agencies which preserve wetland functions should continue to be pursued. Efforts should focus on livestock management and elimination ground disturbing activities in areas that are hydrologically connected to known populations.

***Parnassia kotzebuei* Cham.**

CURRENT STATUS
BLM - None
USFS R4 - None
USFWS - None
Idaho Native Plant Society - Monitor
CDC Rank - G4T4 S1

TAXONOMY

Family: Saxifragaceae

Common Name: Kotzebue's Grass-of-Parnassus

Citation: Spreng. Syst. 1:951. 1825.

Technical Description: (From Hitchcock 1961c) Perennial herb with mostly single flowering stems; stems usually bractless, but sometimes with a near basal, ovate to lanceolate, non-clasping bract up to 15 mm long. Petals white, mostly about equaling the calyx lobes (3.5-7.0 mm), elliptic-lanceolate or elliptic ovate. Staminoidia consisting of an oblong scale, much broader than the fertile filaments, with terminal filamentlike segments ending in capitate knobs.

Nontechnical Description: Information not compiled.

Distinguishing Features and Similar Species: Petals 1-3 nerved, not fimbriate-pectinate on lower half, about equal to calyx lobes. Flowering stems usually bractless or with near-basal bract. Staminoidia with segments ending in capitate knobs. Although four species of Parnassia occur in Idaho, they are easily distinguished by close examination. Parnassia fimbriata may occur with P. kotzebuei, but they are not readily confused (Caicco and Henderson 1981).

DISTRIBUTION

Range: Alaska to Alberta and British Columbia with a few localities in Washington, Idaho, Montana, Wyoming, and Nevada; also in northeastern North America, Labrador, and the Gaspe Peninsula to Greenland; Asia. Within Idaho, known from two locations in the Lost River Range and two in the Pioneer Moutains.

Habitat and Associated Species: Moist, rock ledges and crevices in the upper montane zone. Associated species include Polygonum viviparum, Saxifraga oppositifolia, and Poa alpina.

MANAGEMENT

Threats: Due to remoteness of known populations and absence of known mineral potential no threats are likely.

Management implications: The remote nature of the known habitats of Parnassia kotzebuei makes species management practices unnecessary at the present time.

***Primula alcalina* A. Cholewa and D. Henderson**

CURRENT STATUS
BLM - Sensitive
USFS R4 - Sensitive
USFWS - Species of concern
Idaho Native Plant Society - Global priority 1
CDC Rank - G1 S1

TAXONOMY

Family: Primulacea (Primrose)

Common Name: Akali primrose

Citation: Brittonia 36(1): 59-62.

Technical Description: (From Mancuso 1996) Plants farinose only when young, efarinose in age. Scapose perennials with fibrous roots; leaves 1-4 cm long, elliptic-oblanceolate and narrowed gradually to the winged petiole, efarinose to farinose on the abaxial surface when young, the blade margins crenulate or denticulate, sometimes entire; scape 6.5-24 cm high, medium green proximally and darkened distally; inflorescence an umbel, farinose; involucral bracts 4-7 mm long, lanceolate, plane at base, the apex obtuse or acute; flowers distylous, 3-10 on nearly erect, farinose, purplish-green pedicels; calyx campanulate, 4-6.5 mm long,

puberulent and somewhat farinose, sometimes with purplish blotches or striations, lobed 1/3 to 1/2 of its length, apex of the lobes generally acute, gland-tipped; corolla tube 4-7 mm long, lobes 3- 5 mm long and deeply cordate, white with yellow fornices; stamen ca 1.5 mm long, anthers located towards the middle of the corolla tube; stigma capitate, in pin plants located in upper third of corolla tube, positions reciprocal in thrum plants; pollen ca 10 microns in diameter in pin plants, ca 12 microns in diameter in thrum plants, exine microreticulate. Scapose perennials with fibrous roots; leaves 1-4 cm long, elliptic-oblanceolate and narrowed gradually to the winged petiole, efarinose to farinose on the abaxial surface when young, the blade margins crenulate or denticulate, sometimes entire; scape 6.5-24 cm high, medium green proximally and darkened distally; inflorescence an umbel, farinose; involucral bracts 4-7 mm long, lanceolate, plane at base, the apex obtuse or acute; flowers distylous, 3-10 on nearly erect, farinose, purplish-green pedicels; calyx campanulate, 4-6.5 mm long, puberulent and somewhat farinose, sometimes with purplish blotches or striations, lobed 1/3 to 1/2 of its length, apex of the lobes generally acute, gland-tipped; corolla tube 4-7 mm long, lobes 3- 5 mm long and deeply cordate, white with yellow fornices; stamen ca 1.5 mm long, anthers located towards the middle of the corolla tube; stigma capitate, in pin plants located in upper third of corolla tube, positions reciprocal in thrum plants; pollen ca 10 microns in diameter in pin plants, ca 12 microns in diameter in thrum plants, exine microreticulate, 3 syncolpate; fruit a capsule; chromosome number: n=9 (Cholewa and Henderson 1984; Kelso 1987).

Nontechnical Description: Alkali primrose has a naked scape (flowering stem) 2.5 to 10 inches long, subtended by a rosette of numerous, crinkled leaves that are light green. Leaves are about one inch long, with a generally elliptical blade that gradually narrows to a winged petiole. The umbellate inflorescence has 3 to 10 mostly erect flowers, with farinose (mealy, usually whitish covering) calices and white corollas (Mancuso 1996).

Distinguishing Features and Similar Species :Primula alcalina is distinguished by its white corollas, generally (at least when mature) efarinose leaves, and small, distylous flowers (Cholewa and Henderson 1984). Albino flowers can be found in any species of Primula, but Kelso (1987) found that beyond these exceptional specimens, flower color is a very useful taxonomic character at both the sectional and species level. ^Corolla color fading with age can cause identification problems. Flower color is deepest in buds and young flowers and gradually fades as the flower matures. This is particularly noticeable in the violet-flowered species of section Aleuritia (e.g. Primula incana), where older flowers on herbarium specimens can look almost white (Kelso 1987).

The only other lowland, wet-site primrose in the area is Primula incana which is known from the upper East Fork Salmon River drainage. The habitats of the two species are similar, but they are easily distinguished as follows (from Cholewa and Henderson 1984; Kelso 1991):

> Primula incana - Flowers homostylous (anthers at one level in the corolla tube); calyx 5-8 mm long; corolla 5.8-8.2 mm long, lavender; leaves strongly farinose on lower surface, denticulate.
>
> Primula alcalina - Flowers distylous (anthers at two levels in the corolla tube); calyx 4-5.7 mm long; corolla 4.3-6.2 mm long, white; leaves not farinose or farinose only on the lower surface when young, entire or denticulate.

DISTRIBUTION

Range: Primula alcalina is a narrow endemic known only from a series of wet alkaline meadows at the headwaters of four spring-fed creeks in east-central Idaho. These include Summit Creek in Custer County, Texas Creek in Lemhi County, Birch Creek in Clark and Lemhi counties, and Eighteenmile Creek in Lemhi

County. A historical (1936) collection is known from meadows near Monida, Montana, but has never been relocated and is considered extirpated.

Habitat and Associated Species : Primula alcalina occurs in wet, alkaline meadows, at the headwaters of spring-fed creeks in the large, intermontane valleys of east-central Idaho. Soils in the meadows are alluvial, alkaline, fine-textured, light-colored, and derived from outwash from the predominantly carbonate rocks of the Beaverhead, Lemhi, and Lost River ranges. Soil pH was determined during a demographic study of P. alcalina and found to average 8.9-9.6 at study sites (Moseley 1995). It occurs in the lowest topographic positions in the meadows, where the subirrigated soil is saturated to the surface throughout the growing season. Plants occur on low, relatively level benches immediately adjacent to creeks and spring heads, often on the inside of meander loops, and also on low benches with hummocky topography, where they are found only on the tops and sides of the hummocks. While P. alcalina occurs on creek margins, the habitat is relatively stable hydrologically, as the creeks are entirely spring-fed and generally are subject to only minor seasonal or annual fluctuations in flow. Thus, water flows are relatively constant and there is little channel scouring. Elevations of the six populations range from 6,300 to 6,720 feet.

Vegetation on benches and hummocks supporting P. alcalina is dominated by Eleocharis pauciflora, Carex scirpoidea, Carex simulata, Kobresia simpliciuscula, and Juncus balticus. Deschampsia cespitosa and Muhlenbergia richardsonis are other common graminoids. Associated forbs are diverse, but not dominant, and include Dodecatheon pulchellum, Triglochin maritimum, and Thalictrum alpinum. Hummocks are often shared with shrubs, including several Salix species, Betula glandulosa, and Potentilla fruticosa. In several cases, meadows with P. alcalina also contain populations of other plant species rare in Idaho, including Kobresia simpliciuscula, Astragalus diversifolius, A. leptaleus, Lomatogonium rotatum, Salix candida, and S. pseudomonticola (From Mancuso 1996).

MANAGEMENT

Threats: The long-term effects of livestock grazing are unknown. Light to moderate grazing may have no impacts while intense grazing may negatively impact populations. The impacts may include impacts to other aspects of ecosystem composition, structure, and function of both terrestrial and aquatic communities. The impacts need to be assessed in light of the unique wetlands inhabited by P. alcalina (Moseley 1995). At Summit Creek a failed reservoir has eliminated habitat for Primula alcalina and other sensitive species that are known to occur in the area.

Management implications: Primula alcalina is confined to wet alkaline meadows associated with spring-fed, constant-flow streams. It is known from six occurrences five of which are in Idaho. Four of the areas where this species occur are considered high priority fens. Wetland conservation projects are in place at two of the five known locations. Opportunities at the fens to work with private landowners or public agencies which preserve wetland functions should continue to be pursued. Efforts should focus on livestock management and elimination ground disturbing activities in areas that are hydrologically connected to known populations.

***Primula incana* Jones**

CURRENT STATUS
BLM - None
USFS Region 4 - None
USFWS - None
Idaho Native Plant Society - State Priority 1
CDC Rank - G4G5 S1

TAXONOMY

Family: Primulaceae (Primrose)

Common Name: Jones' primrose

Citation: Proceedings of the California Academy of Science 5:706. 1895.

Technical Description: Plants slender and heavily farinose, occasionally efarinose. Scape to 46 cm tall. Leaves elliptic or oblanceolate, including the petioles to 6 cm long, blade 0.3-1.6 cm wide, margins denticulate, blade gradually narrowing into a broadly winged petiole. Involucral bracts oblong, densely covered with white farina, flat above, saccate or gibbous at the base, 0.5-1 cm long. Umbels capitate, (4)7-19-flowered, pedicels 0.3-0.9 cm long. Flowers homostylous. Calyx green, heavily farinose, cylindrical, obscurely ribbed, 0.4-0.7(1) cm long, divided up to one third its length by lanceolate teeth covered with capitate glands. Corolla lavender with yellow throat; limb 0.4-0.8 cm wide, tube equal to or slightly longer than calyx, limb emarginate. Stamens ca 1 mm long, located in upper portion of corolla tube. Pollen 4-syncolpate. Stigma capitate, located adjacent to the anthers. Capsule cylindrical to slightly elliptical, 0.8-1.8 cm long, 0.2-0.3 cm in diameter. Seeds brown, reticulate, ca 0.2 mm long (Kelso 1991).

Nontechnical Description: Tall slender plants with a basal rosette of elliptic leaves, the blade gradually narrowing to a broadly winged petiole. The scape is naked and terminated by a capitate cluster of from 7-19 lavender flowers. The plant is heavily farinose (covered with a meal-like powder), especially in the young leaves and on the calyx and upper stem.

Distinguishing Features and Similar Species: Jones' primrose is a distinctive species with heavily farinose leaves, tall scape, and flat-tipped bracts subtending tight umbels of small, lavender flowers. Elongation of the scape continues throughout anthesis and pedicels lengthen as seeds ripen. Thus, the characteristic tight umbels do not persist beyond anthesis, and individuals in fruiting stage may be many times taller than those in early flowering stage (Kelso 1991).

The only other lowland, wet-site primrose in the area is Primula alcalina, endemic to meadows in the Pahsimeroi, Birch Creek, Little Lost River, and Lemhi valleys. The habitats of the two species are similar, but they are easily distinguished as follows (from Cholewa and Henderson 1984; Kelso 1991):

> Primula incana - Flowers homostylous (anthers at one level in the corolla tube); calyx 5-8 mm long; corolla 5.8-8.2 mm long, lavender; leaves strongly farinose on lower surface, denticulate.
>
> Primula alcalina - Flowers distylous (anthers at two levels in the corolla tube); calyx 4-5.7 mm long; corolla 4.3-6.2 mm long, white; leaves not farinose or farinose only on the lower surface when young, entire or denticulate.

DISTRIBUTION

Range: The distribution of Jones' primrose includes Utah and Colorado, north to Alaska in western North America. It is rare throughout the southern porion of its range in the United States, including, Colorado, Idaho, Montana, Utah, and Wyoming. In Idaho it is known from only two widely disjunct areas: the upper East Fork of the Salmon River, and on private land in the Woods Creek Fen, Teton Basin, Teton County. A population occurs near Monida, Montana, very close to the Idaho border in the Centennial Mountains. It is to

be expected in nearby meadows in Idaho.

Habitat and Associated Species: Throughout its range, Jones' primrose occurs in alkaline clay soil. Such is the case in the study area, where it occurs on bare-soil microsites on the sides of hummocks. Communties may be dominated by Eleocharis rostellata or Deschampsia cespitosa with lesser amounts of Carex praegracilis, Potentilla anserina, Potentilla fruticosa, Juncus balticus, Carex scirpoidea, Erigeron lonchophyllus, and Haplopappus uniflorus.

MANAGEMENT

Threats: The populations along the East Fork Salmon River include two small subpopulations. One population was noted as being grazed.

Management Implications: Both of the populations are small and occur in unique wetland communities. They should be protected from habitat disturbances.

***Salix candida* Fluegge**

CURRENT STATUS
BLM - Sensitive
USFS R4 - None
USFWS - None
BLM-Sensitive
Idaho Native Plant Society - State Priority 2
CDC Rank - G5 S2

TAXONOMY

Family: Salicaceae (Willow)

Common Name: Hoary willow

Citation: Sp. Pl. 4:708. 1806.

Technical Description: (From Cronquist 1964) Freely branched low shrub (0.6) 5-12 (15) dm tall; twigs densely and closely white-tomentose when young, some of the tomentum generally persistent into the second year; stipules usually small and caducous, or larger and more persistent on vigorous young shoots; petioles mostly 5-10 mm long; leaves narrow, mostly oblanceolate to narrowly oblong or less often lanceolate, the better-developed ones mostly 4.5-8.5 (15) cm long and 0.7-1.5 (2.3) cm wide, 3.5-10 times as long as wide, the margins revolute and entire, the lower surface densely and usually permanently white-tomentose with very fine, tangled hairs, the upper surface rugose and glabrate or only thinly tomentose, dark green under the tomentum; aments coetaneous, nearly sessile, but the short peduncle generally with some leafy-textured bracts 5-15 mm long; scales brown, persistent, woolly-villous; staminate catkins (1) 1.5-2.5 cm long, about 1 cm thick or a little less; stamens 2, with purple anthers and glabrous, free filaments; pistillate catkins (2) 3-5 (6) cm long at maturity, the fruits often rather loosely arranged, though the pedicel is very short (up to about 1 mm long); ovaries and capsules tomentose, the capsule 5-7.5 mm long; style and stigmas red or reddish, the style 0.8-1.7 mm long, sometimes divided; stigmas bifid, 0.2-0.5 mm long.

Nontechnical Description: Hoary willow is a low- to medium-sized willow, generally to 4 feet tall. The lower surfaces of the leaves are covered with a dense, white, felt-like tomentum, comprised of fine, tangled hairs.

The catkins are nearly sessile, but may have several, small leafy bracts.

Distinguishing Features and Similar Species : Hoary willow is one of most distinctive willows, due largely to leaf characteristics. In their study area, Brunsfeld and Johnson (1985) report that the thinly tomentose early leaves are evidently glaucous beneath, and so, early in the season these plants somewhat resemble Salix brachycarpa, which is similar in its habitat, stature and floral morphology. Hoary willow, however, has notably longer and narrower leaves.

DISTRIBUTION

Range: Hoary willow is distributed from Labrador to Alaska, south to New Jersey, Iowa, South Dakota, and in the Rocky Mountains to Colorado, Idaho, and southern British Columbia. Hoary willow is known from eighteen, widely scattered populations in Idaho, in Boundary, Bonner, Caribou, Lemhi, Custer, Butte, Teton, and Fremont counties.

Habitat and Associated Species : Throughout its range, hoary willow occurs in bogs and swampy places (Cronquist 1964). In the study area, hoary willow occurs in subirrigated wetland communities that are largely on organic substrates. Common associates include Carex lanuginosa, Carex nebraskensis, Carex simulata, Eleocharis rostellata, Eleocharis palustris, Deschampsia cespitosa, Potentilla fruticosa, and Betula glandulosa.

MANAGEMENT

Threats: The populations occur in areas that are too unstable for direct ground disturbing activities. Impacts to hydrology due to water developments at springs or other causes including compaction are a potential threat.

Management implications: All of the areas where this species occurs are considered high priority fens. Opportunities at the fens to work with private landowners or public agencies which preserve wetland functions should be pursued. Efforts should focus on livestock management and elimination of ground disturbing activities in areas that are hydrologically connected to known populations.

***Salix farriae* Ball**

CURRENT STATUS
BLM - None
USFS R4 - None
USFWS - None
Idaho Native Plant Society - State priority 2
CDC Rank - G4 S1

TAXONOMY

Family: Salicaceae (Willow)

Common Name: Farr willow

Citation: Contr. U.S. Nat. Herb. 22:321. 1921.

Technical Description : (From Hitchcock 1964) Branching shrub (2) 3-10 dm tall; young twigs slightly

puberulent, soon glabrate; leaves relatively small, only slightly hairy at first, but soon glabrous, evidently glaucous beneath; stipules small and soon deciduous, though sometimes green; petioles short, 2-8 mm long; leaf blades entire or minutely and obscurely serrulate, elliptic or elliptic-obovate, the better-developed ones mostly 3-5 (7) cm long and 1-2 (3) cm wide; aments coetaneous to serotinous, on short leafy peduncles; scales brown or blackish; staminate aments slender, 1-2 cm long; stamens 2; filaments glabrous; pistillate aments 1.5-3 cm long at maturity; ovary and capsule glabrous, the capsule 4-6 mm long, on a short pedicel 1 mm long or less; style short but evident, 0.4-0.7 mm long, longer than the short, more or less bilobed stigmas.

Nontechnical Description :Information not compiled.

Distinguishing Features and Similar Species : Salix farriae has a low stature (1 - 2 m), essentially glabrous, entire or inconspicuously toothed leaves that are glaucous beneath. Capsules are glabrous in aments on leafy flowering branches. The twigs of Salix planifolia are less hairy and the lower leaf surfaces are sparsely hairy, capsules are pubescent, and aments are sessile or subsessile. Salix barclayi is usually at least 2 m tall and has toothy leaf margins, longer flowering branchlets and styles and larger anthers. Salix pseudomonticola has sesssile aments and toothed leaf margins. Salix lemmonii has glaucous twigs and hairy capsules (Brunsfield and Johnson 1988).

DISTRIBUTION

Range: Occurs irregularly from Alaska and Yukon to Manitoba, southeast British Columbia, western Montana, western Wyoming, central Idaho and eastern Washington. In Idaho it is known from four occurrences in Custer county.

Habitat and Associated Species : Salix farriae occurs in moist subalpine meadows and shrublands. Associated species may include. Salix brachycarpa, Salix planifolia, Salix wolfii, Pentaphylloides floribunda, Betula glandulosa, Carex aquatilis, Carex utriculata, Deschampsia cespitosa, Juncus balticus and Phleum alpinum,

MANAGEMENT

Threats: Two of the populations support less than ten plants and the viability of the populations is questionable due to low numbers. Human impacts to the populations are minor due to remoteness, though livestock use has occurred at the West Fork Pahsimeroi population.

Management implications: The remoteness of the known habitats of Salix farriae makes species management practices unnecessary at the present time.

***Salix pseudomonticola* Ball**

CURRENT STATUS
BLM - Sensitive
USFS R4 - None
USFWS - None
Idaho Native Plant Society - Priority list 2
CDC Rank - G5? S1

TAXONOMY

Family: Salicaceae (Willow)

Common Name: False mountain willow

Citation: Contr. U.S. Nat. Herb. 22:321. 1921.

Technical Description :Rounded shrub up to 5 (6) m tall; twigs of the season very sparsely to densely spreading hairy, sometimes partly persistent on the dark red to brown second year twigs; mature leaf blades rather thick and leathery, green and generally shiny above, glaucous beneath, margins coarsely to finely toothed; first leaves of the season essentially glabrous above and pubescent beneath with long, straight, silky, deciduous hairs; later leaves red-tinged and pubescent while expanding, the fine appressed hairs dense above; glabrous at maturity, generally except for the puberulent upper midrib; petioles up to 1 cm long, hairy like the stem, or at least puberulent on the upper surface; stipules well developed on most shoots, generally larger than 2mm and up to 1 cm on vigorous shoots; staminate aments 1-3 (4) cm long, expanding before the leaves, sessile; stamens 2; pistillite aments 1-5 (9) cm long, expanding before the leaves, sessile or on short flowering branchlets up to 5 mm long, without, or only occassionally with, small green bracts; capsules glabrous, borne on stipes .5-2.0 (2.5) mm long; styles .5-.9 (1-8) mm long; floral bracts brown to black, sparsely to densely long hairy on both surfaces, persistent (Brunsfeld and Johnson 1985).

Nontechnical Description : Information not available.

Distinguishing Features and Similar Species : Salix lutea strongly resembles this species but differs in having glabrous twigs becoming pale gray with age, smaller stipules, expanding leaves not red-tinged, pistillite aments on short leafy flowering branchlets, longer stipes, shorter styles, and in growing on warmer better drained sites. Salix barclayi differs in having smaller stipules, aments on long leafy flowering branchlets, longer styles (on the average) and in occurring in different, generally higher elevation habitat. Salix bebbiana has red-tinged expanding leaves but differs, along with S. scouleriana in having entire, pubescent leaves of a different shape and pubescent capsules (Brunsfield and Johnson 1985).

DISTRIBUTION

Range: Alaska east to western Quebec, south to Idaho, northern Wyoming, South Dakota and Ontario. In Idaho it is known from Clark, Custer, Lemhi and Fremont Counties.

Habitat and Associated Species : Moist to wet bottomlands between 6300 and 6700 feet in broad sagebrush covered valleys. In wet habitats associated species include Salix planifolia, S. candida, and Potentilla fruticosa where most plants occur on raised hummocks and attain a height of 1-2 m. On drier sites Salix pseudimonticola is generally more abundant where it associates with S. geyeriana, S. bebbiana, and S. boothii and reaches a height of 4-5 m.

MANAGEMENT

Threats: Salix pseudomonticola is known from five somewhat small populations in east-central Idaho. All of the populations have been grazed in the past and three of the five populations continue to be grazed.

Management Implications: All of the areas where this species occur except Eighteenmile Creek are considered high priority fens. Opportunities at the fens to continue or initiate work with private landowners or public agencies which preserve wetland functions should be pursued. Efforts should focus on livestock management and elimination of ground disturbing activities in areas that are hydrologically connected to known populations.

***Scirpus rollandii* Fern.**

CURRENT STATUS BLM - None
USFS R4 - None
USFWS - None
Idaho Native Plant Society - Global Priority 3
CDC Rank - G3Q S1

TAXONOMY

Family: Cyperaceae (Sedge)

Common Name: Rolland's bulrush

Citation: Information not available

Note: 1998 unpublished Kartesz data treats Scirpus rollandii as a synonym of Trichophorum pumilum. It is treated as a variety or subspecies of Scirpus pumilus, or simply as the species S. pumilus, in most North American literature; recognized as a distinct species by Kartesz (1994 checklist). S. pumilus is otherwise Eurasian.

Technical Description: Perennial 3-17 cm; rhizome long, stems erect, tufted, generally less than 1.5 mm wide, subcylindric, more or less grooved, leaves more or less basal; sheaths short, not prominent; blades much greater than the sheaths, more or less flat, thick and glabrous; spikelet 1, 3-5 mm, 1-3 mm wide, 3-6 flowered; bract 1, 1.5-3 mm, erect, stiff, more or less stem like, tip abruptly pointed; lower bract 2-3 mm, glabrous, orange-brown, midrib thick, margin transluscent, tip rounded to abruptly pointed; perianth bristles 0; stigmas 3, fruit 1.5-2 mm, compressed, 2-3 angled, smooth (Hickman 1993).

Nontechnical Description: Information not compiled.

Distinguishing Features and Similar Species: Eleocharis species have achenes with a cap-like top (the enlarged base of the style) a feature absent in Scirpus.

DISTRIBUTION

Range: Circumboreal; disjunct in Wyoming, Idaho, Colorado, Montana, and California.

Habitat and Associated Species: Calcareous fens on permanently saturated soils. Often on low islands or hummocks in pools of standing water. Associated species include Carex simulata, Eleocharis pauciflora, Triglochin maritima, Deschampsia cespitosa, Thalictrum alpinum, and the rare species Primula alcalina, Kobresia simpliciuscula, and Salix candida.

MANAGEMENT

Threats: The populations occur in areas that are too unstable for direct ground disturbing activities. Impacts to hydrology due to water developments at springs or other causes including compaction are a potential threat.

Management implications: The two areas where this species occur, Birch Creek Fen and Summit Creek, are

considered high priority fens. Opportunities at the fens to work with private landowners or public agencies which preserve wetland functions should continue to be pursued. Efforts should focus on livestock management and elimination ground disturbing activities in areas that are hydrologically connected to known populations.

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Appendix F.

Taxonomy, range, status and management of rare animal species in east-central Idaho (from Groves et al. 1997).

Haliaeetus leucocephalus

Falco peregrinus anatum

Numenius americanus

Quiscalus quiscula

Bufo boreas

Rana luteiventris

(Summaries are not included in CDC Homepage Version)