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by

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**Jeffrey J. Yeo**
**PO Box 299**
**Challis, Idaho 83226**

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## Introduction

Chilly Slough Wetland Conservation Area (CSWCA) protects a palustrine, persistent emergent wetland (Cowardin et al. 1979) originating from springs throughout the Thousand Springs valley. The Idaho Conservation Data Center (Idaho CDC) defines the area as the Thousand Springs desert aquatic ecosystem and ranks the wetland as critically imperiled statewide (S1) as well as globally (Idaho Conservation Data Center 1995). CSWCA also contains upland shrub-steppe communities. Chilly Slough supports at least 5 rare plant species (Jankovsky-Jones 1999), and a rich variety of birds (including wading birds, waterfowl, raptors, and passerine birds [Yeo 1999]), mammals, 2 species of trout, and 1 amphibian species (Columbia spotted frog, *Rana luteiventris* [Yeo and Peterson 1998]). Much of the CSWCA was grazed historically with abandoned homesteads scattered throughout the wetland. Fences excluding livestock have been effective only in recent years. Therefore, the composition of some community types may be altered or changing, and hence identification may be equivocal or boundaries may not be distinct.

In 1993, the Bureau of Land Management (BLM) Challis Field Office began identification of plant communities in the CSWCA using aerial color photographs and assigning a summer technician to "ground-truth" community identities. Colored mylar overlays delineating plant community boundaries resulted from this initial effort. The following year, The Nature Conservancy contracted a wetland ecologist (Bursik 1994) to identify the plant communities of the Thousand Springs/Chilly Slough wetland complex. Bursik (1994) spent one day in the wetland and identified the following five wetland plant communities:

- Baltic rush (scientific names are listed in Table 1) sloped hummocky marsh
- Tufted hairgrass – short-beaked sedge – spike reedgrass sloped hummocky marsh
- Sedge-rich fen
- Common cattail emergent marsh
- Aquatic stream community

In 1997, the Idaho CDC (Jankovsky-Jones and Mancuso 1997) spent two days in the Chilly Slough wetlands and identified the following 12 wetland communities:

- Common cattail
- Softstem bulrush
- Bladder sedge
- Water sedge
- Nebraska sedge
- Short-beaked sedge
- Baltic rush
- Tufted hairgrass
- Mat muhly
- Alkali cordgrass
- Alkali (Sandberg) bluegrass
- Greasewood/basin wildrye

Vegetation classification for non-forested wetlands and uplands of Idaho and Montana for the Upper Columbia assessment (Quigley and Arbelbide 1997) identifies the following as applicable to CSWCA:

Graminoid and Forb-dominated wetland:

- Wet to moist meadow grasslands
- Tufted hairgrass – reedgrass
- Inland saltgrass – alkali sacaton
- Sedges
- Cattail marsh

Upland:

- Wyoming big sagebrush steppe
- Salt-desert shrub
- Greasewood
  - Greasewood – sagebrush
  - Greasewood – saltsage

The purpose of this project was to identify and to map the distribution of plant communities within the boundaries of the CSWCA, and digitize the resultant map as a Geographic Information System (GIS) project file. The vegetation maps will become an historical record of the vegetation at the time the CSWCA was created, and as a baseline to monitor changes in the extent of plant community types over time.

Acknowledgements.—Jerry Gregson, BLM wildlife biologist, suggested the project, gave assistance whenever I asked, and made useful comments on an earlier draft of this report. Wetland ecologist Caryl Elzinga, Alderspring Consulting, gave me advice prior to project initiation and made many helpful editorial comments on the report. Mabel Jankovsky-Jones, wetland ecologist – Idaho CDC, assisted me with timely information and reports, and edited a draft of this report.

## Study Area

The CSWCA is located in Custer County, Idaho, about 18 miles north of Mackay (Figure 1). CSWCA lies in a broad valley at about 6,200 feet elevation between the Lost River Mountains to the east, and the White Knob Mountains to the west. The wetland comprises about 5,000 acres surrounding the numerous springs that feed Thousand Springs Creek, with about 2,000 acres publicly owned by BLM and Idaho Department of Fish and Game (IDFG) in several distinct units separated by privately-owned lands. Over the past decade, a consortium of interests have helped fund the purchase of private lands to include in the conservation area. The BLM and IDFG manage the public lands jointly, and the BLM has designated portions of the wetland as a Research Natural Area (RNA) and Area of Critical Environmental Concern (ACEC). Areas within the CSWCA have different cultural histories and varying periods since exclusion of livestock use. Adjacent privately-owned lands are used mostly for growing forage for livestock and livestock grazing. Water is diverted from nearby rivers and streams for irrigation and ultimately some of this water drains back into the wetland.

Soils have been mapped for the CSWCA (Figure 2) as part of a larger effort mapping the soils of Custer and Lemhi counties (NRCS *in prep.*). Soil boundaries don't always match vegetation boundaries although these differences may in part be explained by errors in digitizing or different map scales. However, as will be seen, some soil type polygons indicate very different potential vegetation than currently occurs. The difference between soil type and overlying vegetation may be a result of soil identification error or may result from changes wrought by past human land use practices.

## Methods

I surveyed plant communities within the boundaries of the CSWCA during July and August, 2000. I used a GPS, and color and black-and-white aerial photographs (1:4,720) to locate plant community boundaries and identify community polygons. This scale was not detailed enough to differentiate small communities such as mat muhly, alkali bluegrass, or softstem bulrush. I also used the Custer-Lemhi Counties soil survey (NRCS *in prep.*) to identify potential plant communities. I visited hundreds of sites within the CSWCA to ascertain plant community identity but did not visit all areas within each polygon. In particular, the terrain and muck that characterizes sedge fen was very difficult to traverse. For the 2 large sedge fen areas in the central portion of the North Unit and in the southern portion of the Middle Unit, I surveyed the periphery on foot and some central portions by canoe. For areas not visited, I extrapolated plant community identity and boundaries based on aerial photographs, mapped soil types, and my best estimate viewed through binoculars.

I relied upon the previous surveys of Bursik (1994) and Jankovsky-Jones and Mancuso (1997), as well as the wetland plant community keys of Jankovsky-Jones (1999) to classify plant communities. Previous visual delineation of plant communities using color aerial photographs and field surveys in 1993 by J. Henderson (BLM Challis Field Office) also helped to identify plant communities and their boundaries. Upland plant communities were classified using BLM rangeland plant community guides (BLM Challis Field Office, Salmon). I used Hitchcock and Cronquist (1976) to identify unknown plants because it still represents the most current complete flora for the region. I used the Natural Resources Conservation Service PLANTS database for current plant taxonomy (NRCS 1999).

I did not sample each plant community for composition and relative frequency as originally proposed. Both this past summer and the previous summer experienced significant drought which affected plant growth and water levels within the CSWCA. I felt that many species, particularly forbs, would be under-represented in my samples thus giving a false picture of community composition. However, I assembled lists of species for each wetland community using Bursik (1994), Jankovsky-Jones and Mancuso (1997), Jankovsky-Jones (1999), and my observations. These lists are not exhaustive but do show many of the species found in the wetland community types.

Field maps of the observed vegetation cover types, overlaid on black-and-white aerial photographs, were digitized in the GIS (ArcView 3.2, Environmental Systems Research Institute, Inc., 1999) at 1:4,000 scale.

## Results and Discussion

*Flora*

The efforts of Henderson, Bursik (1994), and Jankovsky-Jones and Mancuso (1997) have contributed to building a flora for the CSWCA. I've added some species from my surveys to develop a growing list of species (101 species of graminoids, forbs, and shrubs identified to date) found in the CSWCA (Table 1). Without question there are many additional plants growing in the CSWCA that are not yet on this list. There also are undoubtedly errors in species identification that will change the composition of this list in the future.

*Community Classification*

I chose to use a modification of Bursik's (1994) classification to map some wetland communities as associations because vegetation in the individual communities was too diffuse to distinguish boundaries or because the area of the communities was too small to map effectively. For some upland communities, I mapped the vegetation type as a complex because the mosaic of plant communities was too small and scattered to distinguish at a reasonable scale. I used the following vegetation classification for mapping purposes which includes 11 vegetation types plus 1 anthropogenic type with, in some cases, several plant communities included within each type:

<u>Mixed Scrub-Shrub Vegetation Types (saline wetland):</u>

- <u>Greasewood/basin wildrye alkaline scrub-shrub community</u>.—This is the same as the greasewood/basin wildrye scrub-shrub type as identified by Jankovsky-Jones (1999). The BLM also identifies a greasewood/basin wildrye association (saline loamy range site). This community type occurs on sometimes hummocky sites slightly elevated above saturated soils throughout the CSWCA (Figure 3). Some sites lack greasewood yet are dominated by rubber rabbitbrush which may be in response to past human-caused habitat disturbances (Figure 4; Jankovsky-Jones 1999).
- <u>Greasewood/inland saltgrass alkaline scrub-shrub community</u>.—This also follows the wetland community key by Jankovsky-Jones (1999), but wasn't identified by her as occurring in the CSWCA. I encountered a few small sites principally in the South Unit where the herbaceous vegetation was essentially pure stands of inland saltgrass with scattered greasewood so I felt this was an appropriate classification. Plants common to both greasewood vegetation types are listed in Table 2.
- <u>Alkaline Grassland emergent association</u>.—I created this association to account for the following recognized communities (Jankovsky-Jones 1999) which exist as complex mosaics or small stands:
  - mat muhly
  - alkali cordgrass
  - Sandberg (alkali) bluegrass

  Additional associated grasses include: nuttall's alkaligrass, slender wheatgrass, and possibly western wheatgrass. Sedges commonly are co-dominants (Figure 5). The BLM recognizes a sedge/wheatgrass association (semi-wet meadow range site). Alkaline grassland occurs in all

three units of CSWCA on sites similar to greasewood communities but shrubs are absent. Table 3 presents a list of species common to the alkaline grassland association.

Emergent Vegetation Types:

- Willow emergent community.—There is a small stand of narrowleaf willow and Drummond's willow at Whiskey Springs. The understory is dominated by sedges, tufted hairgrass, Baltic rush, and other graminoids and forbs. There also are a few isolated dwarf willows in the North Unit. Bursik (1994) identified the presence of willows in the CSWCA but didn't classify the stand at Whiskey Springs as a community type. Jankovsky-Jones and Mancuso (1997), and Jankovsky-Jones (1999) didn't identify willow communities for the CSWCA.
- Baltic rush emergent community.—This is the same community as described by Bursik (1994) as Baltic rush sloped hummocky marsh and recognized by Jankovsky-Jones (1999) as Baltic rush emergent community type. It typically occurs as a narrow band between the alkaline or upland communities and the more mesic tufted hairgrass – sedge or sedge fen communities (Figure 6). Baltic rush is dominant and other grasses and sedges may be co-dominant (Table 4).
- Tufted hairgrass – sedge emergent community.—Bursik (1994) described a tufted hairgrass – short-beaked sedge – spike reedgrass sloped hummocky marsh. Jankovsky-Jones (1999) recognizes only a tufted hairgrass emergent community. Spike reedgrass is not always present but sedges always are co-dominant with tufted hairgrass. The aspect typically is hummocky ground with tufted hairgrass occurring on the hummocks and sedges in the troughs between hummocks (Figure 7). The tufted hairgrass – sedge community typically borders the Baltic rush on its drier side and grades into the more mesic sedge fen at lower elevations. This community is particularly diverse and variable with the greatest number of species recorded (Table 5).
- Sedge Fen.—This is the same as Bursik's (1994) sedge-rich fen. This association includes the following communities identified by Jankovsky-Jones (1999), listed on a hydrological gradient from wet to moist sites:
  - bladder sedge
  - water sedge
  - Nebraska sedge
  - analogue (short-beaked) sedge

  Sedge fen is the most extensive vegetation type in the CSWCA. It borders either the tufted hairgrass – sedge community or Baltic rush community on the upland side, and broadleaf cattail/softstem bulrush marsh at lower elevations (Figure 8). Sedge fen harbors a rich variety of plants (Table 6) yet the difficulty of travel within the community probably limits the number of species described so far.
- Broadleaf cattail/softstem bulrush marsh.—Bursik (1994) described a cattail emergent marsh with which he included softstem bulrush as prominent in deeper water sites within the wetland. Jankovsky-Jones (1999) recognized separately a cattail emergent type and a softstem bulrush emergent type. I chose to combine the 2 types because in some areas of CSWCA broadleaf cattail and softstem bulrush occur intermixed (Figure 9) although cattail is typically dominant whereas there are pure stands of cattails and there are pure stands of bulrush. These separate stands are difficult to map and can't be distinguished on aerial

photographs. Graminoids are the most conspicuous plants within the community although the community includes a variety of associated aquatic plants (Table 7).

- Aquatic community.—This is the same as Bursik's (1994) aquatic stream community but I've changed the name slightly to identify the inclusion of an ephemeral pond in the South Unit which is dominated by aquatic plants and the large slack water areas and ponds found throughout CSWCA which may not be directly linked with a stream (Figure 9). Aquatic forbs dominate although rarely dwarf willows can be found (Table 8).

Upland Vegetation Types:

- Wyoming big sagebrush/bluebunch wheatgrass – Sandberg bluegrass upland.—This community occurs in the CSWCA as a narrow strip in the northwest corner of the North Unit, and as scattered islands in the Satellite Units and the South Unit in swales and drainage ways (Figure 10). The community is extensive on surrounding uplands and throughout the Challis Resource Area.
- Silver chickensage – prairie sagewort/Sandberg bluegrass – needle-and-thread upland.—On windswept sites in the South Unit and Satellite Units, this community occurs on flat and convex slopes surrounding islands of Wyoming big sagebrush/bluebunch wheatgrass – Sandberg bluegrass (Figure 11). It borders greasewood/basin wildrye or Baltic rush communities downslope.

Both upland communities obviously have been grazed for long periods historically and preferred species such as bluebunch wheatgrass and needle-and-thread are much reduced. I also included a cover type, **anthropogenic site**, to map areas that have been significantly disturbed by human activities, e.g., the homestead sites at Whiskey Springs, a homestead in the northwest portion of the North Unit, and the building site in the Middle Unit.

As Bursik (1994) and others have noted, the plant communities occur along a hydrological gradient from yearlong inundated sites to seasonally flooded sites to xeric uplands (Figure 12). Changes in community type across the landscape can result from subtle changes in elevation (a few inches) and the associated hydrological changes.

*Vegetation Maps*

Although the bounds of some plant communities can be readily delimited visually (e.g., cattail, greasewood/basin wildrye), many communities intergrade or are too small to map (e.g., mat muhly, alkali bluegrass) which makes defining boundaries arbitrary. Baltic rush communities are visually obvious yet typically occur as long narrow bands (a few yards to ~ 10 yards) separating more mesic wetland from alkaline or upland communities and so are also difficult to map.

North Unit.—The North Unit is the largest of the units in the CSWCA and the lowlands surrounding Thousand Springs Creek are dominated by sedge fen (Figure 13). I represented the Baltic rush community as a linear band which typically is true although at some sites the community may be narrow enough to step across yet elsewhere may be very broad. A few small, isolated pure stands of broadleaf cattail or softstem bulrush occur in the stream channel along Thousand Springs Creek but most are too small to map. There are a few ponds and slack water areas along Thousand Springs Creek which provide resting and feeding areas for waterfowl.

Isolated dwarf willow plants are found near the headwater springs in the northern portion of the unit. The upland communities in the northwest portion of the unit were appended to the CSWCA only within the past year and, along with the northwestern uplands of the unit surrounding the abandoned homestead (due to trespass cattle), have been grazed by livestock within recent years.

Middle Unit.—The north half of the Middle Unit currently is a mix of tufted hairgrass – sedge and alkaline grassland (Figure 14). This area obviously was grazed (and probably hayed – there's an abandoned cultivator/seeder) in the past, and the area surrounding an abandoned log building (possibly a barn) was significantly disturbed. So communities likely don't reflect soils and moisture regimes. This is particularly true for the gravelly loam range site (Figure 2) which should support Wyoming sagebrush steppe vegetation but currently supports alkaline grassland. The site may have been cleared of all shrubs. It remains to be seen whether long-term exclusion of livestock and other human-induced disturbances will engender succession to recognizable, distinct wetland communities or not. Baltic rush is a conspicuous co-dominant both in the alkaline grassland and tufted hairgrass – sedge fen communities in the Middle Unit as well as in these communities in the other units of the CSWCA. Baltic rush is thought to be resistant to grazing and so becomes more prominent with grazing (Bursik 1994 citing others). Exclusion of livestock may result in Baltic rush becoming less conspicuous in alkali grasslands and tufted hairgrass – sedge communities. Likewise, alkali grasslands may become more distinct as recognizable communities with long-term livestock exclusion than the mosaic of species currently encountered. The southern portion of the Middle Unit is a large expanse of sedge fen bisected by Thousand Springs Creek.

Satellite Units.—These 2 areas lie along Highway 93 just north of the South Unit (Figure 15). Both consist of the upland complex of Wyoming big sagebrush/bluebunch wheatgrass – Sandberg bluegrass and silver chickensage – prairie sandwort/Sandberg bluegrass – needle and thread communities, as well as the greasewood/basin wildrye community. A fence bisects the southern unit of the 2 Satellite Units with the area southwest of the fence line being used for private livestock grazing. Whether the mapping of the unit boundaries is in error or the private use is in trespass is not known.

South Unit.—The South Unit contains the largest stand of the broadleaf cattail/softstem bulrush community, the most extensive areas of open slack water, and the greatest variety of plant communities within the CSWCA (Figure 16). The only stand of willows (rather than rare isolated individual willow) within the CSWCA occurs in the northern portion of the unit just south of the abandoned log buildings at Whiskey Springs. There are small almost pure stands of alkali saltgrass and mat muhly in the southwestern portion of the unit. On privately-owned lands along Thousand Springs Creek just north of the unit are the most extensive pure stands of softstem bulrush within the entire wetland.

*Conclusion*

With the exclusion of livestock from large areas of the CSWCA, we may see changes in the extent of communities for which this mapping effort can act as a baseline. More likely we'll see changes in the composition of communities. For example, the greasewood/basin wildrye communities currently dominated by rubber rabbitbrush (Figure 4) may change with cover of

rabbitbrush and other graminoids declining, and greasewood and basin wildrye becoming the dominant appearance. Sites around old homesteads and outbuildings may succeed towards more natural vegetation composition. For example, the dominance of annuals around abandoned building sites may decline, and willows, which seem to occur only near abandoned homestead sites both at Whiskey Springs and in the North Unit, may expand their cover in the absence of livestock grazing. Willows are surprisingly uncommon throughout the CSWCA and their occurrence may be due to past protection (e.g., protection of a spring source from livestock) or other cultural practices. Baltic rush may recede in importance in some communities such as the tufted hairgrass – sedge and alkaline grasslands. The extreme hummocky aspect of many sites (> 2 feet deep in some places) has been attributed to livestock grazing (Bursik 1994, Jankovsky-Jones 1999). Hummocks may be maintained by or may be naturally caused by frost heaving. Livestock may exacerbate or promote hummocks, or may be the initiating factor. With livestock absent, these hummocks may diminish in size over long periods through the continued action of frost heaving (Caryl Elzinga, Alderspring Consulting, pers. commun.).

The soil map for the CSWCA (Figure 2) indicates that some areas should support very different vegetation than is currently apparent (e.g., Wyoming big sagebrush within a portion of the Middle Unit when the actual vegetation is alkaline grassland). I don't know whether this is due to errors in the soil mapping or the current vegetation is a result of past livestock grazing and other uses. Continued monitoring of vegetation change within the CSWCA will be necessary to see what changes occur.

This project mapped the polygons of vegetation community type as well as listed plants common to each community. To determine the effects of changed management (principally livestock exclusion) on community composition, baselines within representative stands of those stands most likely to respond to change in management should be established. The upland and drier wetland communities likely have been most affected by livestock and past agriculture, and so are most likely to change in response to inclusion within the CSWCA.

I recommend that a competent wetland plant ecologist establish permanent transects or plots soon to monitor these vegetation shifts if they happen. Cover measures would likely be most sensitive to successional change or altered composition. Locations of rare plants also should be mapped. Exotic species are surprisingly uncommon in the CSWCA (Jankovsky-Jones, Idaho CDC, pers. commun.). Likely this apparent rarity, in part, is due to not sampling in disturbed areas as well as the lack of intensive sampling within the CSWCA as a whole. Exotic species locations should be mapped and monitored.

## Literature

Bursik, R.J. 1994. Field survey of plant communities at Thousand Springs/Chilly Slough, Custer County, Idaho. Unpublished report prepared for The Nature Conservancy, Idaho Field Office, Sun Valley.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979 (Reprinted 1992). Classification of wetlands and deepwater habitats of the United States. FWS/OBS-79/31.

Hitchcock, C.L., and A. Cronquist. 1976. Flora of the Pacific Northwest, an illustrated manual, 3rd printing. University of Washington Press, Seattle.

Idaho Conservation Data Center. 1995. Preliminary catalog of wetland and riparian plant communities in Idaho. Unpublished. Idaho Department of Fish and Game Conservation Data Center, Boise.

Jankovsky-Jones, M. 1999. Conservation strategy for wetlands in east-central Idaho. Idaho Department of Fish and Game Conservation Data Center, Boise.

_____, and M. Mancuso. 1997. Field notes for Chilly Slough macrosite (S.USIDHP*59). Idaho Department of Fish and Game Conservation Data Center, Boise.

NRCS. 1999. The PLANTS database (http://plants.usda.gov/plants). National Plant Data Center, U.S. Department of Agriculture Natural Resources Conservation Service, Baton Rouge, LA. 70874-4490 USA.

_____. *In prep*. Custer-Lemhi Counties, Idaho soil survey. U.S. Department of Agriculture Natural Resources Conservation Service, Boise.

Quigley, T.M., and S.J. Arbelbide (tech. eds.). 1997. An assessment of ecosystem components in the interior Columbia basin and portions of the Klamath and Great Basins. USDA Forest Service Gen. Tech. Rep. PNW-GTR-405.

Yeo, J.J. 1999. Avian surveys of the Chilly Slough Wetland Conservation Area, Custer County, Idaho; 1997-1999. Idaho Bureau of Land Management Technical Bulletin No. 02-6.

_____, and C.R. Peterson. 1998. Amphibian and reptile distribution, and habitat relationships in the Lost River Mountains and Challis-Lemhi Resource Areas. Idaho Bureau of Land Management Technical Bulletin No. 98-10.

Table 1. Partial flora of the Chilly Slough Wetland Conservation Area. Plant names follow NRCS (1999) PLANTS version 3.0 database. Sources for listing species occurrences: 1 = Bursik (1994), 2 = Jankovsky-Jones and Mancuso (1997), and Jankovsky-Jones (1999), 3 = current study.

| Species | Plant | Source |
|---|---|---|
| Sporogens | | |
| *Equisetum laevigatum* | Smooth horsetail | 2 |
| Graminoids | | |
| *Achnatherum (=Oryzopsis) hymenoides* | Indian ricegrass | 3 |
| *Agropyron caninum* | Bearded wheatgrass* | 1,3 |
| *Agrostis scabra* | Rough bentgrass | 1 |
| *Agrostis thurberiana* | Thurber's bentgrass | 1 |
| *Alopecurus aequalis* | Shortawn foxtail | 1 |
| *Beckmannia syzigachne* | American sloughgrass | 1,3 |
| *Bromus inermis* | Smooth brome | 1 |
| *Calamagrostis stricta* | Spike reedgrass | 1,2,3 |
| *Carex aquatilis* | Water sedge | 1,2 |
| *Carex aurea* | Golden sedge | 2 |
| *Carex nebrascensis* | Nebraska sedge | 1,2 |
| *Carex praegracilis* | Clustered field sedge | 2 |
| *Carex scirpoidea* | Northern singlespike sedge | 2 |
| *Carex simulata* | Analogue (short-beaked) sedge | 1,2 |
| *Carex sp.* | Sedge | 1,2,3 |
| *Carex rostrata (=utriculata)* | Beaked sedge | 1,2 |
| *Deschampsia cespitosa* | Tufted hairgrass | 1,2,3 |
| *Distichlis spicata* | Inland saltgrass | 2,3 |
| *Eleocharis palustris* | Common (creeping) spikerush | 1 |
| *Eleocharis quinqueflora (=pauciflora)* | Fewflower (poor) spikerush | 1,2 |
| *Elymus elymoides ssp. elymoides (=Sitanion hystrix)* | Squirreltail | 3 |
| *Elymus trachycaulus* | Slender wheatgrass | 2 |
| *Glyceria borealis* | Small Floating mannagrass | 1 |
| *Hesperostipa (=Stipa) comata* | Needle and thread | 3 |
| *Hordeum jubatum* | Foxtail barley | 1,2,3 |
| *Juncus balticus* | Baltic rush | 1,2,3 |
| *Juncus drummondii* | Drummond's rush | 1 |
| *Leymus (=Elymus) cinereus* | Basin (giant) wildrye | 1,2,3 |
| *Muhlenbergia richardsonis* | Mat muhly | 2,3 |
| *Pascopyrum (=Agropyron) smithii* | Western wheatgrass | 3 |
| *Poa compressa* | Canada bluegrass | 1 |
| *Poa secunda (includes juncifolia)* | Sandberg (includes alkali) bluegrass | 1,2,3 |
| *Poa pratensis* | Kentucky bluegrass*** | 1 |
| *Pseudoroegneria spicata (=Agropyron spicatum)* | Bluebunch wheatgrass | 1,3 |

| | Species | Plant | Source |
|---|---|---|---|
| | *Schoenoplectus tabernaemontani (=Scirpus validus)* | Softstem bulrush | 1,2,3 |
| | *Puccinellia nuttalliana* | Nuttall's alkaligrass | 3 |
| | *Spartina gracilis* | Alkali cordgrass | 2,3 |
| Forbs | | | |
| | *Argentina (=Potentilla) anserina* | Silverweed cinquefoil | 1,2 |
| | *Aster foliaceus* | Leafy aster | 1 |
| | *Astragalus diversifolius* | Meadow milkvetch (S2, G3)** | 2 |
| | *Astragalus leptaleus* | Park milkvetch (S2, G4)** | 2 |
| | *Cardaria draba* | Hoary whitetop*** | 2 |
| | *Ceratophyllum demersum* | Coon's tail | 1 |
| | *Cirsium arvense* | Canadian thistle*** | 1 |
| | *Cirsium scariosum (includes magnificum)* | Meadow thistle (showy and elk thistle) | 1,2 |
| | *Cirsium eatonii (=tweedyi)* | Eaton's (Tweedy's) thistle | 1 |
| | *Crepis runcinata* | Fiddleleaf (dandelion) hawksbeard | 2 |
| | *Cymopterus sp.* | Springparsley | 2 |
| | *Dodecatheon jeffreyi* | Sierra (Jeffrey's) shooting star | 2 |
| | *Epilobium ciliatum* | Fringed (hairy) willowherb | 2 |
| | *Epilobium palustre* | Marsh (swamp) willowherb (S3, G5)** | 1 |
| | *Erigeron lonchophyllus* | Shortray fleabane | 2 |
| | *Erigeron peregrinus* | Subalpine fleabane | 2 |
| | *Gentiana detonsa* | Smaller fringed gentian* | 1 |
| | *Gentianella amarella* | Autumn dwarf (northern) gentian | 1 |
| | *Glaux maritima* | Sea milkwort (saltwort) | 2 |
| | *Gnaphalium palustre* | Western marsh cudweed | 1 |
| | *Haplopappus unifloris* | One-flowered goldenweed | 2 |
| | *Hippuris vulgaris* | Common mare's-tail | 1 |
| | *Lemna sp.* | Duckweed | 2 |
| | *Lemna trisulca* | Star duckweed | 1 |
| | *Lomatogonium rotatum* | Marsh felwort (S1, G5)** | 1 |
| | *Mentha arvensis* | Wild mint | 1 |
| | *Myriophyllum sibiricum* | Shortspike watermilfoil | 1 |
| | *Packera (=Senecio) cymbalarioides* | Cleftleaf groundsel | 1 |
| | *Packera (=Senecio) debilis* | Weak groundsel | 2 |
| | *Phlox kelseyi var kelseyi* | Kelsey's phlox | 2 |
| | *Plantago tweedyi* | Tweedy's plantain | 1,2 |
| | *Polemonium occidentale* | Western polemonium | 1 |
| | *Potamogeton filiformis* | Fine-leaf pondweed | 1 |
| | *Potamogeton pectinatus* | Sago pondweed | 1 |
| | *Potentilla gracilis* | Slender cinquefoil | 1 |
| | *Ranunculus aquatilis* | Whitewater crowfoot (water buttercup) | 1 |
| | *Ranunculus cymbalaria* | Alkali (shore) buttercup | 2 |
| | *Ranunculus gmelinii* | Gmelin's buttercup | 1 |
| | *Ranunculus sceleratus* | Cursed buttercup | 1 |

| Species | Plant | Source |
|---|---|---|
| *Rorippa nasturtium-aquaticum* | Watercress | 1 |
| *Rumex crispus* | Curly dock*** | 1 |
| *Sisyrinchium idahoense* | Idaho blue-eyed grass | 2 |
| *Solidago multiradiata* | Rocky Mountain goldenrod | 1 |
| *Symphyotrichum boreale (=Aster junciformis)* | Northern bog aster (S1, G5)** | 1 |
| *Thalictrum alpinum* | Alpine meadow-rue | 1,2 |
| *Thelypodium integrifolium* | Entireleaved thelypody | 1 |
| *Trifolium hybridum* | Alsike clover*** | 2 |
| *Triglochin concinnum* | Utah arrowgrass* | 2 |
| *Triglochin maritimum* | Seaside arrowgrass | 1,2 |
| *Typha latifolia* | Broadleaf cattail | 1,2,3 |
| *Utricularia minor* | Lesser bladderwort | 1 |
| *Utricularia macrorhiza (=vulgaris)* | Common bladderwort | 1 |
| *Veronica anagallis-aquatica* | Water speedwell | 1 |
| *Viola macloskeyi* | Small white violet | 1 |
| Shrubs | | |
| *Artemisia frigida* | Prairie sagewort | 3 |
| *Artemisia tridentata ssp. wyomingensis* | Wyoming big sagebrush | 3 |
| *Chrysothamnus viscidiflorus* | Yellow (green) rabbitbrush | 2,3 |
| *Ericameria nauseosa (=Chrysothamnus nauseosus)* | Rubber rabbitbrush | 3 |
| *Krascheninnikovia lanata (=Eurotia lanata)* | Winterfat | 3 |
| *Ribes oxyacanthoides (setosum)* | Inland (Missouri) gooseberry | 1 |
| *Salix drummondiana* | Drummond's willow | 1 |
| *Salix exigua* | Narrowleaf (coyote) willow | 1 |
| *Sarcobatus vermiculatus* | Greasewood | 2,3 |
| *Sphaeromeria argentea (=Tanacetum nuttallii)* | Silver chickensage | 3 |

*species not identified as inhabiting Idaho (NRCS 1999).
**special status species: S1/G1 = critically imperiled statewide/globally, S2/G2 = imperiled statewide/globally, S3/G3 = rare or uncommon statewide/globally, S4/G4 = apparently secure statewide/globally, S5/G5 = demonstrably secure statewide/globally
***introduced species

Table 2. Plant species identified in the **greasewood/basin wildrye** and/or **greasewood/inland saltgrass** community in the Chilly Slough Wetland Conservation Area (Bursik 1994, Jankovsky-Jones and Mancuso 1997, Jankovsky-Jones 1999, current study).

| | Plant |
|---|---|
| Graminoids | |
| | Inland saltgrass |
| | Slender wheatgrass |
| | Foxtail barley |
| | Baltic rush |
| | Basin wildrye |
| | Alkali bluegrass |
| | Alkali cordgrass |
| Forbs | |
| | Meadow milkvetch |
| | Clustered field sedge |
| | Meadow thistle |
| | Fiddleleaf hawksbeard |
| | Springparsley |
| | Sierra shooting star |
| | Sea milkwort |
| | One-flowered goldenweed |
| | Kelsey's phlox |
| | Tweedy's plantain |
| | Weak groundsel |
| | Idaho blue-eyed grass |
| Shrubs | |
| | Greasewood |
| | Rubber rabbitbrush |
| | Yellow (green) rabbitbrush |

Table 3. Plant species identified in the **alkaline grassland** association in the Chilly Slough Wetland Conservation Area (Bursik 1994, Jankovsky-Jones and Mancuso 1997, Jankovsky-Jones 1999, current study).

| | Plant |
|---|---|
| Graminoids | |
| | Spike reedgrass |
| | Clustered field sedge |
| | Sedge |
| | Baltic rush |
| | Basin wildrye |
| | Mat muhly |
| | Alkali bluegrass |
| | Nuttall's alkaligrass |
| | Alkali cordgrass |
| Forbs | |
| | Meadow milkvetch |
| | Meadow thistle |
| | Fiddleleaf hawksbeard |
| | Sierra shooting star |
| | Smooth horsetail |
| | Sea milkwort |
| | One-flowered goldenweed |
| | Kelsey's phlox |
| | Weak groundsel |
| | Alsike clover |
| Shrubs | |
| | Greasewood |
| | Rubber rabbitbrush |
| | Yellow (green) rabbitbrush |

Table 4. Plant species identified in the **Baltic rush** community in the Chilly Slough Wetland Conservation Area (Bursik 1994, Jankovsky-Jones and Mancuso 1997, Jankovsky-Jones 1999, current study).

| **Plant** |
|---|
| Graminoids |
| Bearded wheatgrass* |
| Rough bentgrass |
| Smooth brome |
| Spike reedgrass |
| Analogue sedge |
| Tufted hairgrass |
| Foxtail barley |
| Baltic rush |
| Basin wildrye |
| Alkali bluegrass |
| Kentucky bluegrass |
| Bluebunch wheatgrass |
| Forbs |
| Silverweed cinquefoil |
| Canada thistle |
| Meadow thistle |
| Eaton's thistle |
| Fringed willowherb |
| Slender cinquefoil |
| Northern bog aster |
| Entireleaved thelypody |
| Shrubs |
| Missouri gooseberry |

*Note: Bursik (1994) identified bearded wheatgrass (*Agropyron caninum*) as occurring within CSWCA (as did I). This is unlikely. Bearded wheatgrass is an introduced species to Washington, not identified as occurring in Idaho (NRCS 1999). More likely the species is slender wheatgrass (*Elymus trachycaulus*) as identified by Jankovsky-Jones and Mancuso (1997).

Table 5. Plant species identified in the **tufted hairgrass/sedge** community in the Chilly Slough Wetland Conservation Area (Bursik 1994, Jankovsky-Jones and Mancuso 1997, Jankovsky-Jones 1999, current study).

| Plant |
|---|
| Graminoids |
| Bearded wheatgrass |
| Rough bentgrass |
| Thurber's bentgrass |
| Smooth brome |
| Spike reedgrass |
| Analogue sedge |
| Tufted hairgrass |
| Poor spikerush |
| Foxtail barley |
| Baltic rush |
| Drummond's rush |
| Canada bluegrass |
| Kentucky bluegrass |
| Utah arrowgrass |
| Seaside arrowgrass |
| Forbs |
| Silverweed cinquefoil |
| Leafy aster |
| Northern bog aster |
| Canada thistle |
| Meadow thistle |
| Eaton's thistle |
| Sierra shooting star |
| Fringed willowherb |
| Marsh willowherb |
| Shortray fleabane |
| Subalpine fleabane |
| Smaller fringed gentian |
| Autumn dwarf gentian |
| One-flowered goldenweed |
| Marsh felwort |
| Wild mint |
| Tweedy's plantain |
| Western polemonium |
| Alkali buttercup |
| Cleftleaf groundsel |
| Rocky Mountain goldenrod |
| Idaho blue-eyed grass |
| Alpine Meadow-rue |

| Plant |
|---|
| Forbs (continued) |
| Small white violet |
| Shrubs |
| Missouri gooseberry |
| Drummond's willow |

Table 6. Plant species identified in the **sedge fen** community in the Chilly Slough Wetland Conservation Area (Bursik 1994, Jankovsky-Jones and Mancuso 1997, Jankovsky-Jones 1999, current study).

| | **Plant** |
|---|---|
| Graminoids | |
| | Thurber's bentgrass |
| | Spike reedgrass |
| | Water sedge |
| | Golden sedge |
| | Nebraska sedge |
| | Analogue sedge |
| | Northern singlespike sedge |
| | Beaked sedge |
| | Tufted hairgrass |
| | Fewflower spikerush |
| | Baltic rush |
| | Drummond's rush |
| | Utah arrowgrass |
| | Seaside arrowgrass |
| Forbs | |
| | Silverweed cinquefoil |
| | Leafy aster |
| | Canada thistle |
| | Meadow thistle |
| | Eaton's thistle |
| | Fringed willowherb |
| | Marsh willowherb |
| | Subalpine fleabane |
| | Smaller fringed gentian |
| | Autumn dwarf gentian |
| | Duckweed |
| | Marsh felwort |
| | Wild mint |
| | Cleftleaf groundsel |
| | Rocky Mountain goldenrod |
| | Western polemonium |
| | Curly dock |
| | Northern bog aster |
| | Alpine meadow-rue |
| | Small white violet |
| Shrubs | |
| | Missouri gooseberry |
| | Drummond's willow |

Table 7. Plant species identified in the **broadleaf cattail/softstem bulrush** community in the Chilly Slough Wetland Conservation Area (Bursik 1994, Jankovsky-Jones and Mancuso 1997, Jankovsky-Jones 1999, current study).

| Plant |
|---|
| Graminoids |
| Shortawn foxtail |
| American sloughgrass |
| Water sedge |
| Beaked sedge |
| Common spikerush |
| Small floating mannagrass |
| Foxtail barley |
| Baltic rush |
| Alkali bluegrass |
| Softstem bulrush |
| Arrowgrass |
| Broadleaf cattail |
| Forbs |
| Coon's tail |
| Western marsh cudweed |
| Common mare's-tail |
| Star duckweed |
| Shortspike watermilfoil |
| Fine-leaf pondweed |
| Sago pondweed |
| Whitewater crowfoot |
| Gmelin's buttercup |
| Cursed buttercup |
| Watercress |
| Curly dock |
| Lesser bladderwort |
| Common bladderwort |
| Water speedwell |

Table 8. Plant species identified in the **aquatic** community in the Chilly Slough Wetland Conservation Area (Bursik 1994, Jankovsky-Jones and Mancuso 1997, Jankovsky-Jones 1999, current study). Plant names follow NRCS (1999) PLANTS version 3.0 database.

| | **Plant** |
|---|---|
| Forbs | |
| | Coon's tail |
| | Common mare's-tail |
| | Shortspike watermilfoil |
| | Fine-leaf pondweed |
| | Sago pondweed |
| | Whitewater crowfoot |
| | Lesser bladderwort |
| | Common bladderwort |
| Shrubs | |
| | Narrowleaf willow |

## Chilly Slough Wetland Conservation Area

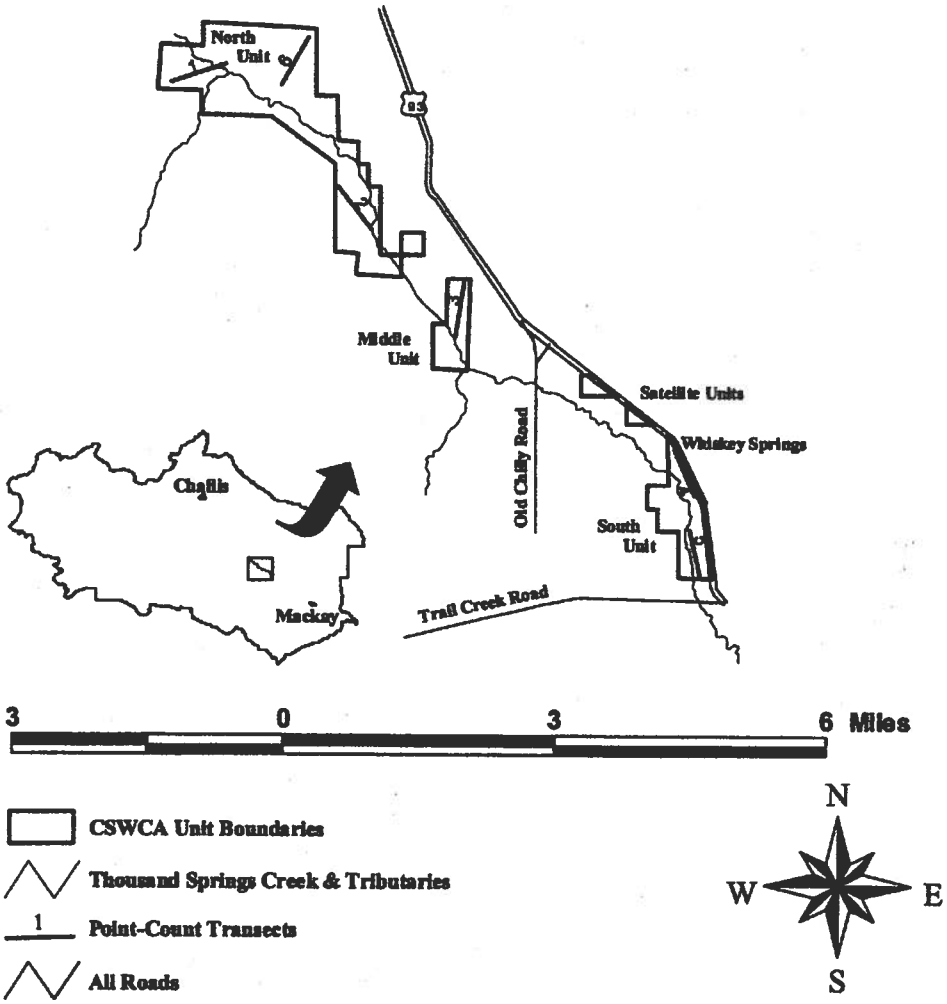


**Figure 1. Chilly Slough Wetland Conservation Area boundaries, locations of separate units, and location of breeding/nesting season point-count transects.**

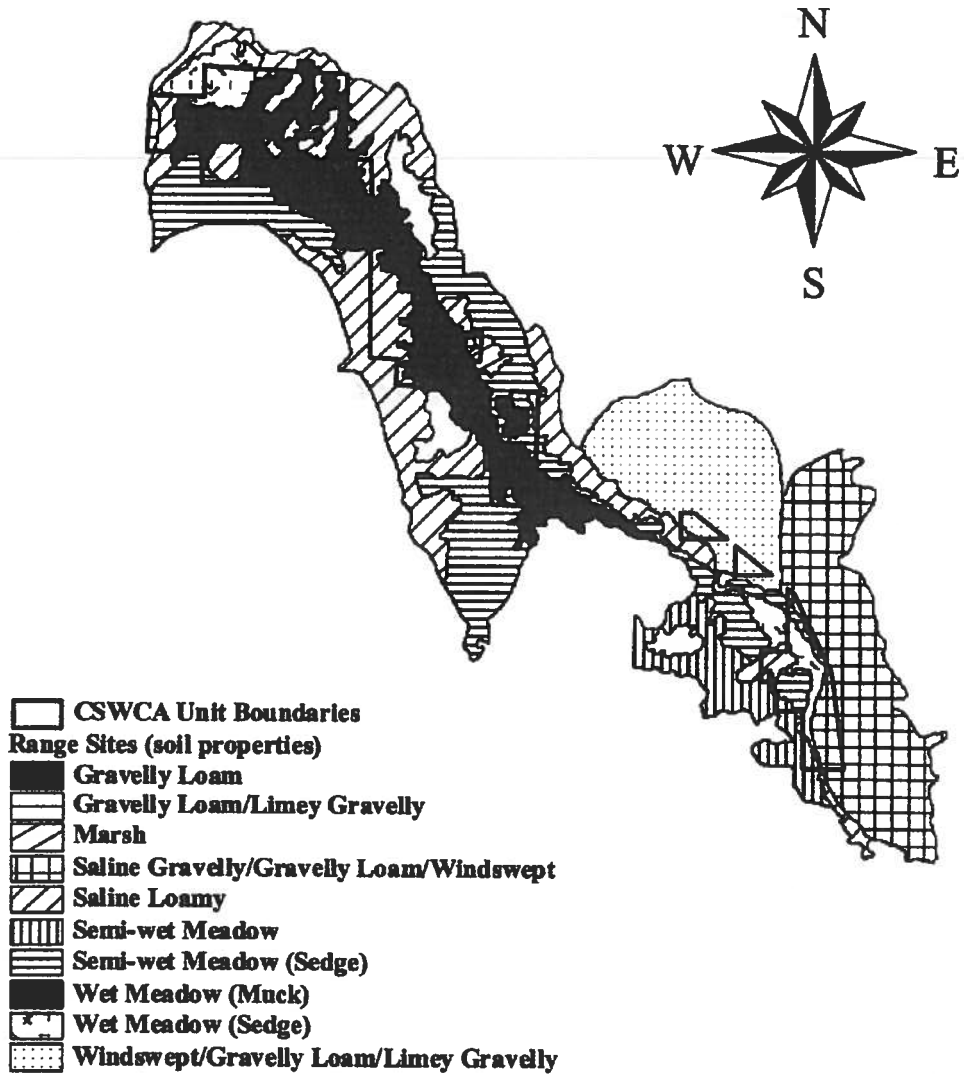


**Figure 2. Range site (soil properties) distribution within the Chilly Slough Wetland Conservation Area (CSWCA) based on the Custer-Lemhi Counties, Idaho soil survey (NRCS in prep.).**

Figure 3. Greasewood/basin wildrye community in the South Unit near Whiskey Springs, Chilly Slough Wetland Conservation Area.

Figure 4. Greasewood/basin wildrye community dominated by rubber rabbitbrush, located in the North Unit, Chilly Slough Wetland Conservation Area.

Figure 5. Alkaline grassland association in the Middle Unit, Chilly Slough Wetland Conservation Area. This site dominated by slender wheatgrass, alkali bluegrass, and sedge.

Figure 6. Gradient of mesic sedge fen (light green in middle of picture) to Baltic rush community (dark green band in middle of picture) to drier hummocky alkaline grass in North Unit, Chilly Slough Wetland Conservation Area.

Figure 7. Tufted hairgrass/sedge community in the North Unit, Chilly Slough Wetland Conservation Area

Figure 8. Sedge fen association in the North Unit, Chilly Slough Wetland Conservation Area.

Figure 9. Broadleaf cattail community (tall dark green in background) with softstem bulrush (dark green with brown inflorescence in middle portion of picture) surrounding a slack-water aquatic community in the South Unit, Chilly Slough Wetland Conservation Area.. The light green graminoid-dominated community in the foreground is the sedge fen community

Figure 10. Wyoming big sagebrush/bluebunch wheatgrass/Sandberg bluegrass community in the South Unit, Chilly Slough Wetland Conservation Area.

Figure 11. Chicken sage/prairie sagewort/Sandberg bluegrass/needle-and-threadgrass community in the South Unit, Chilly Slough Wetland Conservation Area.

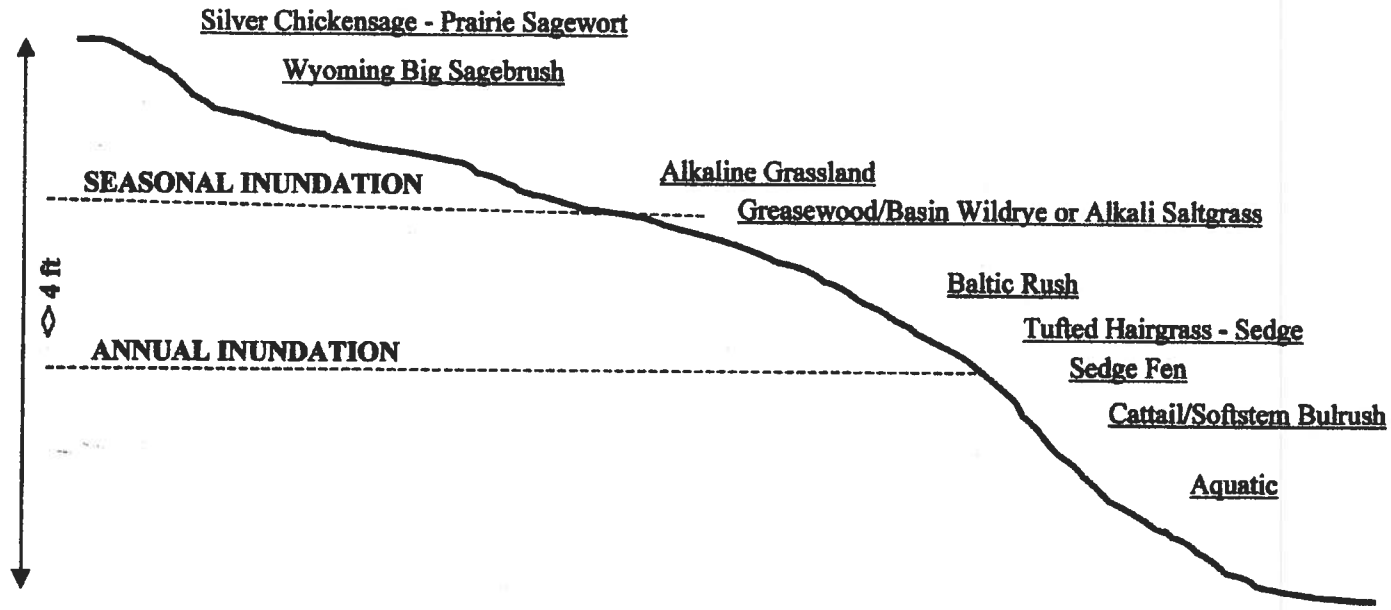


**Figure 12. Distribution of vegetation communities along a dry-wet gradient in the Chilly Slough Wetland Conservation Area. Elevational differences between communities can be subtle, as little as a few feet between aquatic communities and upland communities.**

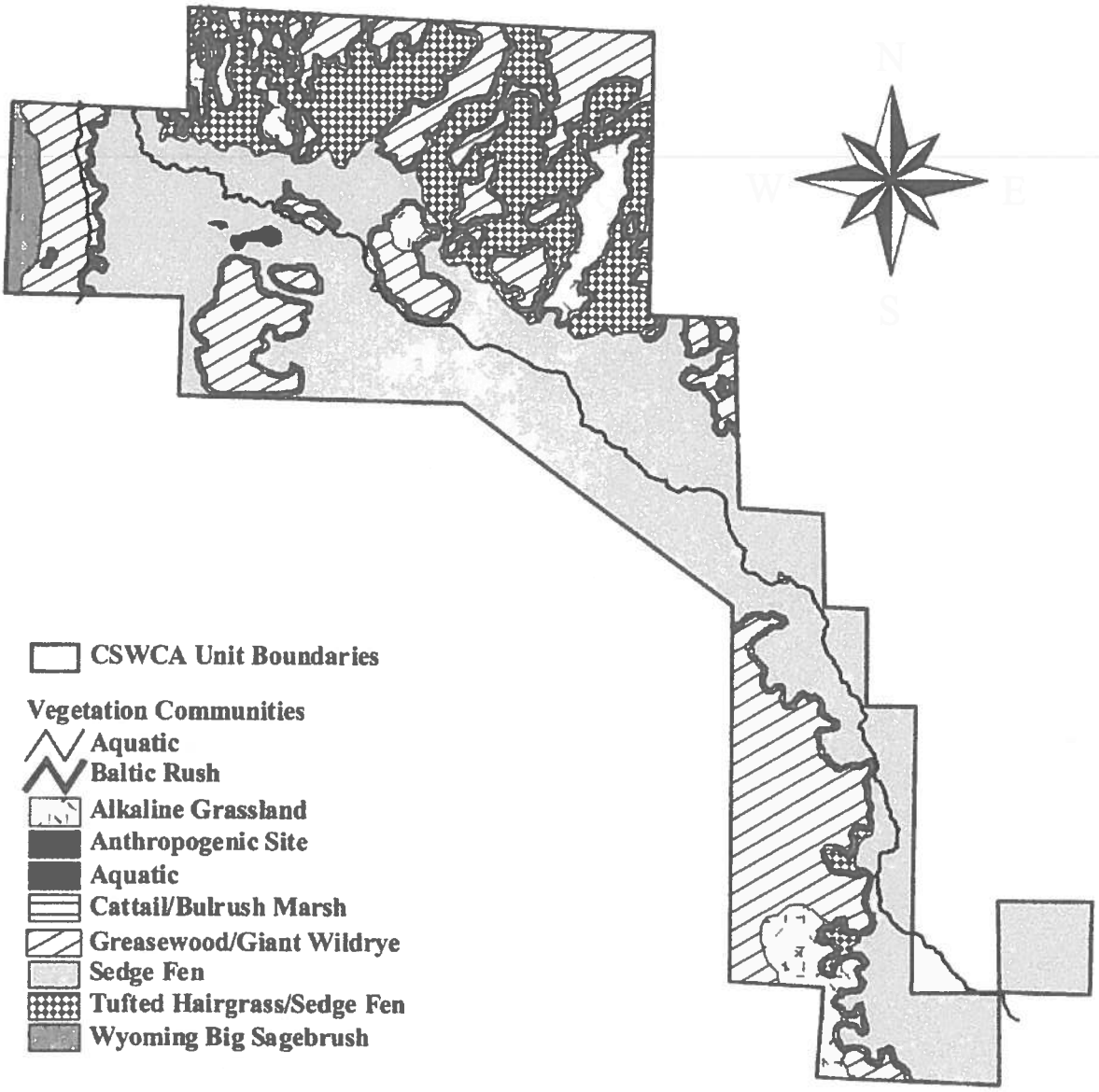


**Figure 13. Vegetation communities in the North Unit of the Chilly Slough Wetland Conservation Area (CSWCA).**

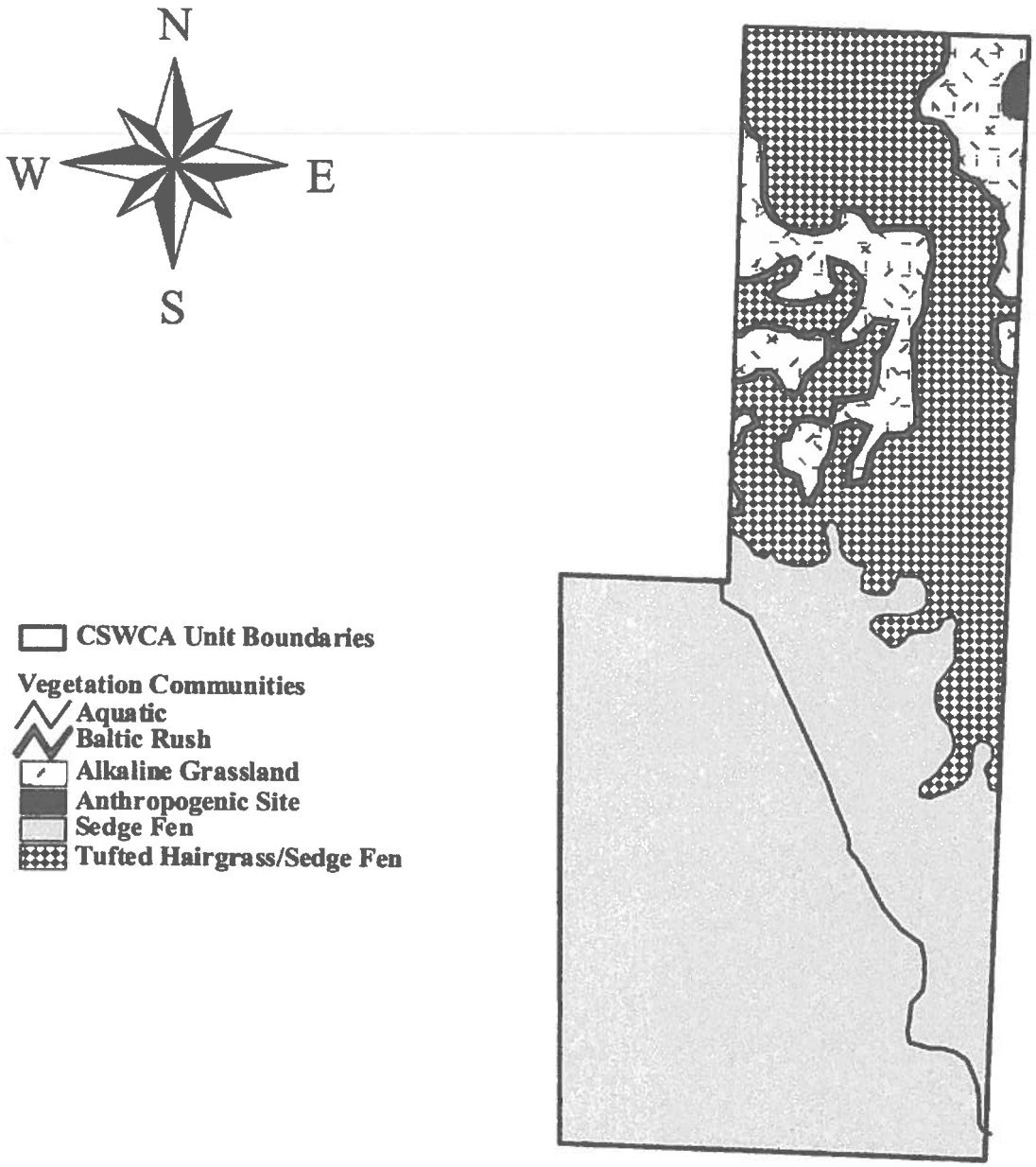


**Figure 14. Vegetation communities in the Middle Unit of the Chilly Slough Wetland Conservation Area (CSWCA).**

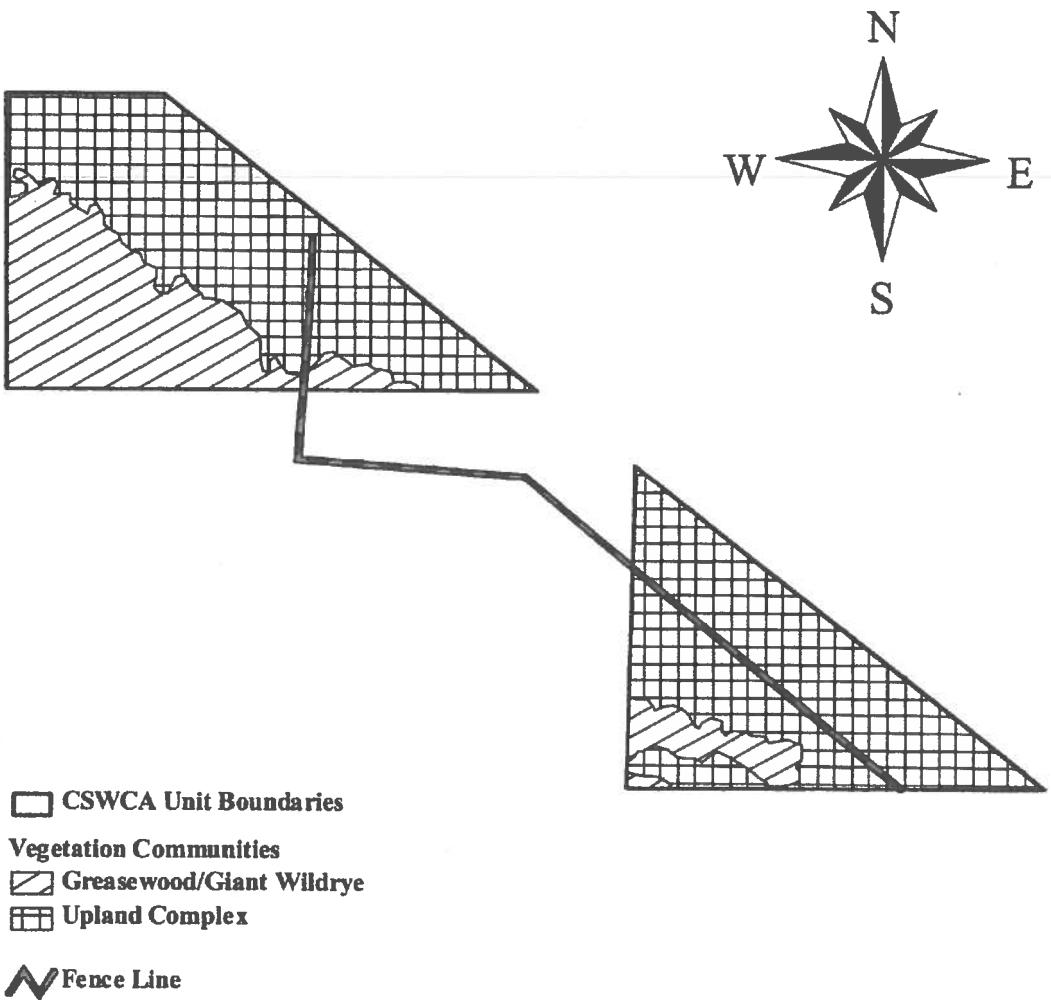


Figure 15. Vegetation communities in the Satellite Units of the Chilly Slough Wetland Conservation Area (CSWCA).

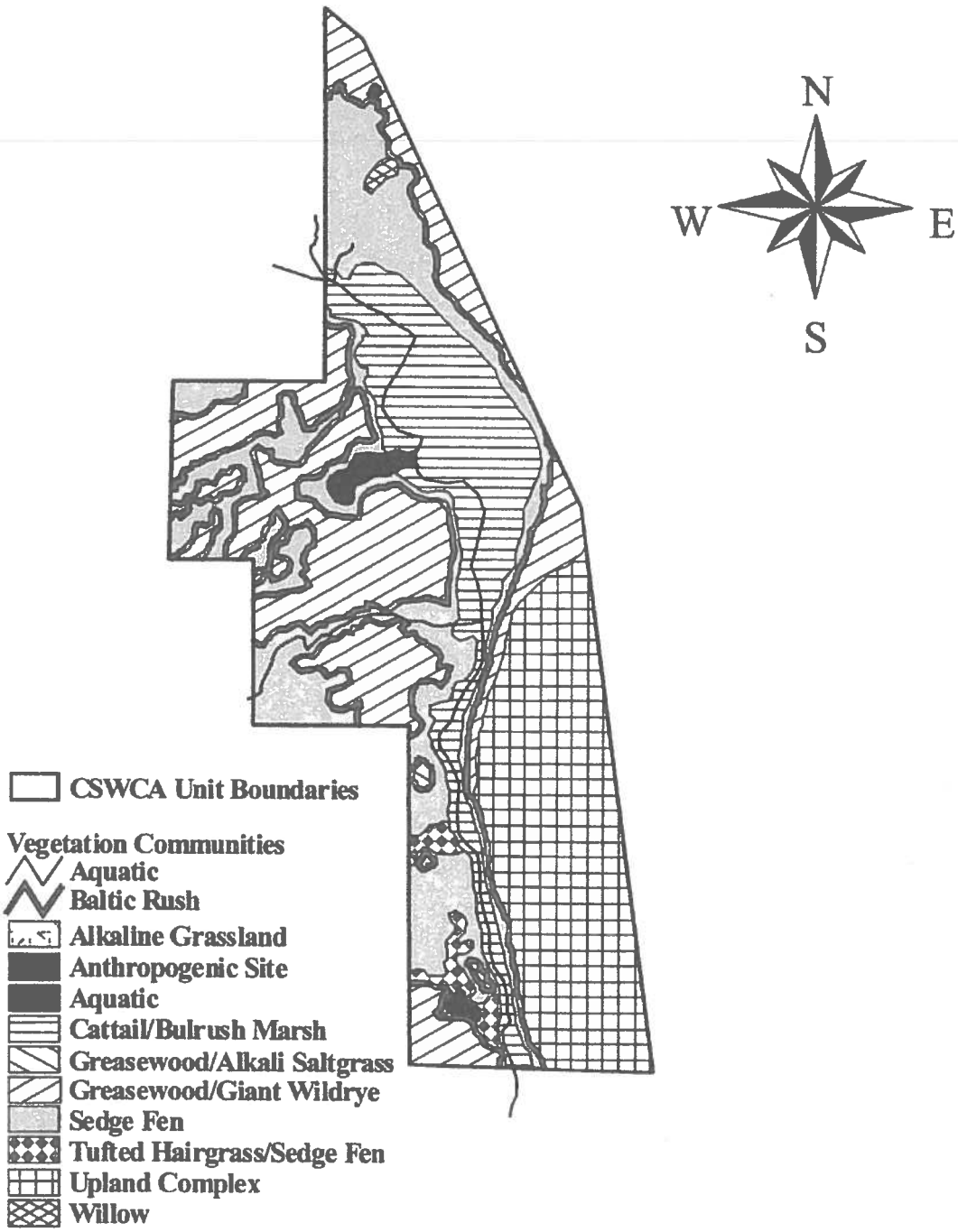


Figure 16. Vegetation communities in the South Unit of the Chilly Slough Wetland Conservation Area (CSWCA).

U.S. Department of the Interior
Bureau of Land Management
Idaho State Office
1387 S. Vinnell Way
Boise ID 83709

BLM/ID/PT-03/003+1150