

STATUS OF
BLEPHARIDACHNE KINGII (KING'S DESERTGRASS)
AND *CLEOMELLA PLOCASPERMA* (ALKALI CLEOMELLA)
IN IDAHO

by

Robert K. Moseley
Conservation Data Center

December 1995

Idaho Department of Fish and Game
600 S. Walnut, P.O. Box 25
Boise, ID 83707
Jerry Conley, Director

Lower Snake River District, BLM
Idaho Department of Fish and Game

Purchase Order No. D010-P5-0064

ABSTRACT

King's desertgrass (*Blepharidachne kingii*) and alkali cleomella (*Cleomella plocasperma*) are widely distributed Great Basin species, disjunct in southwestern Idaho. Alkali cleomella has been recognized to be of conservation concern in Idaho since the early 1980s, while King's desertgrass is a recent addition to the state rare plant list. No systematic survey has been conducted for either species in Idaho. To rectify this paucity of information on the current distribution and conservation status of the two species in Idaho, the Lower Snake River District Bureau of Land Management and the Idaho Department of Fish and Game's Conservation Data Center entered into a cooperative project to conduct field inventories in 1995.

During May and June 1995, I conducted a field survey of suitable habitat for alkali cleomella in the Bruneau Valley area and for King's desertgrass in the vicinity of Oreana. I was unsuccessful in relocating the previously-collected populations of cleomella, but did relocate the population of King's desertgrass previously identified by Pat Packard. No additional populations of the desertgrass were found. I summarize the status of our knowledge of the distribution and conservation status of King's desertgrass and alkali cleomella in Idaho, including information on taxonomy, habitat, distribution, conservation status, and management and conservation recommendations.

TABLE OF CONTENTS

ABSTRACT	i
TABLE OF CONTENTS	ii
LIST OF APPENDICES	ii
INTRODUCTION	1
<i>BLEPHARIDACHNE KINGII</i>	2
<i>CLEOMELLA PLOCASPERMA</i>	8
REFERENCES	15

LIST OF APPENDICES

- Appendix 1. Line drawings of *Blepharidachne kingii* and *Cleomella plocasperma*.
- Appendix 2. Idaho CDC occurrence records for *Blepharidachne kingii* and *Cleomella plocasperma*, and map of *B. kingii* populations.
- Appendix 3. Areas searched by Moseley for *Blepharidachne kingii* during 1995.

INTRODUCTION

King's desertgrass (*Blepharidachne kingii*) and alkali cleomella (*Cleomella plocasperma*) are widely distributed Great Basin species, disjunct in southwestern Idaho. Alkali cleomella has been recognized as a conservation concern in Idaho since the early 1980s (Packard 1981), while King's desertgrass is a recent addition to the state rare plant list. No systematic survey has been conducted for either species in Idaho. To rectify this paucity of information on the current distribution and conservation status of the two species in Idaho, the Lower Snake River District Bureau of Land Management (BLM) and the Idaho Department of Fish and Game's Conservation Data Center (CDC) entered into a cooperative project to conduct field inventories in 1995. The primary objectives of this investigation are as follows:

- 1) Survey and delineate known populations and search for additional populations of the two species in Owyhee County.
- 2) Characterize habitat conditions for the populations.
- 3) Assess population data and threats to the species and make management recommendations to the Lower Snake River District BLM based on these assessments.

RESULTS

During May and June 1995, I conducted a field survey of suitable habitat for alkali cleomella in the Bruneau Valley area and for King's desertgrass in the vicinity of Oreana. I was unsuccessful in relocating the previously-collected populations of cleomella, but did relocate the population of King's desertgrass previously identified by Pat Packard. No additional populations of the desertgrass were found.

Following is the status of our knowledge of the distribution and conservation status of King's desertgrass and alkali cleomella in Idaho, including information on taxonomy, habitat, distribution, conservation status, and management and conservation recommendations. Sections containing line drawings, occurrence records, and distribution maps are appended to the end of the report.

***Blepharidachne kingii* (S. Wats.) Hackel**

TAXONOMY

Bibliographic citation: Originally described as *Eremochloe kingii* by Sereno Watson in: C. King, Geological Exploration of the 40th Parallel, Vol. 5 (Botany), U.S. Government Printing Office, Washington, D.C., 1871.

Type specimen: Watson 1300 (G), dry barren foothills of the Trinity Mountains, Pershing Co., Nevada, May 1868 (Holmgren and Holmgren 1977).

Pertinent synonym(s): *Eremochloe kingii* S. Wats.

Common name: King's desertgrass, eyelash grass, King's eyelash grass.

Size of genus: *Blepharidachne* contains four species, two in North America and two in South America: *B. kingii* (Great Basin and Idaho of western U.S.A.), *B. bigelovii* (Texas, U.S.A. and Coahuila, Mexico), *B. benthamiana* and *B. hitchcockii* (central and western Argentina) (Hunziker and Anton 1979).

Family name: Poaceae (Gramineae).

Common name for family: Grass.

History of knowledge of taxon in Idaho: Several years ago Patricia Packard, then a biology professor at Albertson College of Idaho, was on a field trip with a botany class in the foothills of the Owyhee Mountains near Oreana. Impatiently waiting for the students to return to the vehicles, she wandered up the hillside and stumbled across a grass she had never seen before. Curious, she grabbed an informal collection for later identification. Upon keying it out in the herbarium, she realized it was a new record for Idaho. Armed with maps, I interviewed her during April 1995. Although she could not precisely remember where the population was located, her recollection was enough to enable me to eventually find the population in late May.

Alternative taxonomic treatments: None.

LEGAL OR OTHER FORMAL STATUS

National:

U.S. Fish and Wildlife Service: None.

Bureau of Land Management: King's desertgrass is currently an Idaho BLM Sensitive Species (Conservation Data Center 1994).

Other current formal status recommendations: The Nature Conservancy and the Association for Biodiversity Information (the International Association of Natural Heritage Programs and Conservation Data Centres) give King's desertgrass a global (G) conservation rank of 4, on a scale of 1 to 5, indicating that it is not rare and apparently secure rangewide (Conservation Data Center 1994).

State:

IDAHO

Idaho Native Plant Society: It is a Priority 1 species on the Idaho Native Plant Society's list of the state's rare flora. Priority 1 species are those that are in danger of becoming extirpated from Idaho in the foreseeable future because of rarity or because of identifiable threats contributing to its decline (Idaho Native Plant Society 1995).

Conservation Data Center: The Idaho CDC gives King's desertgrass a state (S) conservation rank of 1, on a scale of 1 to 5, indicating that it is very rare in Idaho (Conservation Data Center 1994).

Review of past status: King's desertgrass was added to the state rare plant list at the Idaho Rare Plant Conference in 1990 (Idaho Native Plant Society 1990).

CALIFORNIA

California Native Plant Society: King's desertgrass is on the CNPS List 2, which includes taxa rare, threatened or endangered in California, but more common elsewhere in their range (Smith and Berg 1988). This is a similar conservation category to that given by the Idaho Native Plant Society .

DESCRIPTION

General nontechnical description: King's desertgrass is a densely tufted perennial with crowded basal leaves, the whole plant being no taller than 4 or 5 inches. The tufts are 1 to 6 inches in diameter, the larger ones often with dead centers. It shares an unusual branching habit with the genus *Munroa* whereby each branch of the culm has long stems with widely spaced internodes and spur shoots with very short, crowded internodes. The green leaves have arcuate blades, are sharp to the touch, and the congested, white inflorescences are exceeded by the upper blades. All these characteristics give it a very short, tight growth habit (Holmgren and Holmgren 1977; Hunziker and Anton 1979).

Technical description: Low, tufted perennials with crowded basal leaves; culms densely tufted, erect to spreading, 0.2-1(1.4) dm tall, not rooting at the nodes; leaf sheaths short and broad, membranous-margined, often hairy near the base and minutely to conspicuously so at the summit; blades firm, arcuate, folded or involute and in that state less than 1 mm wide, pungent-tipped, more or less scaberulous; ligule a ring of hairs to ca. 0.5 mm long, longer hairs often present along the sheath margins; panicle headlike or nearly so, 1-2.5 cm long, subtended by 1 or 2 leaves, ultimately at least partially emergent from the sheaths, often exceeded by the upper culm blades; spikelets 6-8.5 mm long, pale or occasionally purple-tinged, 4-flowered, the internodes of the rachilla very short, the florets forming a basally hairy, fan-shaped cluster; glumes thin, broadly lance-elliptical, sharply acute to awn-tipped, 6-8.5 mm long overall, typically keeled, usually scaberulous to minutely hairy near the base, especially on the midnerve, as long as or longer than the florets, often slightly exceeding the awns of the lemma; lemmas dimorphic: the first two 3.4-5.7 mm long, lobed to about midlength, the midnerve largely free as a plumose awn 3-5 mm long, the lateral nerves prolonged beyond the lobes or not, the margin conspicuously ciliate; third lemma similar to the lower 2 but often glossy and not ciliate laterally below midlength; fourth lemma a 3-awned, bristle-like rudiment; palea of the neuter florets about half as long as the lemmas, very narrow, the keels ciliate, the palea of the fertile floret subequal to the lemma; stamens 2, the anthers 1.5-2 mm long (Arnow 1987); $2n = 14$ (Reeder 1977).

Local field characters: King's desertgrass is unlike any other grass in the shrub-steppe of southern Idaho. That's why Pat Packard was so taken with it when she first saw it; it was obviously different than any species she had seen in the state. Taxonomically, Holmgren and Holmgren (1977) place it in Eragrosteae, a tribe within the subfamily Eragrostoideae. Aside from *Blepharidachne*, the only native genera of this largely subtropical tribe that occur in Idaho are *Sporobolus*, *Eragrostis*, and *Muhlenbergia*. All have radically different growth forms than King's desertgrass. Apparently, it is often mistaken for *Erioneuron pulchellum* with which it shares superficial resemblance (Holmgren and Holmgren 1977). *Erioneuron pulchellum* occurs in southern Utah and Nevada, south into Mexico and differs in the features of the spikelets and especially in its habit of rooting at the upper nodes (stoloniferous), a characteristic not found in King's desertgrass. See General Nontechnical Description section for a description of its habit.

Photos and line drawings: Line drawings from Holmgren and Holmgren (1977) and Hitchcock (1950) appear in Appendix 1. The drawing in Hitchcock is a better representation of the growth habit of plants in Idaho.

DISTRIBUTION

Global distribution: Before Packard's discovery in Idaho, King's desertgrass was thought to be endemic to the Great Basin, distributed from eastern California, across central Nevada to northwestern Utah (Hitchcock 1950; Holmgren and Holmgren 1977; Hunziker and Anton 1979; Arnow 1987; Smith 1993). Apparently, it is rare throughout a portion of its range, however, it is nearly the dominant grass in large areas of Elko and White Pine counties, Nevada and adjacent portions of Utah (Holmgren and Holmgren 1977). The Idaho population occurs in northern

Owyhee County, in the Lakebed Unit of the Lower Snake River Plain Floristic Division (Ertter and Moseley 1992). This population is disjunct perhaps 140 miles north of the nearest populations in Elko County, Nevada, which lie south of the Jarbidge Mountains (Jim Morefield, Nevada Natural Heritage Program, Carson City, NV, personal communication, 1995).

Idaho distribution:

Extant occurrences: The only occurrence known from Idaho is the original one discovered by Packard. I determined the extent of that occurrence in 1995, but was unable to find any new ones. See Appendix 2 for the CDC record for this occurrence, which contains additional location information, and a map of the Idaho occurrence.

Extirpated occurrences: None.

Historical occurrences: None.

Unverified/undocumented reports: None.

Synopsis of past and needed inventories: Because of the very restricted nature of its distribution, I conducted an intensive search for King's desertgrass in suitable habitat in the Brown Creek, Hart Creek, and Picket Creek drainages around Oreana. The search was not extensive, only covering 9-10 square miles, but I did intensively search within that area. A map of the area searched appears in Appendix 3.

Even though I did not find any in 1995, I believe that there are probably other populations in Owyhee County. Because it is a "needle-in-a-haystack" kinda thing, a systematic search is rather useless and additional populations will probably be found by knowledgeable individuals who regularly work in this area. BLM personnel who work in the vicinity of Oreana should be made aware of its existence and trained in its identification. Apparently-suitable habitat occurs over a much wider area of northern Owyhee County, however, from around Murphy east to Bruneau.

HABITAT

General habitat description: Throughout much of its range, the habitat of King's desertgrass is described as dry, gravelly shadscale deserts and sagebrush valleys (Holmgren and Holmgren 1977; Arnou 1987). In eastern California it occurs in pinyon-juniper woodlands (Smith and Berg 1988; Smith 1993).

Idaho habitat description: It occurs in an *Artemisia spinescens/Sitanion hystrix* community on cobbly pavement underlain by sandy lacustrine deposits. The five populations occur on the south-facing rims of different spur ridges that originate on a main ridge system to the east. Slopes range from very gentle to rather steep (25°). The community is open, with less than 30 percent cover of perennials. Associated species are *Chrysothamnus nauseosus*, *Artemisia tridentata* ssp.

wyomingensis, *Chaenactis douglasii*, *C. macrantha*, *Atriplex confertifolia*, *Tetradymia glabrata*, *Astragalus purshii*, *Caulanthus pilosus*, and *Oenothera boothii*. *Bromus tectorum* is the only non-native species in this habitat, and it occurs at very low levels. Interestingly, several species that are common in similar habitats elsewhere in northern Owyhee County are absent from the King's desertgrass populations, including *Enceliopsis nudicaulis*, *Eriogonum ochrocephalum* and *Phlox* sp. (*hoodii*?). See also habitat information in Appendix 2.

POPULATION BIOLOGY

Phenology: Largely unknown. The plants were at anthesis during late May and early June 1995.

Population size and condition: The five small populations contained 429 genets (bunches) in 1995, and covered a total of ca. 755 square yards. Population number and area information for the five populations are as follows (the populations are arranged north to south; Appendix 2):

Population	Number	Area
1	56	30 x 15 yds
2	150	20 x 4 yds
3	13	5 x 5 yds
4	200	20 x 5 yds
5	10	5 x 5 yds

Reproductive biology: King's desertgrass reproduces by seed and by the bunches splitting into smaller fragments as the center dies.

Biological interactions: Unknown.

Competition: Unknown.

Herbivory: Holmgren and Holmgren (1977) report that the low stature and rigid, sharp-pointed blades make King's desertgrass rather unpalatable to livestock even though it becomes locally abundant in portions of its range in the Great Basin.

Land ownership: Owyhee Resource Area, Lower Snake River District, Bureau of Land Management.

Land use: Some light grazing occurs in the vicinity, but there was no obvious use of its habitat, probably because of the low cover of herbaceous plants.

ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

Threats to currently known populations: Rarity is probably the biggest threat to King's desertgrass in Idaho. Because the populations are very localized, they could easily be destroyed by inadvertent habitat destruction. Livestock grazing is not a threat.

Recommendations:

- > Bureau of Land Management - Retain as a sensitive species in Idaho. The single Idaho occurrence should be protected from habitat disturbances. Personnel from the Lower Snake River District should be made aware of the known population and the potential for discovering additional populations, at least in the vicinity of Oreana.
- > Idaho Native Plant Society - Retain as a Priority 1 species.
- > Conservation Data Center - Maintain state conservation rank of S1.

***Cleomella plocasperma* S. Wats.**

TAXONOMY

Bibliographic citation: Like King's desertgrass, alkali cleomella was first described by Sereno Watson in: C. King, Geological Exploration of the 40th Parallel, Vol. 5 (Botany), U.S. Government Printing Office, Washington, D.C., 1871.

Type specimen: Collected by Watson in Humboldt Co., Nevada (Abrams 1944).

Pertinent synonym(s): *C. oocarpa* Gray, *C. mojavensis* Payson, *C. stenosperma* Coville.

Common name: Alkali cleomella, flat-seeded cleomella, alkali rhombopod.

Size of genus: About 12 species, native to the more arid and often alkaline areas of the western United States and northern Mexico (Hitchcock 1964).

Family name: Capparidaceae.

Common name for family: Caper.

History of knowledge of taxon in Idaho: Although not reported in Davis (1952), alkali cleomella was first collected in Idaho by Marcus E. Jones near Bruneau in 1930. It was later collected by John Christ a few miles south of Bruneau at Hot Spring in 1947. Barbara Ertter made the last known collection in Idaho, also near Bruneau in 1972.

Alternative taxonomic treatments: None.

LEGAL OR OTHER FORMAL STATUS

National:

U.S. Fish and Wildlife Service: None.

Bureau of Land Management: Alkali cleomella is currently an Idaho BLM Sensitive Species (Conservation Data Center 1994).

Other current formal status recommendations: The Nature Conservancy and the Association for Biodiversity Information (the International Association of Natural Heritage Programs and Conservation Data Centres) give alkali cleomella a global (G) conservation rank of 4, on a scale of 1 to 5, indicating that it is not rare and apparently secure rangewide (Conservation Data Center 1994).

State:

IDAHO

Idaho Native Plant Society: It is a Priority 1 species on the Idaho Native Plant Society's list of the state's rare flora. Priority 1 species are those that are in danger of becoming extirpated from Idaho in the foreseeable future because of rarity or because of identifiable threats contributing to its decline (Idaho Native Plant Society 1995).

Conservation Data Center: The Idaho Conservation Data Center gives alkali cleomella a state (S) conservation rank of 1, on a scale of 1 to 5, indicating that it is very rare in Idaho (Conservation Data Center 1994).

Review of past status: In her review of the species for the Rare and Endangered Plants Technical Committee of the Idaho Natural Areas Council, Packard (1981) recommended a State Watch List status.

UTAH

Alkali cleomella is very rare in Utah (Welsh *et al.* 1975; Utah Natural Heritage Program 1990), where it is known from the southwestern part of the state in Beaver, Iron, and Millard counties (Welsh *et al.* 1987). The Utah Natural Heritage Program (1990) assigns a state conservation rank of S1.

DESCRIPTION

General nontechnical description: Because I've never seen the plant, I gleaned a few of what I perceive to be the distinctive features of alkali cleomella. It is an annual herb with diffuse, strongly ascending branches. Plants are 15-40 cm tall and branched from the upper nodes. The herbage is glabrous and the linear leaflets of the alternate, 3-foliate leaves are 7-18 mm long and 1-3 mm wide. Numerous, small yellow flowers occur in a terminal raceme. The fruits are rhomboid with two conical valves.

Technical description: Plants usually with several diffuse, strongly ascending branches; stems 15-40 cm tall; leaflets 7-18 mm long, 1-3 mm wide, linear to narrowly oblong; petioles 5-12 mm long; bracts unifoliate and linear or the lower-most 3-foliate; pedicels 9-15 mm long; petals 3-5 mm long; stamens 6-9 mm long; capsules ovoid, rhomboidal, or ovoid, 1.5-3 mm long, 3-6 mm wide, the valves hemispheric, deltoid, or conical; stipes 2-7 mm long; seeds several (Welsh *et al.* 1987).

Local field characters: The three *Cleomella* species in Idaho can be identified using the following key (modified from Hitchcock 1964 and Hitchcock and Cronquist 1973):

- | | |
|--|-----------------------|
| 1. Stipe shorter than the capsule; southwestern Idaho..... | <i>C. parviflora</i> |
| 1. Stipe at least as long as the capsule. | |
| 2. Capsule 6-9 mm long; stipe reddish; central & southwestern Idaho. | <i>C. macbrideana</i> |
| 2. Capsule less than 6 mm long; stipe greenish; Bruneau Valley..... | <i>C. plocasperma</i> |

Photos and line drawings: Line drawings from Abrams (1944) and Vanderpool (1993) appear in Appendix 1.

DISTRIBUTION

Global distribution: Alkali cleomella is largely a species of the Great Basin and Mohave Desert. It is distributed from southeastern Oregon and southwestern Idaho, southwestern Utah, Nevada, and southeastern California (Tidestrom 1925; Abrams 1944; Peck 1945; Hitchcock 1964; Welsh *et al.* 1987; Vanderpool 1993). The population in Idaho is disjunct from the main range of the species and restricted to the Bruneau Valley.

Idaho distribution:

Extant occurrences: None.

Extirpated occurrences: None.

Historical occurrences: Our knowledge of the distribution of alkali cleomella in Idaho is based on three herbarium collections collected between 1930 and 1972, listed below. I consider these occurrences historical, rather than extirpated, because there is a possibility that they may still be extant on private land in the Bruneau Valley that was not searched in 1995.

Jones 25285 (WTU), 6-23-30, Owyhee County, Bruneau.

Christ 16724 (NY), 6-10-47, Owyhee County, 8 miles southeast of Bruneau at Hot Spring, on edge of saltgrass meadow (Appendix 2).

Ertter 506/2 (CIC), 6-11-72, Owyhee County, Mather's farm (or 4-M ranch) west of Bruneau alongside artesian well.

I was unable to relocate these sites or find any new populations during a search in June and July 1995 (see section below).

Unverified/undocumented reports: None.

Synopsis of past and needed inventories: Ann DeBolt, Snake River District BLM, has looked for alkali cleomella opportunistically for the last several years (personal communication, 1995). I spent several days between 10-19 June 1995 searching in suitable-appearing habitat along the

Snake River, between Grand View and Bruneau Dunes State Park, and in the Bruneau Valley. A list of specific sites that were surveyed are included in the following table.

Description	Legal Location	Comments
<i><u>W to E along the Snake River and C.J. Strike Reservoir</u></i>		
1. BLM isolated tract below Strike Dam greasewood/weeds	T5S R4E	
2. Border Lake	T5S R4E	super weedy wetland
3. Wet area near Dam Operations Village	T5S R4E	potential
4. Vicinity of Black Sand Resort	T6S R4E	not much good
5. Cove Recreation Site - BLM	T6S R4E	potential
6. Bruneau Arm Narrows Sportsman Acc.	T6S R5E	drainage with excellent-looking habitat
7. Cottonwood Campground	T6S R5E	potential
8. CJ Strike WMA HQ Public Access	T6S R5E	mostly farmed or Russian olive, considerable saltgrass
9. CJ Strike WMA - Jacks Creek Access	T6S R5E	excellent greasewood/saltgrass
10. CJ Strike WMA - Bruneau Valley Sportsman Access - west	T6S R5E	good greasewood/saltgrass
11. CJ Strike WMA - Bruneau Valley Sportsman Access - east	T6S R5E	good greasewood/saltgrass
12. Hwy 51 crossing of Bruneau River	T6S R5E	potential
13. Bruneau River Sportsman Access	T6S R5E	much greasewood/saltgrass
14. Crane Falls Cove Arm Sportsman Acc	T5S R5E	little/no suitable habitat
15. Crane Falls Lake	T5S R5E	little/no habitat
16. SW of Loveridge Bridge	T6S R6E	lots of greasewood/saltgrass-BLM
17. Loveridge Bridge Sportsman Access- north side	T5S R6E	nice greasewood/saltgrass
18. Loveridge Bridge Sportsman Access- south side	T6S R6E	nice greasewood/saltgrass
19. Wildlife Viewing Pond - BLM	T6S R6E	no suitable habitat
20. Flatiron Butte - BLM land on S side	T6S R6E	lots of greasewood/saltgrass

21. Bruneau Dunes State Park T6S R6E no greasewood/saltgrass

Bruneau Valley - Hot Spring to Bruneau

22. Ditches in the vic of Hot Spring T7S R6E maybe yes, maybe no (?)

23. Vicinity Hot Spring Cemetery T7S R6E greasewood/weeds

24. BLM corner near South Side Canal T6S R5E greasewood/weeds



All habitat that remains to be checked is on private land, largely in the Bruneau Valley. Within the area I searched, the following are the areas on public land that have the greatest potential for discovering alkali cleomella populations:

1. BLM land around C.J. Strike Reservoir; appear largely to be a part of the Wildlife Management Area (according to BLM Surface Management Status maps).
2. Fish and Game land in C.J. Strike Wildlife Management Area.

HABITAT

General habitat description: California: wet, alkaline meadows, greasewood flats, around thermal springs, 2600-5000 feet (Abrams 1944; Vanderpool 1993). Utah: saline soils with greasewood, and other halophytes, 4500-5500 feet (Welsh *et al.* 1987). Oregon: low alkaline flats and around hot springs (Peck 1945).

Idaho habitat description: All habitats listed above occur in and around the Bruneau Valley, which, at 2500 feet, apparently lies at the lower end of the species' elevational range. Christ's collection was from the edge of a saltgrass (*Distichlis stricta*) meadow and Ertter's was from near a hot artesian well and adjacent ditch (Packard and Ertter n. d.). Also of note, Packard (1981) states that alkali cleomella is often found in sites with some disturbances and that it has "weedy tendencies."

This information leads me to believe that ideal alkali cleomella habitat in the Bruneau Valley is in the greasewood (*Sarcobatus vermiculatus*)/saltgrass plant association. Soils in this association are generally moist, especially in the spring and early summer, although the water table is near the surface throughout the year. In the Bruneau area, another greasewood association, greasewood/basin wild rye (*Elymus cinereus*), has drier soils and probably is not optimal habitat (all stands of this association that I observed were very disturbed and basin wild rye was absent, replaced by exotic annual grasses, especially *Eremopyrum triticeum* and *Bromus tectorum*). Both of these greasewood associations were probably much more common in the Bruneau Valley prior to recent American settlement, and what remains has been disturbed and is fragmented. Their status in the Bruneau Valley is typical of the rest of Idaho where the CDC gives

greasewood/saltgrass a state conservation rank of S1, and greasewood/basin wild rye a SH (of historical occurrence and possibly extirpated).

POPULATION BIOLOGY

Phenology: Largely unknown. All specimens were in flower when they were collected in mid-June.

Population size and condition: Unknown.

Reproductive biology: Unknown.

Biological interactions: Unknown.

Competition: If the plant has weedy tendencies, it may be an indication that it lacks competitive ability.

Herbivory: Unknown.

Land ownership: Many of the extant greasewood habitats in the vicinity of Bruneau (Bruneau Valley, Little Valley, Sugar Valley, and others) are in private ownership. A few scattered locations of this habitat are on BLM land, both Bruneau and Jarbidge resource areas, and on the C.J. Strike Wildlife Management Area, managed by the Idaho Department of Fish and Game.

Land use: The bottomlands of the Bruneau River and tributaries have largely been converted to cultivated agriculture, ranching and livestock grazing, or urban/residential. The lower Bruneau Valley and portions of the nearby Snake River are inundated by the waters behind C.J. Strike Dam.

ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

Threats to currently known populations: Not applicable.

Recommendations:

- > Bureau of Land Management - Retain as a sensitive species in Idaho. The BLM manages several parcels that have what appears to be excellent habitat for alkali cleomella (see list of sites above). Personnel from the Lower Snake River District should be made aware of the potential for this species to occur in greasewood/saltgrass habitats in the vicinity of Bruneau.
- > Idaho Native Plant Society - Retain as a Priority 1 species.
- > Conservation Data Center - Maintain state conservation rank of S1.

REFERENCES

- Abrams, L. 1944. Illustrated flora of the Pacific States; Washington, Oregon, and California, Volume II. Stanford University Press, Stanford, CA. 635 p.
- Arnow, L.A. 1987. Gramineae. Pages 684-788 *in*: A Utah Flora, S.L. Welsh, N.D. Atwood, L.C. Higgins, and S. Goodrich, Great Basin Naturalist Memoir No. 9.
- Conservation Data Center. 1994. Rare, threatened, and endangered plants and animals of Idaho. Third edition. Idaho Department of Fish and Game, Boise, ID. 39 p.
- Davis, R.J. 1952. Flora of Idaho. Brigham Young University Press, Provo, UT. 836 p.
- Ertter, B., and B. Moseley. 1992. Floristic regions of Idaho. Journal of the Idaho Academy of Science 28:57-70.
- Hitchcock, A.S. 1950. Manual of the grasses of the United States. Miscellaneous Publication No. 200. U.S. Department of Agriculture, Washington, D.C. 1051 p.
- Hitchcock, C.L. 1964. *Cleomella*. Pages 558-560 *in*: Vascular Plants of the Pacific Northwest, Part 2, C.L. Hitchcock, A. Cronquist, M. Ownbey, and J.W. Thompson, University of Washington Press, Seattle, WA.
- Hitchcock, C.L., and A. Cronquist. 1973. Flora of the Pacific Northwest. University of Washington Press, Seattle, WA. 730 p.
- Holmgren, A.H., and N.H. Holmgren. 1977. Poaceae. Pages 175-464 *in*: Intermountain Flora, Volume 4, A. Cronquist, A.H. Holmgren, N.H. Holmgren, J.L. Reveal, and P.K. Holmgren, New York Botanical Garden, Bronx, NY.
- Hunziker, A.T., and A.M. Anton. 1979. A synoptical revision of *Blepharidachne* (Poaceae). Brittonia 31:446-453.
- Idaho Native Plant Society. 1990. Results of the sixth annual Idaho Rare Plant Conference. Unpublished document on file at the Conservation Data Center, Idaho Department of Fish and Game, Boise, ID.
- Idaho Native Plant Society. 1995. Results of the eleventh annual Idaho Rare Plant Conference. Unpublished document on file at the Conservation Data Center, Idaho Department of Fish and Game, Boise, ID.

- Packard, P.L. 1981. *Cleomella plocasperma*. Page 101 in: Vascular plant species of concern in Idaho, by the Rare and Endangered Plants Technical Committee of the Idaho Natural Areas Council, Bulletin Number 34, Forest, Wildlife and Range Experiment Station, University of Idaho, Moscow, ID.
- Packard, P.L., and B. Ertter. No date. Notes on the flora of the Snake Country. Unpublished manuscript on file at the Conservation Data Center, Idaho Department of Fish and Game, Boise, ID. 13 p.
- Peck, M.E. 1945. Some interesting plants of Malheur County, Oregon. Leaflets of Western Botany 4:177-186.
- Reeder, J.R. 1977. Chromosome numbers in western grasses. American Journal of Botany 64:102-110.
- Smith, J.P. 1993. *Blepharidachne*. Page 1236 in: The Jepson Manual, J.C. Hickman, ed., University of California Press, Berkeley.
- Smith, J.P., and K. Berg, eds. 1988. Inventory of rare and endangered vascular plants of California. California Native Plant Society, Sacramento, CA. 168 p.
- Tidestrom, I. 1925. Flora of Utah and Nevada. Contributions from the U.S. National Herbarium 25:1-665.
- Utah Natural Heritage Program. 1990. Special plant list. Division of Wildlife Resources, Salt Lake City, UT. 49 p.
- Vanderpool, S.S. 1993. *Cleomella*. Page 470 in: The Jepson Manual, J.C. Hickman, ed., University of California Press, Berkeley.
- Welsh, S.L., N.D. Atwood, and J.L. Reveal. 1975. Endangered, threatened, extinct, endemic, and rare or restricted Utah vascular plants. Great Basin Naturalist 35:327-376.
- Welsh, S.L., N.D. Atwood, L.C. Higgins, and S. Goodrich. 1987. A Utah Flora. Great Basin Naturalist Memoir No. 9. 894 p.

Appendix 1

Line drawings of *Blepharidachne kingii*
(from Hitchcock 1950 and Holmgren and Holmgren 1977)
and *Cleomella plocasperma*
(from Abrams 1944 and Vanderpool 1993).

Appendix 2

Idaho CDC occurrence records for *Blepharidachne kingii* and *Cleomella plocasperma*,
and map of *B. kingii* populations.

BLEPHARIDACHNE KINGII
KING'S DESERTGRASS
Occurrence Number: 001

Survey Site Name: HART CREEK

County: Owyhee

USGS quadrangle: OREANA

Survey Date: 1995-06-06

Last Observed: 1995-06-06

First Observed: 1980's

Population Data:

1995: 5 very localized, moderately dense populations on different spur ridges within 0.3 mile of each other. 429 total genets (north to south populations of 56, 150, 13, 200, 10 respectively). Plants at anthesis. Area very thoroughly surveyed by Bob Moseley, Idaho CDC.

Habitat Description:

Artemisia spinescens/Sitanion hystrix community on cobbly pavement underlain by sandy lacustrine deposits. S-facing rim of spur ridge on gentle to steep (25 degree) slope. Open community with less than 30% cover of perennials. Associated with *Atriplex confertifolia*, *Tetradymia glabrata*, *Astragalus purshii*, *Caulanthus pilosus*, and *Oenothera boothii*.

Minimum Elevation: 3075 feet
Size: 755 SQ M

Maximum Elevation: 3125 feet

Ownership Comments: Boise District BLM, Owyhee RA.

Protection Comments: Some light cattle grazing occurs in the vicinity. No obvious threats.

Specimens: Moseley 2880, 2882 (ID).

CLEOMELLA PLOCASPERMA
ALKALI CLEOMELLA
Occurrence Number: 001

Survey Site Name: BRUNEAU HOT SPRING

County: Owyhee

USGS quadrangle: HOT SPRING

Survey Date: 1995-06
Last Observed: 1947-06-10
First Observed: 1947-06-10

Population Data:
1947: No data. Collected by J. H. Christ and C. B. Christ.

Habitat Description:
"On edge of saltgrass meadow."

Elevation: 3600 feet
Size:

Ownership Comments:
Private land.

Comments:
Other collections from the Bruneau Valley with vague location information: *Ertter 506/2* (CIC) from Mather's farm and *Jones 25285* (WTU) from Bruneau.

Specimens:
J. H. Christ and C. B. Christ 16724 (NY).

Appendix 3

Areas searched by Moseley for *Blepharidachne kingii* during 1995.
General location of routes traveled are indicated on the maps, which are all copies of the
USGS 1992 Oreana 7.5' quad.