

**Sensitive Plant Survey in the
Dickinson Park area, Shoshone National Forest
Fremont County, Wyoming**



Prepared for the Shoshone National Forest,

By

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ABSTRACT

Systematic surveys were conducted for Sensitive wetland plants in the Dickinson Park area, part of the Wind River District, Shoshone National Forest. At the start of the project, livid sedge (*Carex livida*), a Sensitive species and fen obligate, was known from one location. As a result of surveys, the original record was greatly expanded to nine mapped locations, two more Sensitive species were documented, and two additional target species were surveyed. The study also expanded documentation of the local wetland flora and provided a window into habitat response under drought conditions. Survey results contribute information on rare plant species habitat requirements and Dickinson Park wetlands in general.

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Front cover: Fen habitat of *Carex livida*, *C. limosa* and *Utricularia minor* on Sand Creek.
By B. Heidel.

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INTRODUCTION

The primary purpose of this study was to systematically survey Sensitive wetland plant species in the Dickinson Park study area of Shoshone National Forest. Secondary purposes were to document any other Wyoming plant species of concern present as tracked by Wyoming Natural Diversity Database (WYNDD), and report on the Dickinson Park distribution and status for all of these species. Throughout this report, the targeted wetland plant species are collectively referred to as Sensitive species while including additional criteria as appropriate.

STUDY AREA

The Dickinson Park study area is located in the Wind River District of Shoshone National Forest in Fremont County, on the east slopes of the Wind River Range. It lies about 15-20 air miles (24-32 km) west of Lander, immediately south of the Wind River Reservation, and it is a relatively isolated area of national forest in the Wind River Range (Figure 1).

Dickinson Park refers to a long open parkland that extends over three miles north-south (5 km), centered on confluent creeks that form broad wetlands surrounded by upland meadows within forest. Dickinson Park lies in the center of T33N R102W, with Dickinson Park Ranger Station at the north end and the Dickinson Creek Campground at the south end. The sheltered setting with wetlands and grassy meadows is part of a horse allotment, with trailheads to the Popo Agie Wilderness Area. For purpose of this study, the survey area includes about half of the sections in the township. Wetland features are associated with drainages in the study area, and wetland plant surveys were conducted along or in the watersheds of Dickinson Creek, Ranger Creek, Sand Creek, Twin Parks Creek, and the North Popo Agie River. Areas surveyed ranged in elevation from about 8520-9840 ft (2600-3000 m).

The Wind River Range is the largest discrete mountain mass in Wyoming (Blackstone 1971; cited in Scott 1995) and signifies one of the largest thrust faults in the Rocky Mountains, a 100-mile block of Precambrian crust raised and thrust to the southwest (Lageson and Spearing 1988). The Precambrian crust is exposed in places and the Dickinson Park area is located in the center of one of the largest areas of Late Archean granitic bedrock in the Wind River Mountains, composed of granodiorite to porphyritic and equigranular granite (Love and Christiansen 1985). In contrast to the rugged granitic outcrops, low-lying terrain in the same area is mantled by glacial till and outwash of sand, gravel and boulders. Water collects in the largest of glacial deposits, forming palustrine, riverine and lacustrine features. Most wetlands in the area are mapped in National Wetlands Inventory mapping (NWI; U.S. Fish and Wildlife Service 2012) following Cowardin et al. (1979) as Freshwater Emergent Wetlands, with graminoid cover and either seasonal standing water (PEMC), or semi-permanent standing water (PEMF). The Wind River Mountains have been flagged as an area with high wetland density and very high wetland condition when it comes to conserving, managing and restoring Wyoming's wetlands (Copeland et al. 2010).

Most of the Dickinson Park area is managed in for multiple use. Surveys entered the Popo Agie Wilderness Area only at the head of Twin Falls Creek. Summer use includes hikers and pack trains. The area is also used by hunters in fall.

The montane climate of the Wind River Range is characterized as receiving most precipitation from snowfall. The nearest maintained meteorological station is at Lander (1948-2006), an intermontane setting at 5560 ft (1695 m). Mean annual temperature is 44.8° F (7.1° C) with mean January temperature at 20.5° F (-6.4° C) and mean July temperature at 70.9° F (21.6° C). Mean annual precipitation is 12.98 in (32.97 cm), with peak precipitation in May 2.45 in (6.22 cm) (USDI NOAA 2006).

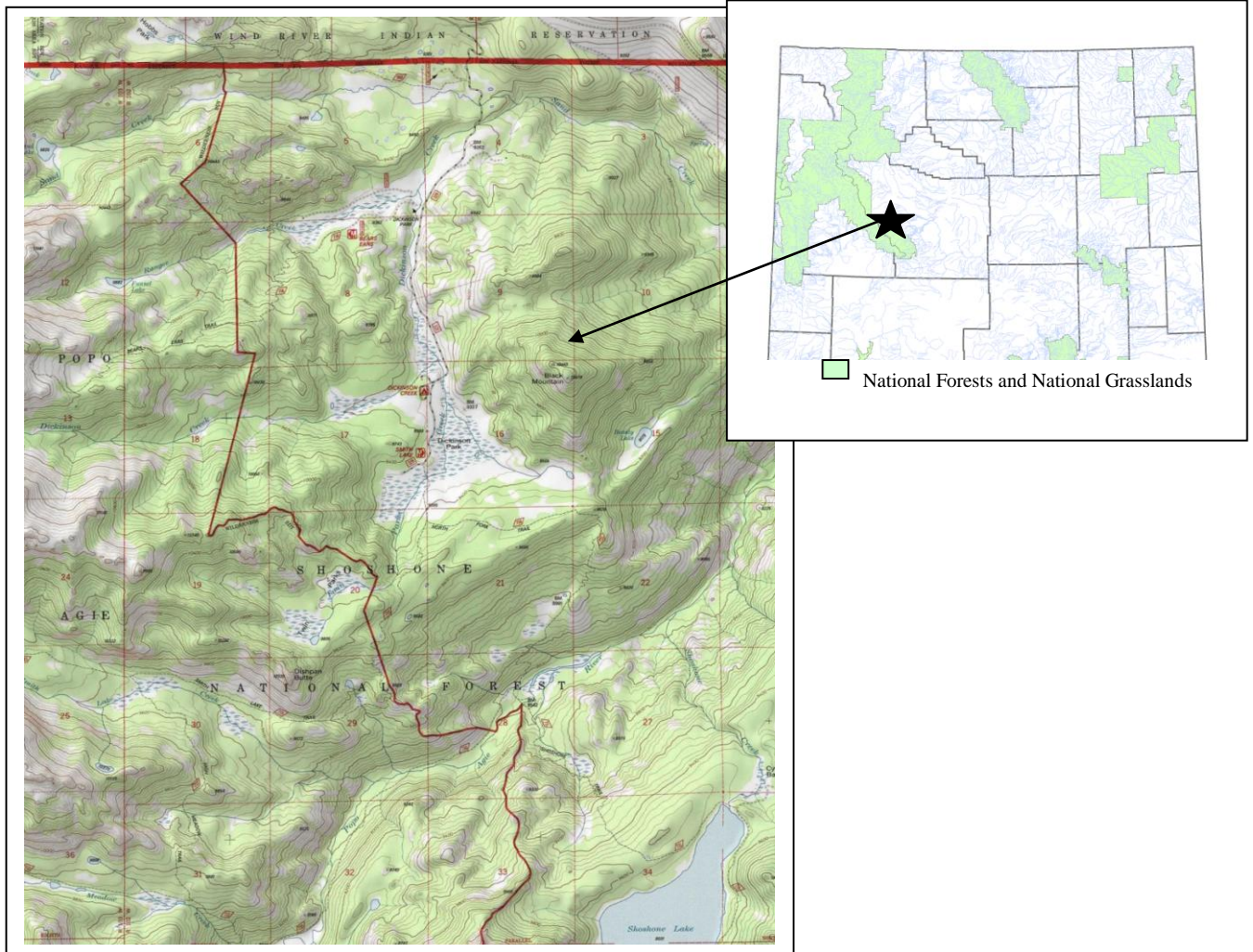


Figure 1. Dickinson Park study area, Fremont County, Wyoming

METHODS

The steps in project development are sketched below.

1. Assemble and prepare resources for field inventories (maps, aerials, Sensitive plant records, Forest Service site information).
2. Conduct inventories, using all available resources.
3. Process field collections.

4. Prepare reports on fieldwork results, accompanied by supporting documentation (specimen numbers, photo files, GIS files).
5. Review and update the status of any species documented in these studies, and any others that may be requested by the Forest, also conveying any results that have bearing on the vascular flora compilation.

Prior to fieldwork, an ArcMap project was set up using digital orthophotographs (NAIP 2006) upon which other layers were added for geo-referencing including the quarter-quad boundaries of the Dickinson Park Quad (U.S.G.S. 7.5') and section lines. A set of aerials was prepared and printed for reference in the field to represent each quarter-quad (at about 1:24,000) and each targeted wetland feature (most were printed at 1:4000). The NWI mapping was interpreted as representing approximate wetland extent, and the enlarged aerials were used to determine vegetation and associated hydrological patterns to survey. In addition, a data query was conducted for all Wyoming plant species of concern in the area. Essentially, all Wyoming plant species of concern were considered, regardless of whether they were known from the study area or not.

Surveys were conducted in Dickinson Park from 25-28 July 2012. The one species with special management status known from Dickinson Park is livid sedge (*Carex livida*), designated Sensitive by the U.S. Forest Service – Rocky Mountain Region (2001), and collected at one place. It was documented incidental to floristic inventory on the East Slope of the Wind River Range (Massatti 2007). No Threatened or Endangered plants are known to occur there. Additional wetlands of the area were flagged for Sensitive plant inventory based on recommendations of the Forest Ecologist (Houston pers. commun. 2012). Some wetlands were added (e.g., Sand Creek) and some small wetland features in kettle potholes were surveyed to consider the importance of wetland size in harboring the target species. The twenty wetland areas that were surveyed are shown in Figure 2.

Prior to this study, there were no known fens in the Dickinson Park area, although *Carex livida* had been characterized as a fen obligate (Heidel 2006), and might indicate the presence of fen habitat. The NWI wetland mapping showed no wetlands mapped as having permanently-saturated soils at the surface (fens; PEMB) in the Dickinson Park area, indicating fen habitat, so the NWI layer was not referenced except to as a wetland delimitation reference (Figure 2). In the field, soil texture was noted at each site, whether organic or mineral.

Surveys spanned wetland habitat on five drainages and covered 20 areas including all wetlands originally identified for survey. During surveys, the opposite ends of wetland features were recorded using Global Positioning System (GPS) units, and rare plant population boundaries were also recorded as a series of GPS points in order to later map the population. Additional information represented on the Wyoming plant species of concern survey form was also recorded. Voucher species were collected for depositing in RM and photographs were taken. If species observed in the field were not represented in Dorn (2001), voucher specimens were collected as secondary contributions to previous floristic work.

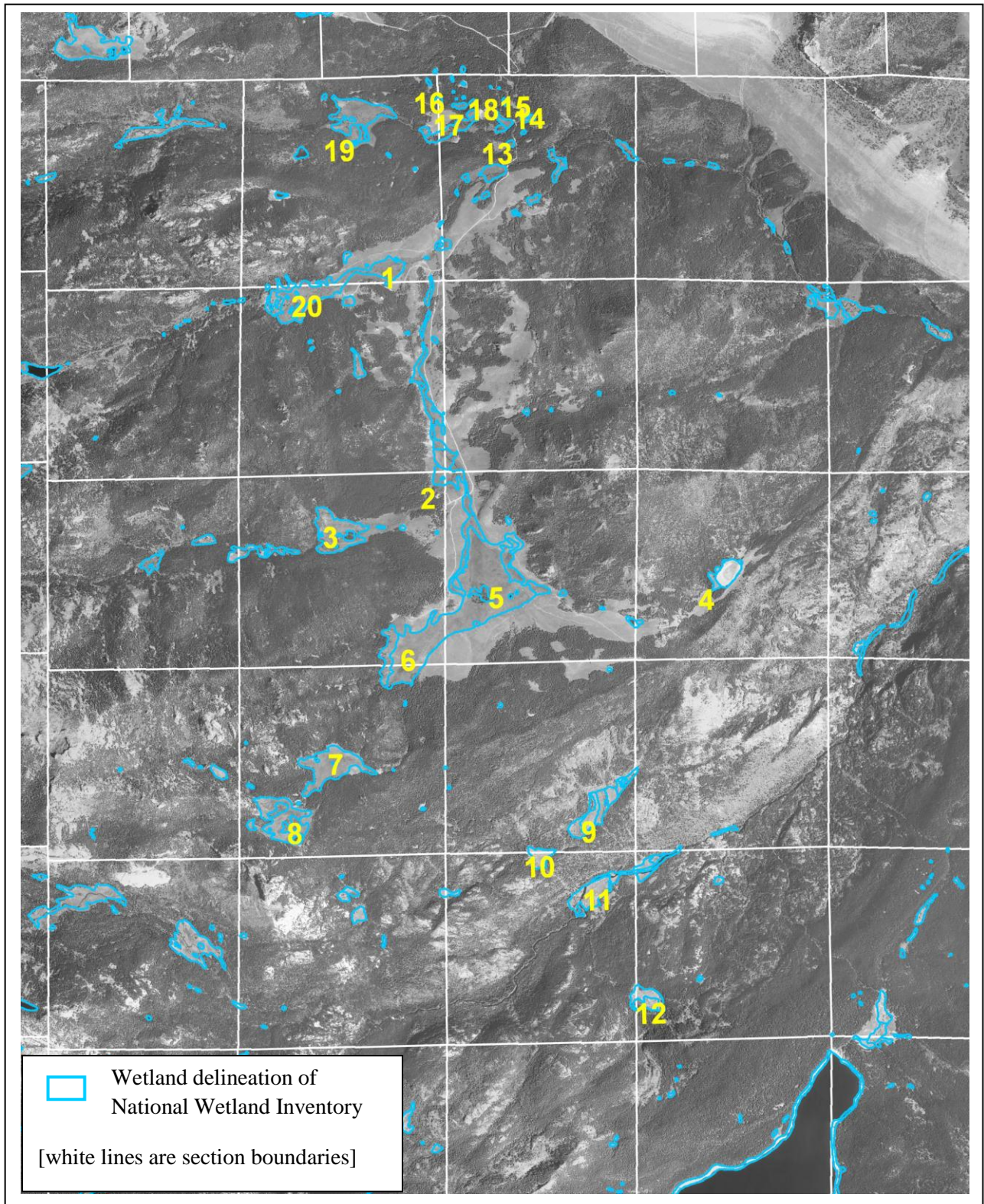


Figure 2. Wetlands surveyed in the Dickinson Park study area; site nos. 1, 20 – Ranger Cr., site nos. 2, 3 – Dickinson Cr., site nos. 4, 13-19 – Sand Cr., site nos. 5-8 Twin Parks Cr., site nos. 9-12 – North Popo Agie R.

RESULTS

As a result of 2012 surveys, five plant species of interest were documented (Figure 3, Table 1). They were found at nine of the 20 wetland survey sites (Table 2).

Carex livida was documented at nine locales across five sections. The locales have differing degrees of hydrological connectivity but are all within 1 mile of one another, and thus within range of wind pollination distances. They are treated as a single large population complex, one of the most extensive of the 25 known populations in the state. It was abundant and locally dominant in less than half of the subpopulations.

Surveys documented two other Sensitive species. Often growing with *Carex livida* was lesser bladderwort (*Utricularia minor*), present at over half of the *C. livida* locales (five of nine), including most of the ones that had standing water pools. In addition, simple kobresia (*Kobresia simpliciuscula*) was collected at the last wetland surveyed, representing the second time it has been collected in the Wind River Range after Erwin Evert collected it near Ross Lake in 2002.

Carex livida is more common than mud sedge (*Carex limosa*) in Yellowstone National Park according to Jennifer Whipple (Whipple pers. obs.). While *C. limosa* is no longer tracked as a Wyoming species of concern, the relationships between these two in the Wind River Range may elucidate *C. livida* status, so information was collected on both. *Carex limosa* was present at three of the nine locations where *C. livida* grew and at a small, isolated glacial pothole where it was the only target species present.

Uplands were not routinely surveyed, but tranquil goldenweed (*Pyrrocoma clementis* var. *clementis*) was promptly recognized incidental to wetland access, and was found to be widespread in the dry meadows above wetlands. It occupies habitat in the area that spans the length of Dickinson Park and was the most extensive of the species surveyed, occupying habitat conservatively estimated at over 260 acres (100 ha).

Table 1. Plant survey results in the Dickinson Park area

No.	Species	FS status	WYNDD status	Fen indicator	Acres (ha)
010	<i>Carex livida</i> Livid sedge	Sensitive	Watch	Obligate	50.5 (20.4)
067	<i>Carex limosa</i> Mud sedge	None	Not tracked, but valuable context	Obligate	15.7 (6.4)
006	<i>Kobresia simpliciuscula</i> Simple kobresia	Sensitive	Tracked	Obligate	< 1
001	<i>Pyrrocoma clementis</i> var. <i>clementis</i> Tranquil goldenweed	None	Tracked	NA	260+ (100)
034	<i>Utricularia minor</i> Lesser bladderwort	Sensitive	Watch	Obligate?	31.1 (12.6)

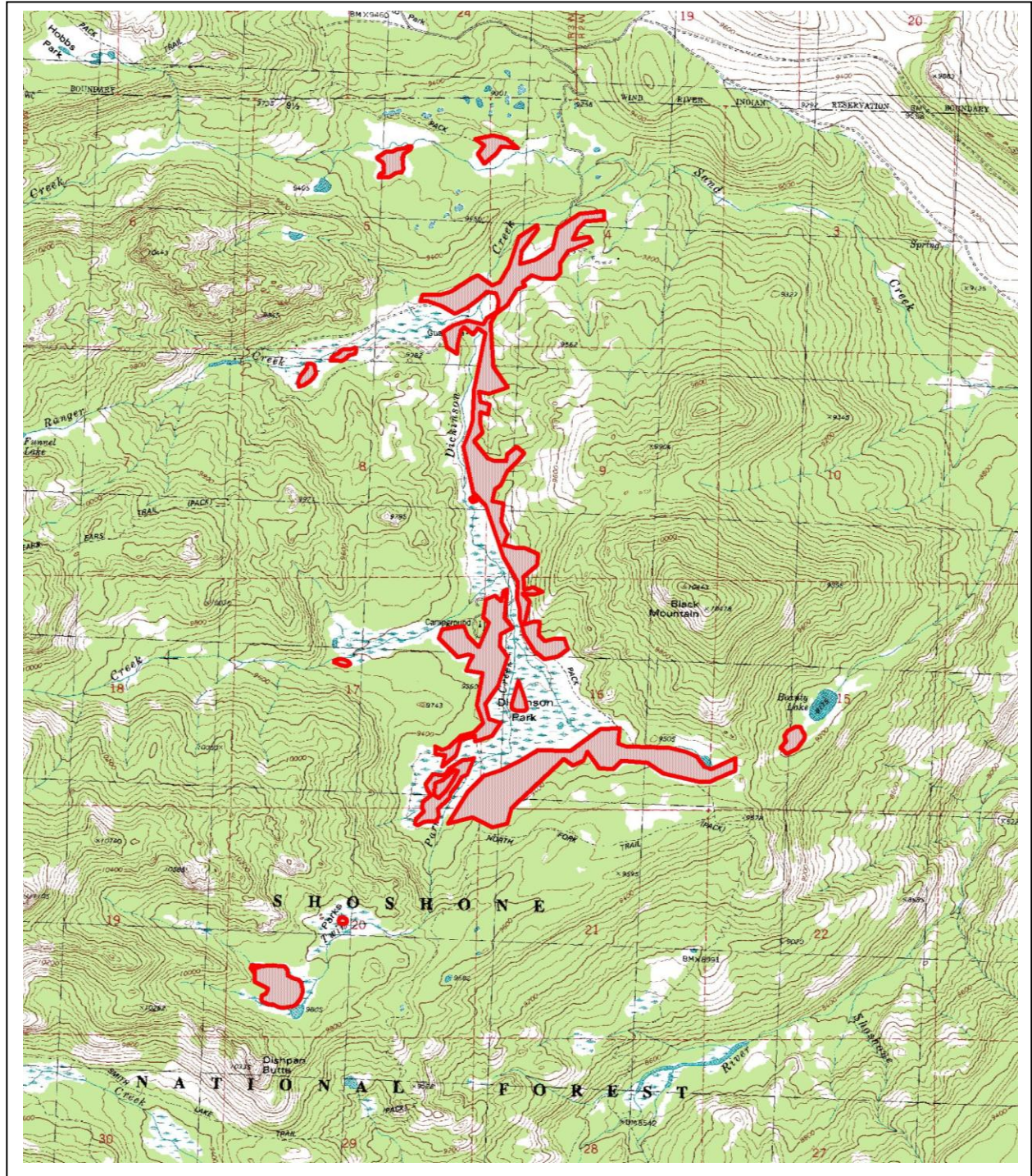


Figure 3. Distribution of Sensitive plants in the Dickinson Park area

Table 2. Dickinson Park area plant survey results, by site

Site No.	Watershed	Target species	Wetland % occupied	Notes
1	Ranger	none	-	Fen area straddling creek
2	Dickinson	<i>Carex livida</i> on E side of creek, nothing on W side of creek	Small	Two isolated springs above creek, one with peat
3	Dickinson	<i>Carex livida</i> , <i>Utricularia minor</i>	Small	Isolated perched fen habitat, above creek, part of much larger wetland
4	Sand	none	-	Shallow lake w/ gravelly bottom and drawdown on all sides and mesic meadow to S and W
5	Twin Parks	<i>Carex livida</i>	Large ?	Site of Massatti collection, one of the largest wetlands in the area, heavily churned
6	Twin Parks	<i>Carex livida</i> , <i>Utricularia minor</i>	Large	Relatively dry fen habitat w/ high alkalinity, includes a small perched fen terrace outlier
7	Twin Parks	<i>Carex livida</i>	Small	Central fen pocket in larger wetland
8	Twin Parks	<i>Carex livida</i> , <i>C. limosa</i> , <i>Utricularia minor</i>	Prevalent	Large fen wetland with small lake, ponds, boulders
9	N Popo Agie	none	-	Not fen.
10	N Popo Agie	none	-	Not fen. Burned, one of the steeper sites
11	N Popo Agie	none	-	Not fen.
12	N Popo Agie	none	-	Not fen.
13	Sand	none	-	Glacial kettle
14	Sand	none	-	Glacial kettle
15	Sand	none	-	Glacial kettle
16	Sand	<i>Carex limosa</i>	Small	Glacial kettle with tiny floating peat mat
17	Sand	none	-	Glacial kettle
18	Sand	none	-	Glacial kettle
19	Sand	<i>Carex livida</i> , <i>C. limosa</i> , <i>Utricularia minor</i>	Prevalent	Large fen wetland with central pool, on south side of creek
20	Ranger	<i>Carex livida</i> , <i>C. limosa</i> , <i>Kobresia simpliciuscula</i> ,	Prevalent?	Three fen areas on both sides of creek; all rare plans on south side

The following pages provide species' results and status information for the five target species. All 2012 survey results are detailed in Appendix A. They provide basis for updating Sensitive species evaluations, as completed for *Utricularia minor* (Appendix B) and state ranks.

LIVID SEDGE

Carex livida (Wahl.) Willd.

Classification

Scientific name: *Carex livida* (Wahl.) Willd.

Synonyms: none

Common name: Livid sedge

Family: Cyperaceae

Size of genus: The sedge genus is a circumboreal genus of about 2000 species (460 in North America; Ball and Reznicek 2002). It is the largest genus in Wyoming, with 120 unique taxa as reported in Dorn (2001).

Present legal or other formal status

U.S. Fish & Wildlife Service: none

U.S. Forest Service – Rocky Mountain Region: Sensitive

Global Heritage rank: G5

State Legal status: none

State Heritage rank: The more recent list update (Heidel 2012) reported an SRANK change of S3. Data recently provided from Yellowstone National Park indicate that it may be more common in the Greater Yellowstone area than previously documented. It is retained on the Watch list.

Wyoming contribution rank: Conservation of livid sedge as a disjunct species in Wyoming signifies a medium-level contribution to rangewide conservation.

Description

General description: Livid sedge is a rhizomatous or loosely tufted perennial 10-40 cm tall. Leaves are 1-4 mm wide, deeply grooved down the middle, waxy-bluish-green, and found only on the lower 1/3 of the stem. The uppermost flowering spike is entirely staminate, 1-2.5 cm long, and on a long stalk. The 1-3 lateral spikes are 1-2.5 cm long, all pistillate, and nearly sessile. The bract subtending the lowest spike is leaf-like and up to 7 cm long. Pistillate flower scales are oval with a broad, green midrib stripe, brown marginal stripes, and white-membranous edges. The perigynia are oblong-ovate and taper to the tip, waxy-green (glaucous), and minutely bumpy on the surface. The achenes are three-sided with 3 stigmas (Fertig et al. 1994; Hermann 1970, Hurd et al. 1998, Johnston 2001, Hitchcock et al. 1969; Figures 4-5).

Local field characters: The uppermost spike is staminate and usually long-stalked, and the perigynia are waxy-green.

Similar species: *Carex aquatilis* has long-stalked spikes and flowers with 2 stigmas. *C. buxbaumii* has pistillate flowers at the tip of the terminal spike and long-tapering (awned) scales. *C. limosa* has drooping spikes on slender stalks (Dorn 2001).

Phenology: July-August.



Figure 4. *C. livida*, by Jeanne Janish, from Hitchcock et al. (1969)

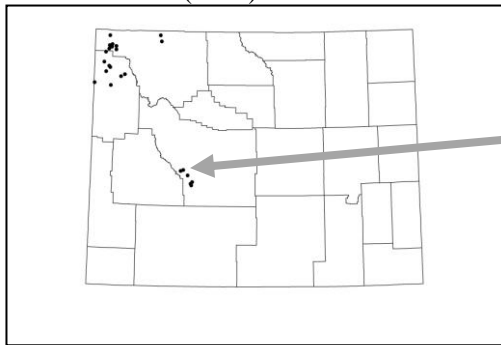


Figure 6. Wyoming distribution of *C. livida*



Figure 5. *C. livida* by B. Heidel

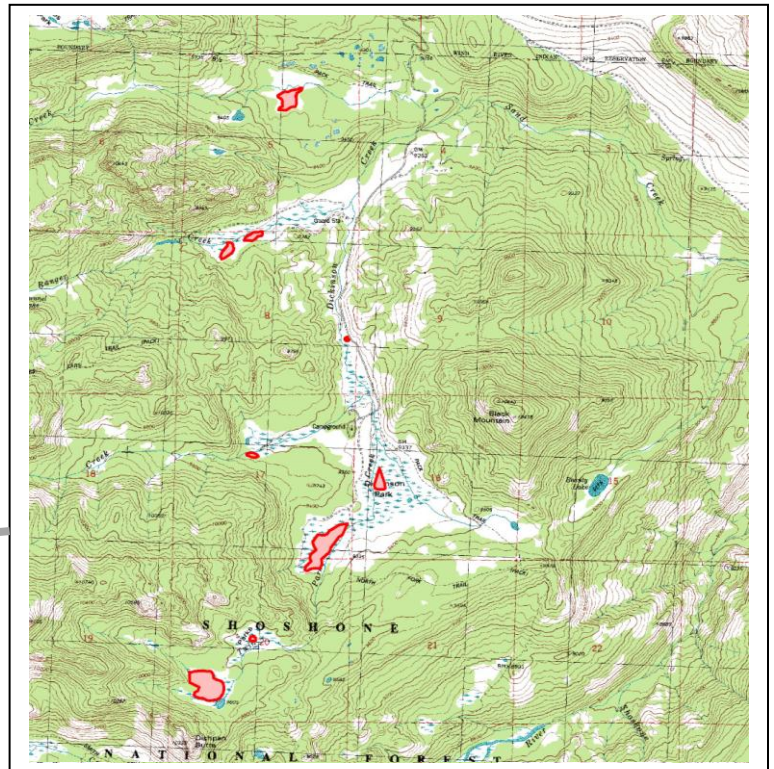


Figure 7. Dickinson Park area distribution of *C. livida*

Geographical distribution

Range: Southern Alaska to Newfoundland, south to California, Colorado, Michigan, and New Jersey. In Wyoming it is known from the Beartooth Mountains, Wind River Range and Yellowstone Plateau (Figure 6). The Dickinson Park population extends from the Dickinson, Ranger, Sand and Twin Parks watersheds (Figure 7). It is known in the Wind River Range from five other areas, and the present study indicates it may be more widespread than records would indicate.

Number of populations in the state and in the study area: *Carex livida* is known from 25 extant occurrences in Wyoming. The Dickinson Park population represents one of the most extensive populations known in Shoshone National Forest. The specimen data from Yellowstone National Park only recently became available, to update this statewide tally of occurrences.

Additional species information

Size and extent: *Carex livida* subpopulation numbers vary greatly in Dickinson Park, from small patches to areas where it was the prevalent species over hundreds of square meters. It is rhizomatous, so that stem numbers do not indicate population size.

Habitat in the state and in the study area: In Wyoming and the Rocky Mountain Region, *Carex livida* occupies graminoid fens, including zones that have floating mats or are anchored (Gage and Cooper (2006). In Dickinson Park, it is found in highest numbers where there are large open water pools, but present in an array of settings. Associated plants include *Carex simulata*, *C. scopulorum*, *Eleocharis pauciflora* and high moss cover. In Yellowstone National Park, it is reported as co-dominant or associated there with *Drosera anglica* and *Eleocharis tenuis* var. *borealis* (Lemly 2007, Lemly and Cooper 2011). Note: Both of these associated species are also designated Sensitive species by the U.S. Forest Service – Rocky Mountain Region, though not associated with *C. livida* in Shoshone National Forest. Elevation: 6420-9840 ft. Dickinson Park also represents the upper limits of known elevation in Wyoming. In Yellowstone National Park, it is known from sites with pH values ranging from 5.5-8.1 (Whipple pers. commun. 2012).

Dickinson Park notes: In two places at the south end of Dickinson Park, only staminate plants of *Carex livida* were present, and these locales were the driest of occupied habitats. This may reflect 2012 drought conditions.

One of the nine areas where *Carex livida* was present, at the south end of Dickinson Park, had the center of the wetland area torn up by wildlife use such that only barren peat was at the center. Central areas are the wettest in the landscape, and *C. livida* was present at the fringes, so it is possible that wildlife use has reduced available habitat at this one place. This is discussed further in the assessment section at the end. The three sites with the largest *Carex livida* numbers are represented on aerial maps (Figures 8-10; north to south). The Ranger Creek area is the historic and current center of human activity. By comparison, the Sand Creek and Twin Parks Creek sites are relatively isolated and the latter lies within Popo Agie Wilderness Area.

Largest *Carex livida* subpopulations

Figure 8.
Sand Creek (site #19)

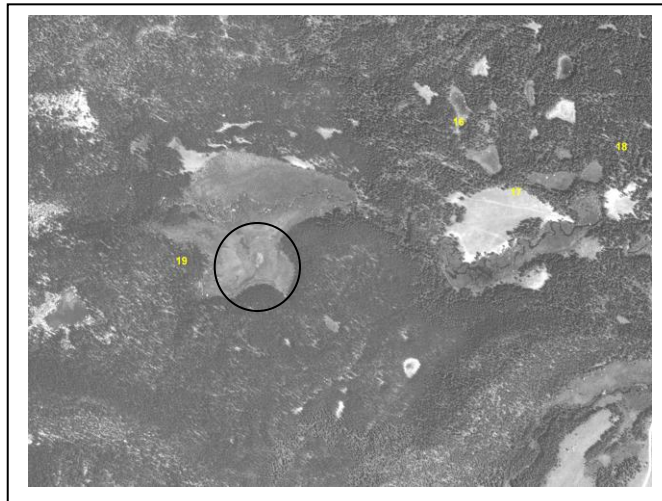


Figure 9.
Ranger Creek (site #20)

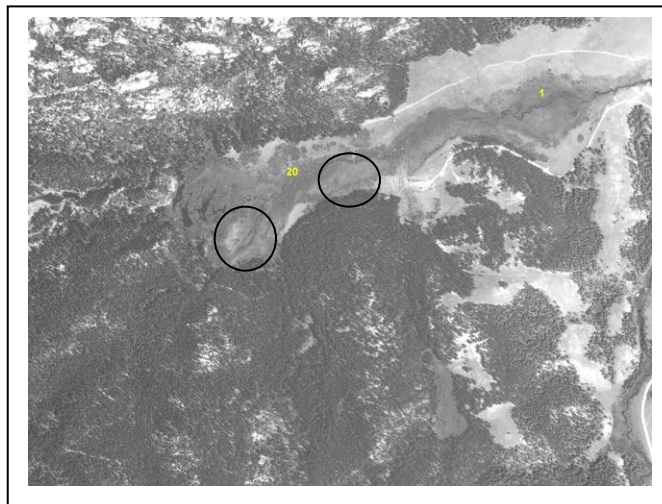


Figure 10.
Twin Parks Creek (site #8)



MUD SEDGE
(*Carex limosa* L.)

Scientific name: *Carex limosa* L.

Common name: Mud sedge

Synonym: none

Family: Cyperaceae

Size of genus: The sedge genus is a circumboreal genus of about 2000 species (460 in North America; Ball and Reznicek 2002). It is the largest genus in Wyoming, with 120 unique taxa as reported in Dorn (2001).

Present legal or other formal status

U.S. Fish & Wildlife Service: none

U.S. Forest Service – Rocky Mountain Region: Sensitive

Global Heritage rank: G5

State Legal status: none

State Heritage rank: The more recent list update (Heidel 2012) reported an SRANK of S3 when it was dropped from state ranking in 2007.

Wyoming contribution rank: Conservation of mud sedge as a sparsely-distributed species in Wyoming signifies a low-level contribution to rangewide conservation.

General Description

Description: Mud sedge is a perennial with stems (culms) 20-60 cm tall from long-creeping rhizomes that are covered by yellowish-brown felty hairs (these hairs are sometimes obscure). Leaves are 1-2 mm wide, and tend to be channeled rather than flat. The terminal spike of the inflorescence is 13-27 mm long and consists entirely of staminate flowers. One to three lateral, pistillate spikes are 1-2.5 cm long and nod on slender stalks. Pistillate scales are light to dark brown with a prominent midvein, a rounded to sharp-pointed (cuspidate) tip, and are commonly as long and wide as the perigynium. Perigynia are 2.3-4.2 mm long, elliptic to ovate, pale greenish or straw colored and covered with small rounded bumps. Achenes 3-sided with 3 stigmas (Dorn 2001, Hitchcock et al. 1969; Hermann 1970; Hurd et al. 1998, Johnston 2001; Figures 11-12).

Local field characters: Nodding pistillate spikes with scales at least as wide as perigynia and barely longer.

Similar Species: *Carex paupercula* has shorter terminal spikes and long-pointed pistillate scales that are narrower and longer than the perigynia. *Carex livida* and *C. buxbaumii* have erect lateral spikes. *C. capillaris* has tufted stems and scales that are smaller than the perigynia (Dorn 2001).

Phenology: Late June-August.



Figure 11. *C. limosa*, by Jeanne Janish, from Hitchcock et al. (1969).



Figure 12. *C. limosa* by B. Heidel

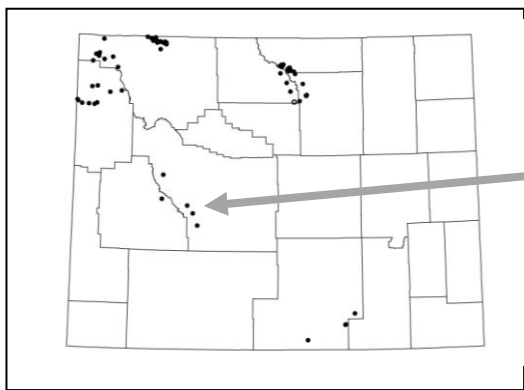


Figure 13. Wyoming distribution of *C. limosa*.

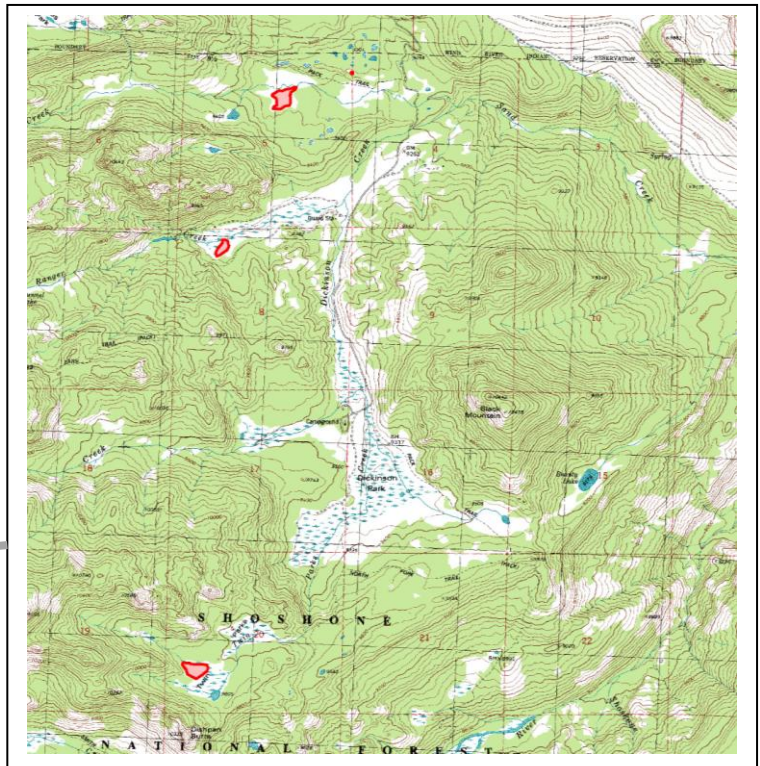


Figure 14. Dickinson Park area distribution of *C. limosa*

Distribution

Circumboreal, from Labrador and Newfoundland to Alaska, south to California, Colorado, Nebraska, Indiana and Delaware. In Wyoming, known from the Absaroka, Beartooth, Big Horn, Sierra Madre, and Wind River ranges, and Yellowstone Plateau, in Big Horn, Carbon, Johnson, Park, Sheridan, Sublette, and Teton counties (Figure 13). In the Dickinson Park area, it is present in the Ranger, Sand and Twin Parks watersheds (Figure 14).

Number of populations in the state and in the study area: There are one historic and 63 extant populations in the state, including Bighorn, Medicine Bow and Shoshone National Forests (Heidel 2011, Heidel and Jones 2006, Fertig and Jones 1992). There are four known subpopulations making up the Dickinson Park area population.

Additional species information

Size and extent: The four *Carex limosa* subpopulations in the Dickinson Park area range in size from about 1 m in a small glacial kettle to dominance in parts of well-developed fens at opposite ends of the study area (Sand Creek and Twin Parks South). It reproduces vegetatively, so stem numbers are not an indication of population size.

Habitat in the state and in the study area: Occurs rangewide in *Sphagnum* bogs, wet meadows and shores (Ball 2002). In Wyoming, it is most abundant in floating peatland mats but present in different fen types and water chemistry; uncommon in wet meadows. Soils are wet to saturated at the surface. Elevation 6600-10,280 feet.

Carex limosa forms floating mats that have been known to trap bison in Yellowstone National Park (Whipple pers. commun. 2011), where it has been reported from sites with pH values ranging from 4.4-8.1.

Dickinson Park notes: Dickinson Park is a missing link in understanding the geographic and habitat sorting of the two species at the southern end of the Greater Yellowstone area. The only clear habitat distinctions between *Carex limosa* and *C. livida* habitats is that the former is more restricted to floating peat rather than anchored peat. It is more often in association with *Carex simulata* than *C. scopulorum* or *Eleocharis quinqueflora*. It may be that *Carex limosa* is better-adapted to colonize openwater zones, while *C. livida* is better-adapted to surviving in peat-burial conditions.

SIMPLE KOBRESIA

Kobresia simpliciuscula (Wahl.) Mack.

Classification

Scientific name: *Kobresia simpliciuscula* (Wahl.) Mack.

Common name: Simple kobresia

Synonyms: none

Family: Cyperaceae

Size of genus: The kobresia genus has about 30 species, most of which are in Asia. There are three species in North America (Ball 2002) and all three are in Wyoming (Dorn 2001).

Present legal or other formal status

U.S. Fish & Wildlife Service: none

U.S. Forest Service – Rocky Mountain Region: Sensitive

Global Heritage rank: G5

State Legal status: none

State Heritage rank: S1

Wyoming contribution rank: Conservation of simple kobresia as a disjunct species in Wyoming signifies a medium-level contribution to rangewide conservation.

General description

Description: Simple kobresia is a densely tufted perennial graminoid with stems (culms) 10-35 cm tall clothed with persistent leaves at the base. Leaves are about 1 mm wide, erect to strongly curved, and shorter than the flowering stems. The inflorescence is 1.5-4 cm long and 5-8 mm wide and consists of 3-12 spikes. Terminal spikes contain all staminate flowers, while lower spikes contain both sexes or only pistillate flowers. Flowering scales are brown and shorter than the perigynia. Perigynia are 2.5-2.7 mm long and split down their inner side nearly to the base to expose the grayish brown achenes. Stigmas 3 (Hulten 1968; Hitchcock et al. 1969; Porsild and Cody 1980; Dorn 1992; Figures 15-16).

Local field characteristics: Easily mistaken for a sedge, particularly because it has multiple spikes. Closer examination reveals that it has a perigynia slit down one side nearly to the base surrounding the achene.

Similar species: *Kobresia schoenoides* and *K. myosuroides* have solitary terminal spikes. *Carex* spp. have perigynia fused into a sac-like structure that completely enclose the achene.

Flowering/Fruiting Period: July-August.

Geographical distribution

Range: Circumpolar, in North America from Alaska to Greenland south to New Brunswick, northern Ontario, Alberta and in the Rocky Mountains south to Montana, northwest Wyoming



Figure 15. *K. simpliuscula*, by Jeanne Janish, from Hitchcock et al. (1969)



Figure 16. *K. simpliuscula* (specimen photo) by B. Heidel

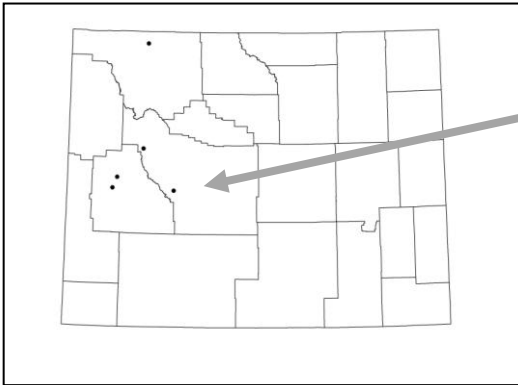


Figure 17. Wyoming distribution of *Kobresia simpliuscula*

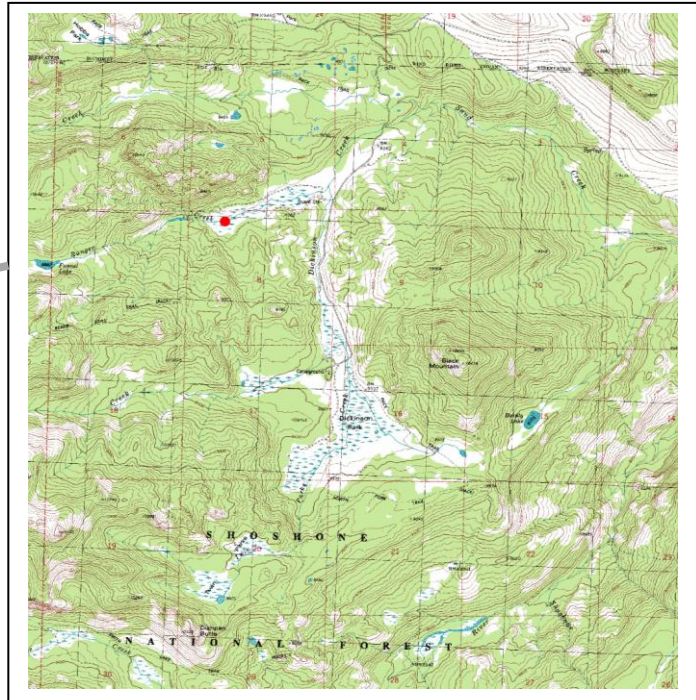


Figure 18. Dickinson Park area distribution of *Kobresia simpliuscula*

and central Colorado (Figure 17). The first place it was discovered in the state was in Swamp Lake (Fertig and Jones 1992). In Wyoming, it is known from the Clarks Fork Valley in the northern Absaroka Range, the Wind River Range and the Upper Green River Basin of Fremont, Park and Sublette counties. In the Dickinson Park area, it has only been found on Ranger Creek (Figure 18). The distribution has expanded since the most recent conservation assessment (Decker et al. 2006).

Number of populations in the state and study area: *Kobresia simpliciuscula* is known from five extant occurrences in Wyoming, all of which have been discovered since 1985 (last observed in 2012). Three are on Shoshone National Forest, two of which are in the Wind River Range.

Additional species information

Size and extent: The Swamp Lake occurrence has been estimated as occupying 20 acres. The Upper Green River Basin occurrences are magnitudes smaller (Heidel 2013). No data are available on Wind River Range occurrences. The Dickinson Park occurrence was in an area of many vegetative graminoids, so the population extent could not be determined..

Habitat in the state and study area: In the Pacific Northwest, *Kobresia simpliciuscula* is reported from bogs, wet meadows, edges of beaver ponds, and other wet places in the mountains, but generally not at the highest elevations (Hitchcock et al. 1969). In Wyoming, it occurs in graminoid fens, often with *Carex simulata* and *Triglochin maritimum*. Elevation ranges from 6600-10,820 feet. The Dickinson Park habitat is gently-sloping graminoid fen, possibly restricted to the lower end at the point of discharge into Ranger Creek.

Elsewhere in the Rocky Mountains, it has been as co-dominant in a plant association of extreme rich fen (Sanderson and March 1996, Carsey et al. 2003).

Dickinson Park notes: *Kobresia simpliciuscula* was not found until the end of surveys, so it was not on the running target list. It is unclear whether it is restricted to a single point at Ranger Creek or whether it may have been present more widely in vegetative condition and overlooked.

TRANQUIL GOLDENWEED

Pyrocoma clementis Rydb. var. *clementis*

Classification

Scientific name: *Pyrocoma clementis* Rydb. var. *clementis*

Synonyms: *Pyrocoma villosa*, *Haplopappus villosa*

Common name: Tranquil goldenweed

Family: Asteraceae

Size of genus: The goldenweed genus is comprised of 14 species, all restricted to North America (Bogler 2006). There are six species in Wyoming (Dorn 2001). The genus was first described by Hooker in 1833, characterized by its persistent basal rosettes of leaves, yellow-rayed heads on scapiform or few-bracteate peduncles, and obtuse, acute or mucronate phyllaries.

Present legal or other formal status

U.S. Fish & Wildlife Service: none

U.S. Forest Service – Rocky Mountain Region: none.

Note: *Pyrocoma clementis* var. *villosa* is the other variety present in the state. It is designated Sensitive by the U.S. Forest Service list, and this has been a source of confusion because variety distinctions are not accepted in the Rocky Mountain Herbarium at present, and all specimens are filed by species name. Specimens of both varieties were studied in work on a *Pyrocoma clementis* Rydb. var. *villosa* status report prepared for Bighorn National Forest (Heidel 2011) in which the variety distinctions were noted as consistent and warranting taxonomic research.

Global Heritage rank: G3G4T3T4

State Legal status: none

State Heritage rank: S1 (Heidel 2012)

Wyoming contribution rank: Conservation of tranquil goldenweed as an outlying or peripheral population segment apart from the rest of its range in Wyoming signifies a low- or medium-level contribution to rangewide conservation.

Description

General description: Tranquil goldenweed is a perennial forb with 1 to many stems from a branched rootstock. Stems are 3-15 (30) cm tall and loosely white-hairy to glabrous. Basal leaves are oblanceolate to narrowly elliptic, 2-12 cm long, and sparsely pubescent to glabrate on the surface. Stem leaves are progressively smaller and sessile to clasping. Flower heads are solitary or number 2-4 with involucre 9-15 mm high and woolly to glabrous lanceolate to obovate, abruptly acute, attenuate bracts that are green throughout. Ray flowers are yellow and 10-15 mm long while disk flowers are 6-8.5 mm long. Fruits are 4-sided hairy achenes with tawny to brown bristles (Cronquist 1994; Dorn 2001, Bogler 2006; Figures 19-20).

Local field characters: *Arnica* spp. have mostly opposite leaves.

Similar species: *Pyrocoma clementis* var. *villosa* is similar except for lanceolate to oblanceolate involucral bracts and glabrous achenes. The variety epithet would seem to suggest that it is



Figure 19. *Pyrocoma clementis*, from Hall 1928.



Figure 20. *Pyrocoma clementis* var. *clementisa* by B. Heidel

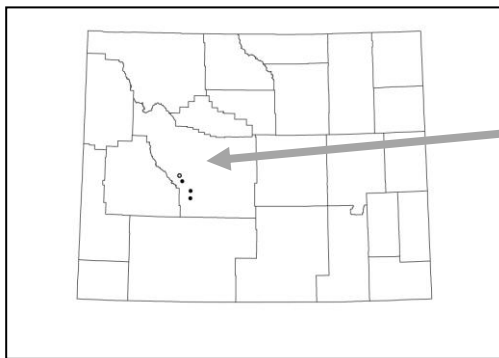


Figure 21. Wyoming distribution of *Pyrocoma clementis* var. *clementisa*

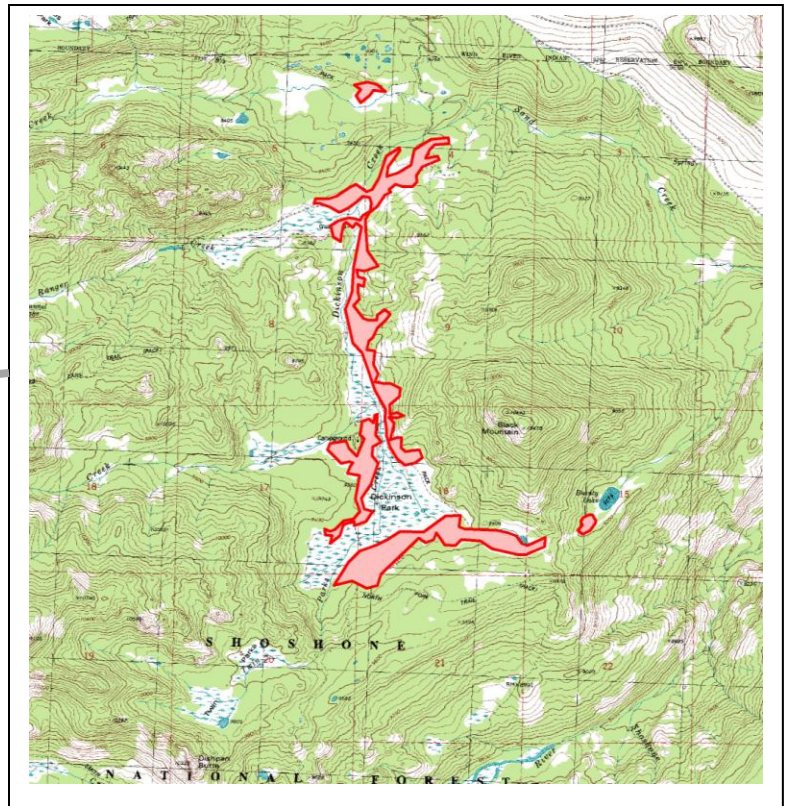


Figure 22. Dickinson Park area distribution of *Pyrocoma clementis* var. *clementisa*

Similar species: *Pyrrcoma clementis* var. *villosa* is similar except for lanceolate to oblanceolate involucre bracts and glabrous achenes. The variety epithet would seem to suggest that it is particularly hairy, but this does not distinguish the two varieties. *Pyrrcoma integrifolia* has green-tipped involucre bracts or green just on upper end. *Pyrrcoma uniflora* has 1-4 flowering heads with involucre 5-10 mm long. *Pyrrcoma lanceolata* has 4 or more flower heads per stem with involucre 5-10 mm long of green-tipped bracts (Dorn 2001; Cronquist 1984, Bogler 2006).

Phenology: Flowering late June-early August.

Distribution: Only known from the Wind River Range in Wyoming (Figure 21). There is also a report of it from Carbon County (Dorn 2001) but there is not a voucher known to support this report. In Colorado it is known from intermontane parks and dry alpine (Weber and Wittmann 2012) and in Utah it is known from high elevation grass-sagebrush, spruce-fir, sedge-forb and meadow communities (Welsh et al. 2008). It more or less encircles the Dickinson Park area wetlands (Figure 22).

Pyrrcoma clementis var. *villosa*, by comparison, is only known from the Bighorn Mountains of Wyoming where it is extant in Big Horn and Washakie counties, and known historically from Johnson and Sheridan counties.

Additional species information

Size and extent: Dickinson Park is the only population with partial mapping of its extent. If this pattern repeats elsewhere on the East Slope of the Wind River Range, other populations of sizeable extent would be expected.

Habitat: The Dickinson Park population is on gravelly upland meadows on loams derived from glacial till. It is not known if its Wyoming populations have granitic bedrock geology in common. If so, it would be expected to have a wider distribution in either direction along the Wind River Range. It is associated with Idaho fescue (*Festuca idahonis*), sulfur-flower buckwheat (*Eriogonum umbellatum* var. *majus*), and sometimes with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*).

Pyrrcoma clementis var. *villosa*, by comparison, is mainly known from landscapes with limestone or dolomite parent material.

Dickinson Park notes: The taxon was also noted in woodland openings south of Dickinson Park, but GPS points were not taken. Plants were in late stages of flowering at the time of visit in 2012, a dry year. The rosettes of basal leaves are distinctive in vegetative condition, but much less conspicuous.

LESSER BLADDERWORT

Utricularia minor L.

Classification

Scientific name: *Utricularia minor* L.

Synonyms: none

Common name: Lesser bladderwort

Family: Lentibulariaceae

Size of genus: The bladderwort genus is a large cosmopolitan genus comprised of nearly 300 species, best developed in the tropics (Hitchcock et al. 1959). It is so complex and variable that early authors divided it into 12 genera. There are four bladderwort species in Wyoming (Dorn 2001, and Hellquist et al. in preparation). Two bladderwort taxa are documented in Pole Mountain (Rocky Mountain Herbarium 2012).

Present legal or other formal status

U.S. Fish & Wildlife Service: none

U.S. Forest Service – Rocky Mountain Region: Sensitive

Global Heritage rank: G5

State Legal status: none

State Heritage rank: S3; reranked in the most current revision (Heidel 2012)

Wyoming contribution rank: Conservation of lesser bladderwort as a disjunct species in

Wyoming signifies a medium-level contribution to rangewide conservation.

Description

General description: Lesser bladderwort is a perennial aquatic herb with submersed, weak stems and leaves. The leaves are 0.3-1 cm long and finely dissected, with each 3-parted leaflet further divided into 1-3 flat, toothed segments. Small bladders (1-2 mm wide) are scattered along the main leaf blade among the leaflets, and sometimes also on separate branches. The inflorescence is a raceme of 2-9 yellow flowers on an emergent stalk 4-15 cm long. The short-spurred, snapdragon-like flowers are bilobed, with the lower lip 4-8 mm long and about twice as long as the upper lip (Hitchcock et al. 1959, Cronquist et al. 1984; Figures 23-24).

Local field characters: Leaves are mostly 3-parted at base, 1 cm or less long, and bladders are mostly on ordinary leaves.

Similar species: Common bladderwort (*Utricularia vulgaris*) has leaves that are mainly 2-parted, 1-5 cm long, and flowers 12-18 mm long. Flatleaf bladderwort (*U. intermedia*) has bladders 2.5-4.0 mm long, borne on separate, leafless branches.

Phenology: Rarely seen in flower. Collected vegetatively June-September.

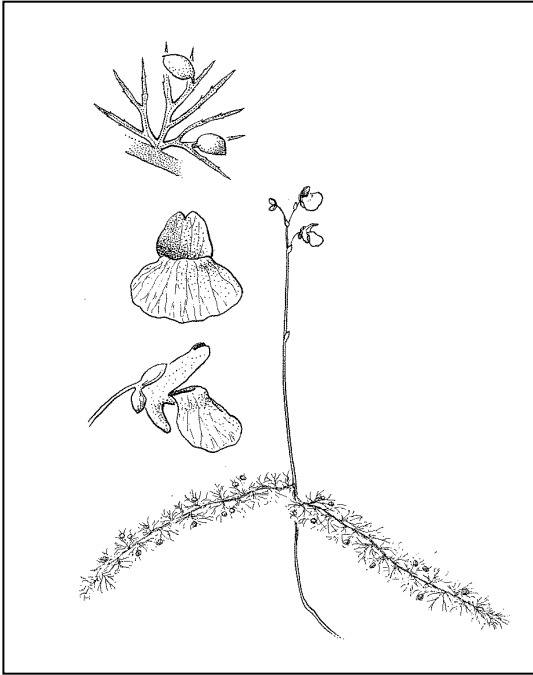


Figure 23. *Utricularia minor*, by Jeanne Janish. From: Hitchcock et al. 1959.



Figure 24. *Utricularia minor* by B. Heidel

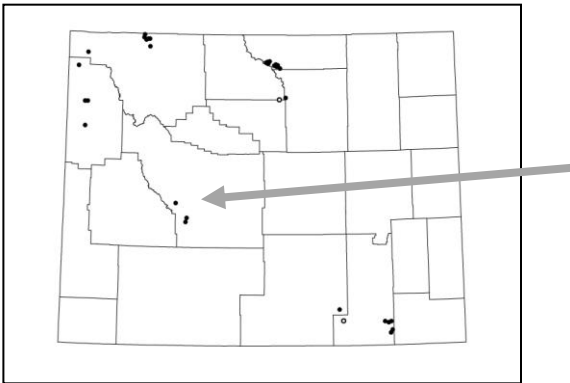


Figure 25. Wyoming distribution of *U. minor*

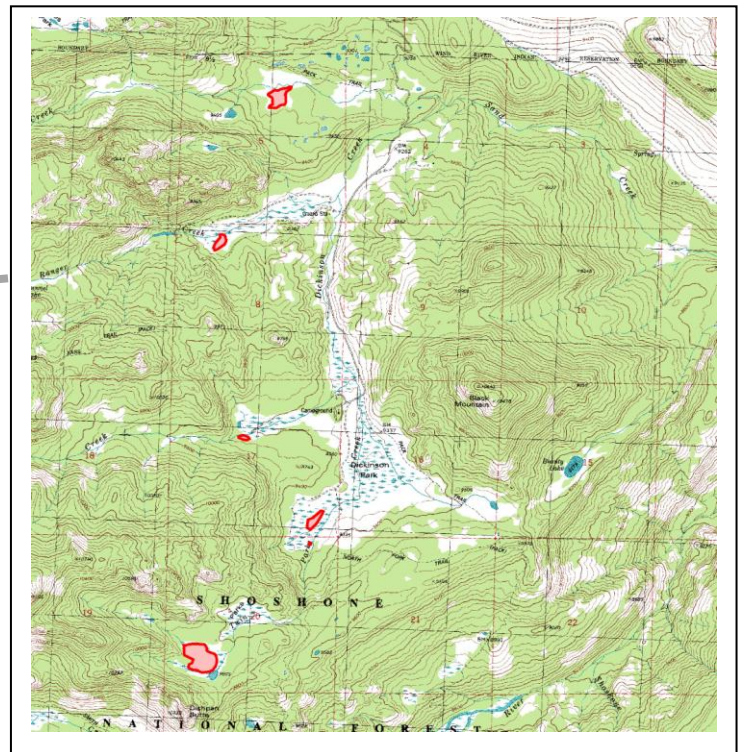


Figure 26. Dickinson Park area distribution of *U. minor*

Geographic distribution

Range: Circumboreal, extending south in North America to California, Colorado, Indiana and New Jersey. In Wyoming, known from the Yellowstone Plateau, Jackson Hole, Laramie Basin, and Absaroka, Big Horn, Laramie, Medicine Bow and Wind River Ranges; in Albany, Fremont, Johnson, Park, Sheridan and Teton counties (Figure 25). In Dickinson Park, it is known from Sand, Ranger, Dickinson and Twin Parks watersheds (Figure 26).

Number of populations in the state and in the study area: *Utricularia minor* is known from 31 extant occurrences in the state, not counting two historic records. In Dickinson Park, there is one population with six subpopulations.

Additional species information

Size and extent: *Utricularia minor* distribution in Pole Mountain ranged from single, isolated pools to repeated occurrences in a series along the drainage.

Habitat in the state and in the study area: In Wyoming, *Utricularia minor* occupies shallow water in isolated pools and ponds. It is usually in well-developed fen wetlands where the peat forms small pockets with stable levels, no circulation, and warming conditions in mid-summer. It is a carnivorous plant and the specificity of its prey, and prey habitat requirements are not known.

In Yellowstone National Park, it was proposed as a plant community co-dominant with *Eleocharis palustris* (Lemly 2007, Lemly and Cooper 2011). The Dickinson Park settings are in shallow, open water of graminoid fen habitats, particularly those with floating mats or patterned features.

Dickinson Park notes: *Utricularia minor* was found on the first day of surveys and added to the running survey objectives. Many of the plants collected had bladders produced on separate leafless branches, so the possibility was raised that it may be *Utricularia intermedia*. Therefore, all collections were sent to Garrett Crow, expert in the genus, for his review. He confirmed that they are *Utricularia minor*, providing photographs of microscopic features to support the determination – the quadrifid hairs within the bladders (Figure 27).

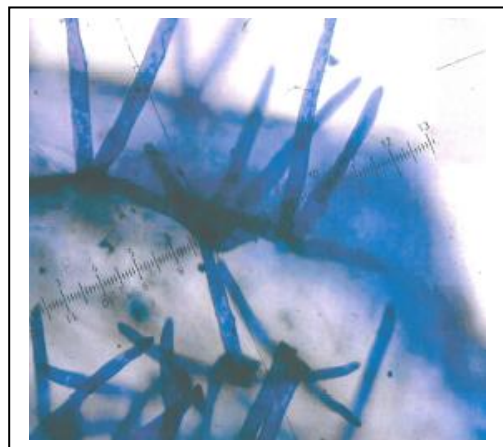


Figure 27. Diagnostic hairs of *Utricularia minor*. by Garrett Crow

OTHER SPECIES AND HABITAT NOTES

In addition to the five target species above, additional species were collected as possible additions to the flora of Fremont County, Shoshone National Forest, and/or the Wind River Mountains. No new species were found, but multiple collections were made of *Betula glandulosa* as representing trait variability.

Pygmy gentian (*Gentiana prostrata*; syn. *Gentiana nutans*) was previously tracked as a Wyoming species of concern. It was first collected in the Dickinson Park area by Richard Scott on Ranger Creek. In 2012, it was relocated there and in two other areas of fens and springs (Figure 28).

All Sensitive plant species documented in this study are confined to fen habitat as present in the Dickinson Park area. The habitats ranged in size from little more than 100 m² to prevailing features of fen habitats spanning over 30 ac (12 ha) even though the species were present in only a portion. Glacial kettles had nearly none of the fen habitat development as those directly associated with drainages. They may call for soils mapping and wetland mapping refinement. Their hydrological conditions and local patterns of development were studies in contrast. The highest of the sites, at upper Twin Parks Creek, is a case study for peat-and-pool formation shaped by large glacial erratics throughout (visible on aerials).



Figure 28. *Gentiana prostrata*, by B. Heidel

The extremely dry conditions of 2012 were indicated by exposed peat in an evaporated pool at the south end of Dickinson Park (Figure 29). On a small scale, there were also patches of trampled peat (Figure 30) and continuous bands of it (Figure 31). The *Carex livida* subpopulation at the south end of Dickinson Park is an especially interesting area where the torn peat is so extensive that it shows up on aerials as black barrens, at a larger scale than elsewhere (Figure 32). It would be interesting to evaluate the phenomenon and trend. The peatland trampling by wildlife is reported here in because it has not been observed at the same extent elsewhere by the author. There were no signs of mineral accumulation at the surface, so as to suggest that the trampling served a dietary purpose. In light of the completely unvegetated areas, surrounded by rhizomatous vegetation, it appears as though it must have heavy use at least once a year to deter colonization.

Vegetation plots were not taken, and sedges were headed out in low numbers in 2012. The most widespread dominants in fen habitat appeared to include *Carex scopulorum*, *C. simulata*, and *C. utriculata*.

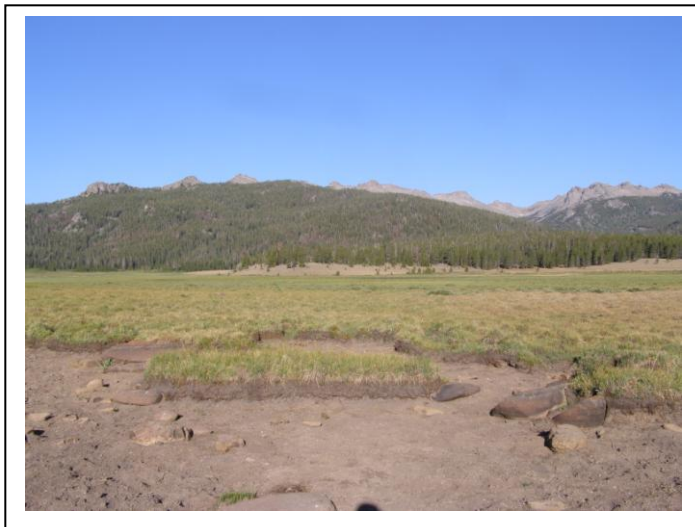


Figure 29. Evaporated pool exposing peat (site #5)



Figure 30. Wildlife trampling in a small area (site #2)

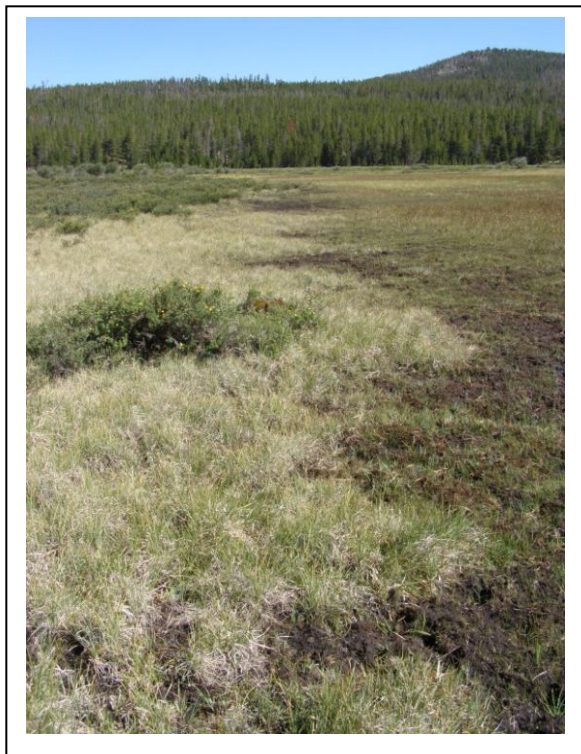


Figure 31. Trampling marks the edge of peat vs meadow in places (site#19)



Figure 32. Trampled peat areas that show up on in aeriels (site #5)

ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

Potential threats to currently known populations

Grazing: The Dickinson Park area is grazed by horses. Their use is dispersed across uplands, and concentrated around wetlands. From observations, it seemed as though they grazed throughout most wetland habitats except unstable peat. Those pack animals brought in by outfitters may not be as aware, but are kept away from grazing fen habitats by fencing that adjoin trailheads and trails.

There are potential secondary effects of grazing, namely trampling, eutrophication, hummock formation, desiccation, and successional shifts that favor the less palatable species. There may be a history of secondary effects. Even traffic through fen habitat without grazing can be deleterious. The boardwalk that cross wetland habitat at the start of the southern trailhead is a major contribution to avoiding impacts. There is real risk to the animals, and those that break through the most unstable peat may be unable to free themselves.

Logging: There is no commercial logging in the vicinity. Trees were thinned in the campground to reduce the hazard of falling trees.

Roads: Dickinson Park is accessed by Forest Service Road 329, which runs along wetland-filled creek bottoms. No signs of erosion or culverts in disrepair were noted.

Weeds: Noxious weeds were not noted in the Dickinson Park area.

Fire: Parts of the wetland in Sec. 28 (Survey site no. 10) had burned but target species are not present at the site. The willows that had burned re-sprouted. The fire ignited peat in one place where a slash pile was located in the wetland. In general, fire may increase surface run-off into wetlands, and modify the timing of snowmelt. The net influence on target species is not known.

Other: Most visitors to the area come for non-motorized recreation. Boardwalks and jack-legged fences are strategically placed to facilitate passage and deter trampling or grazing by pack animals.

The upper end of the Ranger Creek wetland (west end) appeared to have had a beaver dam that had been breached by explosives. Signs of beaver activity were scant in the rest of the study area. Hydrological changes associated with beaver may alter fen habitat, particularly when that fen habitat lies upstream of the dam. In this case, the fen habitat was located downstream.

Management practices and response

Current practices of avoiding travel and recreational impact to wetlands are appropriate and may be sufficient for Sensitive species management.

Conservation recommendations

Recommendations regarding present or anticipated activities: The wetland Sensitive species addressed in this study fall under the U.S. Forest Service peatland policy (USDA Forest Service

2011) as occupying wetlands that cannot readily be mitigated. There may be few instances of proposals to fill or drain wetlands in the Dickinson Park area. General practices that maintain water and watershed quality are likely to be of more frequent concern, from septic systems and beaver management to travel management.

Notification of U.S. Forest Service personnel of locations on national forest: This study is accompanied by GIS export of all five species, for incorporation into the centralized Shoshone National Forest database.

Status recommendations: Results from this study are appropriate to incorporate in maintaining the Sensitive species list of the U.S. Forest Service Rocky Mountain Region as well as in determining the tracking status for the Wyoming species of concern and their state ranks.

Summary: Graminoid fen in the Dickinson Park area harbors three Sensitive species and one other wetland target species. The wetlands are surrounded by dry meadows of varying sagebrush cover that harbor *Pyrrocoma clementis* var. *clementis*. This concentration of rare species outside the alpine zone points to a heretofore overlooked concentration of montane target species in the Wind River Range. It would be valuable to know if the assemblage repeats in other areas of similar geology, or whether this configuration is unique to the area. This report marks baseline documentation for the Wind River Range.

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