

STATUS REPORT ON Oryzopsis contracta  
A USFWS CATEGORY 2 CANDIDATE SPECIES

**Taxon name:** Oryzopsis contracta (Johnson) Shechter

**Common Name:** Contracted Indian ricegrass

**Family:** Poaceae

**States Where Taxon Occurs:** USA; Colorado, Montana, Wyoming

**Current Federal Status:** Category 2

**Recommended Federal Status:** Category 3

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**Original Date of Report:** September 1994

**Individual to Whom Further  
Information and Comments**

**Should be Sent:** The author

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## I. Species Information

### 1. Classification and nomenclature

#### A. Species or infraspecific taxon

##### 1. Scientific name

a. **Binomial or trinomial:** Oryzopsis contracta (Johnson)  
Shechter.

b. **Full bibliographic citation:** Shechter, Y. and B. L. Johnson. 1966. A new species of Oryzopsis (Gramineae) from Wyoming. Brittonia 18: 342-347.

c. **Type specimen:** United States, Wyoming, Carbon County, Freezeout Hills, 1898, Elias Nelson 4850 (RM).

##### 2. Pertinent synonyms:

Oryzopsis hymenoides (R. & S.) Ricker var. contracta  
Johnson. Published in: Johnson, B. L. 1945.  
Cyto-taxonomic studies in Oryzopsis.  
Botanical Gazette 107: 1-32.

Achantherum contractum (Johnson) Barkworth. Published in:  
Barkworth, M. E. 1993. North American  
Stipeae (Gramineae): taxonomic changes and  
other comments. Phytologia 74: 1-25.

3. **Common names:** Contracted Indian ricegrass, Wyoming ricegrass.

4. **Taxon codes:** PMPOA4J051 (The Nature Conservancy).

5. **Size of genus:** As traditionally defined, the genus Oryzopsis contains approximately 35 species of north temperate and tropical regions. In a recent revision, Barkworth (1993) has split the group into three genera. In this treatment, Oryzopsis contracta is one of 30 North American species in the genus Achantherum (a genus that includes most of the former species of Oryzopsis and the short-awned taxa of Stipa).

**B. Family Classification**

1. **Family name:** Poaceae.
2. **Pertinent synonyms:** Gramineae.
3. **Common name for family:** Grass family.

**C. Major plant group:** Monocotyledonae (Monocots).

**D. History of knowledge of taxon:** Contracted Indian ricegrass was initially described as a variety of Oryzopsis hymenoides by Johnson (1945) based on the study of four herbarium specimens. A more detailed study by Shechter and Johnson (1966) led to the recognition of this grass as a distinct species.

**E. Comments on current additional taxonomic**

**treatments:** The genus Oryzopsis, as traditionally defined, is extremely difficult to separate from the related genus Stipa (Kam and Maze 1974). The main characters used to distinguish Oryzopsis and Stipa (lemma, callus, and awn features) are all known to intergrade in some taxa. The treatment of Oryzopsis hymenoides and its close relatives (including O. contracta) is especially problematic in that these species combine lemma shape and awn traits of Oryzopsis with lemma pubescence and callus characteristics of Stipa (Welsh et al. 1993). Recent studies of floral development (Kam and Maze 1974), embryology (Barkworth 1982), and natural hybridization (Johnson 1972) suggest that O. hymenoides should be reclassified as a Stipa. In the most recent revision of the Stipeae tribe, Barkworth (1993) proposes lumping most North American species of Oryzopsis (including O. hymenoides and O. contracta) with the short-awned taxa of Stipa in the new genus Achantherum.

**2. Present legal or other formal status**

**A. International**

1. **Present designated or proposed legal protection or regulation:** None.

2. **Other current formal status recommendations:** None.

**B. National**

**1. United States**

**a. Present designated or proposed legal protection or regulation:** Listed as a Category 2 (C2) species by the US Fish and Wildlife Service (USFWS) (1993). Category 2 includes taxa for which there is current evidence of vulnerability, but for which USFWS lacks sufficient biological data or field survey information to support a listing proposal.

**b. Other current formal status recommendations:** Oryzopsis contracta is ranked G3 in The Nature Conservancy's Natural Heritage Network system. As a species it is either rare or local throughout its range or found locally in a restricted area.

**c. Review of past status:** Prior to 1993, this species was known from only 12 locations in Wyoming and Colorado and was ranked G2, indicating that it was imperiled throughout its range (Fertig 1993 a). Field surveys in 1993 documented 23 new populations and recent examination of herbarium material has resulted in the discovery of over 30 records previously misidentified as Oryzopsis hymenoides. This species has also been documented from Montana for the first time (based on an annotated herbarium record). The rank of this species has been raised to G3 to reflect its newly recognized abundance.

**C. State**

**1. Colorado**

**a. Present designated or proposed legal protection or regulation:** None.

- b. **Other current formal status recommendations:** Ranked S1 by the Colorado Natural Heritage Program (S. Spackman, personal communication).
- c. **Review of past status:** Oryzopsis contracta was listed as a Plant Species of Special Concern by the Colorado Natural Areas Program (1980).

## 2. Montana

- a. **Present designated or proposed legal protection or regulation:** None.
- b. **Other current formal status recommendations:** Ranked SH (historical) by the Montana Natural Heritage Program (B. Heidel, personal communication). No specimens have been observed in Montana since 1921.
- c. **Review of past status:** N/A.

## 3. Wyoming

- a. **Present designated or proposed legal protection or regulation:** None.
- b. **Other current formal status recommendations:** The Wyoming Natural Diversity Database (WYNDD) lists this species as S3, indicating that it is rare or local throughout the state or locally common in a restricted area.
- c. **Review of past status:** Prior to 1993, this species was ranked S2, based on 12 known occurrences (Fertig 1993 a). Recent field surveys and annotations of herbarium specimens have resulted in the discovery of over 50 additional records, resulting in a revision of the state rank to S3.

## 3. Description

- A. **General non-technical description:** Contracted  
Indian ricegrass is a tufted perennial with

glabrous stems 12 to 28 inches tall. The leaves are inrolled, less than 1/8 inch long, and rough margined. The inflorescence is a panicle with branches initially contracted but often becoming stiffly spreading at maturity. Spikelets are single flowered, narrow, and 3/8 inches long. The lemmas are covered by short, white, silky hairs (these hairs do not exceed the lemma in length) and have an awn 1/4-3/8 inches long (Shechter and Johnson 1966; Hallsten et al. 1987; Fertig 1993 b, 1994 in ed.).

**B. Technical description:** Tufted perennial; culms 2.5-7 dm tall, hollow, smooth, glabrous, green or glaucous; vernation rolled; sheaths open, smooth, margin ciliate; leaf blades 0.5-3 mm wide, involute, smooth and puberulent adaxially, edges scaberulous to scabrous; collars indistinct or yellow, continuous; auricles absent; ligules membranous, 3.1-3.4 mm long, truncate or obtuse, entire, glabrous; panicle 7-15 cm long, initially contracted with branches appressed or ascending, at maturity panicle stiffly diffuse, branches spreading to ascending; spikelets 8-10 mm long; glumes 5-7 mm long; lemma 3-3.5 mm long, long-pilose with hairs 2-3 mm long; awn mostly 6-12 mm long; anthers bearded (Johnson 1945; Shechter and Johnson 1966; Hallsten et al. 1987; Hitchcock 1950; Dorn 1992; Fertig 1993 b).

**C. Local field characters:** Oryzopsis contracta can be recognized. These hairs are about equal in length to the lemma (Fertig 1993 b).

Indian ricegrass (Oryzopsis hymenoides) differs from O. contracta in having a widely-spreading, wavy-branched panicle, plump florets, and lemmas with short awns (usually less than 6 mm long) and long silky hairs that well exceed the body of the lemma (Fertig 1994). Littleseed ricegrass (O. micrantha) is distinguished by having glabrous lemmas and strictly contracted panicle branches. The features used by Shechter and Johnson (1968) to distinguish these three taxa are shown in Table 1 (page 6).

X Stiporyzopsis bloomeri is an aggregation of sterile hybrids involving Oryzopsis hymenoides and various species of Stipa that differs from O. contracta in

having erect, appressed branches and more rounded spikelets with longer, distinctly bent awns.

**D. Identifying characteristics of material which is in interstate**



Table 1. Characters used to distinguish Oryzopsis contracta from its putative parental species O. hymenoides and O. micrantha (from Shechter and Johnson 1968).

**E. Photographs and/or line drawings:** Oryzopsis contracta is illustrated in Figure 1 (page 8).

#### **4. Significance**

**A. Natural:** The herbage and protein-rich seeds of Oryzopsis contracta provide valuable forage for native ungulates and other wildlife species.

**B. Human:** Due to its morphologic and genetic similarity to Oryzopsis hymenoides, O. contracta is likely to have similar value to humanity. Indian ricegrass is recognized as one of the most important forage species for all classes of livestock in the western United States (USDA Forest Service 1937). It is especially valued for its protein-rich seeds and abundant, readily cured herbage (Welsh et al. 1993). Historically, the seeds of these species were important as food for American Indians (USDA Forest Service 1937). Both O. contracta and O. hymenoides have been observed to recolonize disturbed sites and have excellent potential for use in erosion control and reclamation of roadsides or abandoned mine lands (Thornburg 1982). Ricegrasses are also useful as indicator species of range condition as they are typically decreaseers under destructive grazing practices (Robertson 1977).

#### **5. Geographical distribution:**

**A. Geographical range:** Oryzopsis contracta is a regional endemic of southwestern Montana, central and western Wyoming, and north-central Colorado (Fertig 1994). The known range of this species in Wyoming is shown in Figure 2 (page 9).

#### **B. Precise Occurrences**

**1. Populations currently or recently known extant:** The following occurrences are based on recent surveys by staff of the Bureau of Land Management (BLM), Rocky Mountain Herbarium (RM), and WYNDD or from confirmed herbarium specimens collected since 1950. Records based on annotated herbarium specimens are indicated by "\*". Wyoming occurrences are arranged by county and WYNDD Element Occurrence number. More detailed information

is provided in the Element Occurrence Records and maps in Appendix A.

Figure 1. Habit of Oryzopsis contracta  
(x 1) and detail of floret (left) and  
lemma (right) x 9.  
Ill. by Isobel Nichols.

Figure 2. Range of Oryzopsis contracta in Wyoming

## WYOMING

### Albany County

004.Laramie Basin: Big Hollow, on S side of dry alkali lake ca 1.5 mi N of Twin Buttes Lake, T15N R76W S24 NW4NE4, USGS Miller and Caldwell Lake Quads. Collections: Reed 693 (WYAC), Porter 7351 (RM), Reeder 5365 (RM), Hallsten 512 (WYAC), Fertig and Refsdal 13938 (RM). Last observed: 1993.

\*067. Laramie Basin: Laramie; city water tower area, T16N R73W S35, USGS Laramie Quad. Collections: Wagner 71 (WYAC). Last observed: 1968.

### Campbell County

001.Powder River Basin: South Middle Pumpkin Butte, T43N R75W S4, USGS South Butte Quad. Collections: Dueholm 6242 (RM). Last observed: 1978.

003.Powder River Basin: Dead Horse Creek, adjacent to Napier Rd, ca 2 mi W of Pleasantdale, T47N R74W S8, USGS Double Tanks Quad. Collections: Sanguinetti and Dueholm 494, 495 (RM). Last observed: 1978.

\*032. Powder River Basin: ca 5 air mi E of Hilight, T45N R70W S21, USGS Hilight Quad. Collections: Dueholm & Sanguinetti 4157 (RM). Last observed: 1978.

\*033. Powder River Basin: Schoolhouse Butte, T48N R73W S14, USGS Appel Butte Quad. Collections: Dueholm 2790 (RM). Last observed: 1978.

\*041. Powder River Basin: ca 13 air mi SW of Gillette (near Wild Horse Creek), T49N R74W S 26, USGS Four Bar J Ranch Quad. Collections: Hartman & Sanguinetti 7292 (RM). Last observed: 1978.

### Carbon County

006."East edge of Hanna Basin, 1-2 mi N of Medicine Bow", T22N R78W. Collections: Porter 8301 (RM). Last observed: 1960.

- 008.**Hanna Basin: ca 7.5 air mi W of Hanna, south of Big Ditch, T22N R83W S13 SW4, USGS Dana Quad. Collections: Nelson and Turner 1865 (RM). Last observed: 1978.
- 019.**Shirley Basin: ca 1.5 mi N of Muddy Creek adj. to County Rd 102, T26N R80W S4 SW4, USGS Pine Hill Quad. Collections: Fertig & Struttmann 14026 (RM). Last observed: 1993.
- \*035.** Shirley Basin: Moss Agate Ridge, T28N R78W S28, USGS Moss Agate Reservoir Quad. Collections: Current 386 (RM). Last observed: 1978.
- \*043.** Sweetwater River Valley: Red Hills WNW of Muddy Gap, T28N R89W S32, USGS Muddy Gap Quad. Collections: Beetle 5604 (WYAC), Haines 6593 (RM). Last observed: 1986.
- 060.**Rawlins Uplift: Rawlins; adjacent to Twentymile Rd and adjacent to Hwy 287 cutoff, T21N R88W S24; T21N R87W S9 SE4NE4, S30 NW4NW4, USGS Rawlins Peak and Rawlins Quads. Last observed: 1993.
- 061.**Rawlins Uplift: Road to Chokecherry Knob, ca 6 air mi S of Rawlins, T20N R87W S18; T20N R88W S13, USGS Smith Draw West Quad. Last observed: 1993.
- \*068.** N Platte River Basin: "1 km S of where O'Brien Creek flows into Seminoe Reservoir", T24N R85W S23, USGS Seminoe Dam SW Quad. Collections: Gonzalez s.n. (WYAC). Last observed: 1973.

**Converse County**

- 030.**N Platte River Basin: ca 6 air mi W of Douglas, T32N R72W S4 SW4, S9 NW4, USGS Douglas Quad. Collections: Hartman 38994 (RM). Last observed: 1993.

**\*Fremont County**

- 036.**SE Absaroka Mountains: S side of Spring Mountain, T42N R106W S3, 4, 9, 10, USGS Indian Point Quad. Collections: Kirkpatrick 4002 (RM). Last observed: 1984.

- \*039. SW Wind River Basin: South Pass, ca 1.5 mi NE of Sweetwater River Bridge on WY Hwy 28, T28N R101 W S9, USGS Anderson Ridge Quad. Collections: Fertig 8605 (RM). Last observed: 1991.
- \*044. Wind River Basin: Beaver Divide, T32N R90W S17, USGS Coyote Springs Quad. Collections: Haines 4243 (RM). Last observed: 1985.
- \*045. Wind River Basin: NW edge of Carmody Lake, T30N R95W S17, USGS Sweetwater Station Quad. Collections: Haines 4667 (RM). Last observed: 1985.
- \*046. Wind River Basin: "ca 18 air mi S of Moneta" (Mahoney Draw), T34N R91W S21, USGS Love Ranch Quad. Collections: Hartman 19869 (RM). Last observed: 1985.
- 054. Sweetwater River Valley: banks of Sweetwater River, ca 6 mi SSW of Sweetwater Station, T29N R96W S13 NW4NW4 & SE4NW4, USGS Barras Spring Quad. Collections: Fertig 14524 (RM). Last observed: 1993.
- 055. Wind River Basin: Cedar Rim Draw, T31N R95W S12 SE4NE4, USGS Dishpan Butte Quad. Collections: Fertig 14577 (RM). Last observed: 1993.

**Hot Springs County**

- 002. Owl Creek Mountains: Middle Fork Owl Creek, T43N R100W S18 SE4, USGS Eagle Nest Quad. Collections: York 315 (RM). Last observed: 1979.
- \*050. S Bighorn Basin: Hogback ridge ca 15 air mi N of Hamilton Dome, T46N R99W S10, USGS Grass Creek Quad. Collections: Jones, R. 1990. Last observed: 1991.

**Natrona County**

- 011. S Powder River Basin: Hell's Half Acre, T35N R85W S6, T35N R86W S1, T36N R85W S31 SE4 & S32 W2, T36N R86W S36, USGS Hells Half Acre Quad. Collections: Dueholm 7789, 7791; Fertig 13890, 13891 (RM). Last observed: 1993.



- 012.**Bates Hole: near Bates Creek crossing, T31N R80W, USGS Twin Buttes Quad. Collections: Porter 8544 (RM). Last observed: 1961.
- 017.**N Platte River Basin: W side of Platte River, 21 air mi SW of Casper, T31N R82W S23 NE4SW4, USGS Clarkson Hill Quad. Collections: Fertig 13776 (RM). Last observed: 1993.
- 020.**N Platte River Basin: Bolten Creek Rd, T31N R81W S33 SW4NE4, USGS Alcova SE Quad. Collections: Fertig 14075 (RM). Last observed: 1993.
- 021.**Bates Hole: Haystack Buttes, T30N R80W S19 W2, USGS Twin Buttes Quad. Collections: Fertig 14079 (RM). Last observed: 1993.
- 022.**Rattlesnake Hills: ridge system ca 2 mi E of Ryan Hill, T31N R83W S10 NE4NE4, S15 W2, USGS Benton Basin NE Quad. Collections: Fertig 14081, 14089 (RM). Last observed: 1993.
- 023.**Bates Hole: SE slopes Twin Buttes, 0.5 mi N of Sand Draw Rd., T30N R80W S34 NW4, USGS Twin Buttes Quad. Collections: Fertig 14090 (RM). Last observed: 1993.
- 026.**S Powder River Basin: Middle Fork Casper Creek, T35N R82W S24, USGS Emigrant Gap NE Quad. Collections: Nelson, B. E. 25819 (RM). Last observed: 1993.
- 027.**S Powder River Basin: Emigrant Gap Ridge, T33N R81W S4 E4, USGS Emigrant Gap Quad. Collections: Hartman 38051 (RM). Last observed: 1993.
- 028.**S Powder River Basin: Coalbank Hills along S Fork Powder River, ca 10 air mi SW of Waltman, T34N R88W S2 SW4, S11 NW4, USGS McRae Gap Quad. Collections: Hartman 40482 (RM). Last observed: 1993.
- 029.**Wind River Basin: US Hwy 20/26, less than 1 air mi E of Fremont Co. line, T37N R89W S27, USGS Madden Quad. Collections: Hartman 40213 (RM). Last observed: 1993.
- \*031.** Rattlesnake Hills: Rattlesnake Mountain, T34N

R88W S32, USGS Ervay Basin Quad.  
Collections: Hill 551 (RM). Last observed:  
1973.

- \*042. Wind River Basin: S Fork Sand Creek, ca 7.25 air mi E of Lost Cabin, T38N R89W S11, USGS Badwater Quad. Collections: Haines 6090 (RM). Last observed: 1986.
- \*047. Powder River Basin: "ca 19 air mi S of Kaycee" (ca 3 mi N of Broken Horn Hill), T40N R82W S16, USGS Broken Horn Creek Quad. Collections: Dueholm 7688 (RM). Last observed: 1979.

#### **Park County**

- \*034. E Slope Absaroka Mountains: Bull Creek, T51N R104W S36, USGS Belknap Creek Quad. Collections: Hartman 15443 (RM). Last Observed: 1983.
- \*051. S Bighorn Basin: Hogback ridge SW of Little Buffalo Basin, T47N R100W S3, USGS Little Buffalo Basin Quad. Collections: Jones, R. 1854 (RM). Last observed: 1991.
- \*052. Bighorn Basin: Polecat Bench, T56N R99W S18, USGS Elk Basin SE Quad. Collections: Nelson, B. E. 15396 (RM). Last observed: 1988.

#### **Sublette County**

- 014.Green River Basin: Yellow Point Ridge, T29N R108W S33 NE4SW4, S34 SE4SE4; T28N R108W S8 SW4NE4, USGS Stud Horse Butte Quad. Collections: Fertig 13974, 13983, 14012 (RM). Last Observed: 1993.
- \*016. Green River Basin: Cottonwood Creek, N of Big Piney, T32N R111W S21 NE4, USGS Ball Island Quad. Collections: Hallsten et al. 261. Last observed: 1982.
- 024.Green River Basin: N Rim of Dry Basin near Calpet Rd, ca 10 air mi SW of Big Piney, USGS Cretaceous Mountain Quad. Collections: Nelson, B. E. 26626 (RM). Last observed: 1993.
- \*038. Green River Basin: "3 mi W of New Fork River and 1 mi N of the Piney cutoff".

Collections: Watson 5 (RM). Last observed: 1965.

**056.**Green River Basin: Adjacent to WY Hwy 191, 18 rd mi N of Farson, T28N R107W S26 NE4, USGS Juel Spring Quad. Collections: Fertig 14368 (RM). Last observed: 1993.

### **Sweetwater County**

\***015.** Green River Basin: Twin Buttes Road, W of Flaming Gorge Reservoir, T12N R109W S3 NE4, USGS Linwood Canyon Quad. Collections: Hallsten 696 (RM). Last observed: 1983.

\***018.** South Pass Area: Oregon Buttes, T26N R101W S1, USGS Dickie Springs Quad. Collections: Heryford 14 (CWC). Last observed: 1990. [Reported as Fremont Co. on label, but this is in error].

**025.**Green River Basin: Stagecoach Draw, ca 13 mi S of Farson, T23N R107W S28 SW4SW4, USGS Pittman Well Quad. Last Observed: 1993 [R. Kass, personal observation].

\***037.** Red Desert Basin: "near Tipton". Collections: Porter 9927 (RM). Last observed: 1965.

**057.**Rock Springs Uplift: Adjacent to WY Hwy 191, ca 25 mi N of Rock Springs, T22N R106W S1, USGS White Rocks Quad. Collections: Fertig 14375 (RM). Last observed: 1993.

**058.**Red Desert Basin: N of Jim Bridger Power Plant, adjacent to service road, T21N R101W S36 SW4SE4, USGS Point of Rocks Quad. Last observed: 1993 [Fertig, C. Refsdal, and J. Whipple, personal observation].

**059.**Green River Basin: Massacre Hill, W of Blacks Fork River, T16N R108W S6, USGS Massacre Hill Quad. Collections: Refsdal s.n. Last observed: 1994.

**062.**Great Divide Basin: Cronin Draw, T24N R97W S21, S22, USGS Bush Lake and Lunan Rim Quads. Last observed: 1993.

**069.**Green River Basin: N side of Peru Hill Rd, ca 3 mi SW of Green River, T17N R107W S8, USGS Blacks Fork Bridge Quad. Collections: Refsdal 147 (RM). Last observed: 1994.

### **Teton County**

**\*040.** N Wind River Range: E bank of Cottonwood Creek, T42N R111W S29 SW4, S30 SE4, S31 NE4, USGS Burnt Mountain Quad. Collections: Fertig 3036 (RM). Last observed: 1990.

### **Uinta County**

**\*048.** Overthrust Belt: "ca 12 air mi N of Mountain View", T17N R114W ?, USGS Austin Reservoir Quad. Collections: Copley 154 (RM). Last observed: 1989.

**065.**Overthrust Belt: 9 mi due S of Mountain View, T13N R115W S2, USGS Leavitt Bench Quad. Collections: Beetle 10731 (WYAC). Last observed: 1950.

### **Washakie County**

**013.**Bighorn Basin: Castle Gardens area, T46N R89W S10, USGS Castle Gardens Quad. Collections: Heller s.n. (RM). Last observed: 1993.

**053.**Bighorn Basin: Nowater Trail (ca 2 mi E of Rocky Point), T45N R92W S36 NW4NW4, USGS Henry Draw Quad. Collections: Martin 1542 (RM). Last observed: 1981.

**063.**Bighorn Basin: SE of Zimmerman Buttes, T44N R92W S30 (reported as S19, but this is NE of buttes), USGS Zimmerman Buttes Quad. Collections: Fisser s.n. (WYAC). Last observed: 1972. (Reported as Hot Springs Co. on label, but this is in error).

**\*064.** Bighorn Basin: Dead Indian exclosure, T45N R88W S20 NE4NW4, USGS Indian Creek Quad. Collections: Fisser 9 (WYAC). Last observed: 1965.

**2. Populations known or assumed extirpated:** Unknown.

**3. Historically known populations where current status not**

**known:** More detailed information on these occurrences is available in Appendix A.

## **COLORADO**

- A. Larimer County: "Laramie River, Colorado".  
Collections: Elias Nelson 467 (RM).  
Last observed: 1901.
- A. Mesa County: "DeBeque". Reported by Weber (1987),  
but no collector or date cited.

## **MONTANA**

- \*Beaverhead National Forest. Collections: Griffin D6-  
123 (RM/USFS). Last observed: 1921.

## **WYOMING**

### **Albany County**

- 009.Laramie Basin: "ca 5 mi N of Laramie". Collections:  
Porter 3265, E. Nelson 411. Last observed:  
1943.

### **Carbon County**

- 007."Freezeout Hills". Collections: E. Nelson 4850 (RM  
type). Last observed: 1898.
- 066.Bates Hole: headwaters of Stinking Creek. Collections:  
Beetle 10349 (WYAC). Last observed: 1949.

### **Natrona County**

- 005.S Powder River Basin: "near Natrona". Collections:  
Weatherwax s.n. (RM, WYAC). Last observed:  
1937.

### **Sweetwater County**

- 010."Leucite Hills". Collections: Merrill and Wilcox 84  
(RM). Last observed: 1901.

### **Teton County**

- \*049. Gros Ventre River Valley: "Horsetail Creek".  
Collections: Coulter 154 (RM/USFS). Last  
observed: 1924.

**4. Locations not yet investigated and believed likely to support other possibly extant natural occurrences:** Extensive areas of potential habitat exist in the Green River Basin (Fertig 1993 b) as well as in the Great Divide and Washakie basins. These areas have not received significant attention from plant collectors in the past (R. Hartman, personal communication). Additional populations are also likely to be found in the Bighorn (Fertig 1992), Wind River, Laramie, and Powder River basins in northern and central Wyoming. Unsurveyed potential habitat may exist in southern Montana, eastern Utah, and northern and western Colorado.

**5. Sites having ambiguous or incomplete locality data:**  
The following six occurrences are not entered into the WYNDD database.

#### **WYOMING**

##### **Converse County**

\*A."Pilot Ranch, 10 mi SE of Douglas". Collections: Bonsell 17 (WYAC). Last observed: 1961.

##### **Fremont County**

B."Top of Beaver Rim". Collections: Spitzer s.n. (WYAC). Last observed: 1976.

\*C."Shoshone Reservation, St. Lawrence Ditch". Collections: Millsap 35 (WYAC). Last observed: 1938.

\*D."Between Moneta and Shoshoni along highway". Collections: Beetle 13901 (WYAC). Last observed: 1959.

##### **Natrona County**

E."T36N R81W" (in vicinity of Bucknum). Collections: Fullerton 15 (WYAC). Last observed: 1962?

\*F."S side of Casper Mountain, roadside area". Collections: Vosler 26 (WYAC). Last observed: 1959.

**6. Locations known or suspected to be erroneous reports:**  
None.

**C. Status and location of presently cultivated**

**material:** No cultivated material is presently known.

**D. Biogeographical and phylogenetic history:**

Morphologically, Oryzopsis contracta is intermediate in almost a dozen floral features between O. hymenoides and O. micrantha. This prompted Shechter and Johnson (1968) to hypothesize that O. contracta evolved from a fortuitous hybrid between these two species. Normally, O. hymenoides ( $2n = 48$ ) and O. micrantha ( $2n = 22$ ) are reproductively isolated and hybrids between them are sterile ( $2n = 35$ ). Shechter and Johnson proposed that a micrantha-hymenoides hybrid was able to produce a chance, fertile 24-chromosome gamete and successfully backcross with an O. hymenoides plant to produce a fertile ( $2n = 48$ ) O. contracta-like plant. This individual was then able to reproduce by self-fertilization. Subsequent chromosomal translocations resulted in the development of reproductive barriers to prevent further back-crossing of O. contracta with either parent species. Occasional hybrid individuals have been reported between O. contracta and O. hymenoides, but these have been found to be infertile (Shechter and Johnson 1966, 1968).

**6. Environment and habitat**

**A. Concise statement of general habitat:** Dry, shallow, sandy or gravelly soils on slopes or rolling plains in open, sagebrush-grassland communities.

**B. Physical characteristics**

**1. Climate**

**a. Koppen climate classification:** Cold steppe with winter drought (Ackerman 1941).

**b. Regional macroclimate:** Average annual precipitation for Oryzopsis contracta habitat in Wyoming ranges from 6 inches in the Red Desert to 14 inches in the Powder River Basin. Most of this precipitation falls as

rain in spring and early summer. Mean annual temperature varies from a low of 34° F in the Green River Basin to a high of 46° F in the Bighorn and Powder River basins (Martner 1986).

- c. **Local microclimate:** Contracted Indian ricegrass typically occurs on light-colored soils in open areas with low vegetative cover. These microhabitats are likely to be drier and have higher soil temperatures than surrounding areas.

2. **Air and water quality requirements:** Not known.

3. **Physiographic province:** The range of Oryzopsis contracta falls primarily within the Wyoming Basin Province and Great Plains Province, Missouri Plateau (unglaciated) Section (Fennemann 1931). Populations at the northwestern edge of the species' range occur in Fennemann's Middle Rocky Mountains Province.

4. **Physiographic and topographic characteristics:**

Contracted Indian ricegrass is found on all aspects of mid to upper slopes and on dry ridgetops and gently rolling plains. Occasional populations are found in more mesic draws. Elevation ranges from 4800-7800 feet (1460-2380 m) above sea level.

5. **Edaphic factors:** Most populations of Oryzopsis contracta occur on dry, sandy, shallow soils. It has also been reported from rocky siltstone, bentonite, saline soils, sandstone bedrock, clay-shale outcrops, redbeds, and limestone gravel (RM and WYNDD records)

6. **Dependence on dynamic aspects:** The presence of many populations on roadcuts and other recently disturbed sites suggests that Oryzopsis contracta may be adapted for early seral environments.

### C. Biological Characteristics

1. **Vegetation physiognomy and community structure:** Oryzopsis contracta is often found in



communities dominated by Wyoming big sagebrush (Artemisia tridentata var. wyomingensis) and needle and thread grass (Stipa comata). It also occurs in birdsfoot sage (Artemisia pedatifida)/Nuttall saltbush (Atriplex gardneri) communities and sagebrush/rabbitbrush grasslands. The habitat of O. contracta is characterized by low vegetative cover with dry, shallow soils.

**2. Regional Vegetation Type:** Great Plains Shortgrass Prairie Province (grama-needlegrass-wheatgrass section) and Wyoming Basin Province (wheatgrass-needlegrass-sagebrush and sagebrush-wheatgrass sections) (Bailey 1976).

**3. Frequently associated species:**

Agropyron cristatum (Crested wheatgrass)  
Arenaria hookeri (Hooker sandwort)  
Artemisia pedatifida (Birdsfoot sagebrush)  
Artemisia tridentata  
var. wyomingensis (Wyoming big sagebrush)  
Astragalus spatulatus (Spoonleaf milkvetch)  
Atriplex gardneri (Nuttall saltbush)  
Opuntia polyacantha (Plains pricklypear cactus)  
Oryzopsis hymenoides (Indian ricegrass)  
Poa secunda (Sandberg bluegrass)  
Stanleya pinnata (Desert princesplume)  
Stipa comata (Needle and thread grass)  
Stipa nelsonii (subalpine needlegrass)  
Xylorhiza glabriuscula (Woodyaster)

**4. Dominance and frequency:** Contracted Indian ricegrass populations may be small with widely scattered individuals (Fertig 1993 b) or locally dominant and extensive. This latter condition is most prevalent along sandy roadside areas in the basins of central Wyoming (WYNDD records). At one roadside location in Bates Hole, O. contracta was found to be co-dominant with planted strips of Agropyron cristatum.

**5. Successional phenomena:** The adaptations of Oryzopsis contracta to sandy, disturbed sites makes it a potential early successional species in some habitats.

**7. Population biology**

**A. General summary:** Oryzopsis contracta is a perennial bunchgrass that typically occurs in small, widely scattered patches or clumps. Under favorable conditions, however, it may become locally dominant and cover extensive areas. Most bunches observed in 1993 produced numerous inflorescences and abundant seed. Seedlings were not observed in 1993 and it is not known what effects yearly climatic fluctuations have on seedling establishment and survival.

**B. Demography**

**1. Known populations:** There are currently 63 known populations of Contracted Indian ricegrass in Wyoming. Fifteen additional occurrences are known from historical records in Colorado, Wyoming, and Montana. Surveyed populations range in abundance from 10-20 to several thousand plants.

**2. Demographic details:** Population data are available for only 14 occurrences surveyed in 1993. For additional information, see the Element Occurrence Records in Appendix A.

**004.** Albany Co: Laramie Basin; Big Hollow.

**1. Area:** ca 100-200 acres.

**2. Number and age of plants:** No census taken due to confusion in separating this from O. hymenoides, but plants observed to be moderately common in 1993.

**3. Density:** Unknown.

**4. Presence of dispersed seed:** Unknown.

**5. Evidence of reproduction:** Most plants observed in flower.

**6. Evidence of expansion/contraction:** Population probably stable. Noted to be "locally common" in 1971 by Reeder (RM records). Has been known from this site since 1947 (WYAC records).

**011.** Natrona Co.: S Powder River Basin; Hell's Half Acre

**1. Area:** ca 10 acres.

**2. Number and age of plants:** Population small and mixed with the more abundant O. hymenoides in 1993.

3. **Density:** Scattered.
4. **Presence of dispersed seed:** Unknown.
5. **Evidence of reproduction:** Many plants in early flower (most with inflorescences still in the leaf sheath).
6. **Evidence of expansion/contraction:** First observed at this site in 1979. 1993 survey revealed that this population covers a larger area than was previously known.

014. Sublette County: Green River Basin; Yellow Point Ridge

1. **Area:** ca 50 acres.
2. **Number and age of plants:** 50-100 flowering plants.
3. **Density:** Mostly small and localized in 4 separate subpopulations. Greatest density observed was 15 bunches in an area of ca 40 sq ft (Fertig 1993 b).
4. **Presence of dispersed seed:** Unknown.
5. **Evidence of reproduction:** Most plants in early flowering.
6. **Evidence of expansion/contraction:** Unknown.

017. Natrona County: N Platte River Basin; W side of Platte River

1. **Area:** 30 acres.
2. **Number and age of plants:** Locally common, mixed with less numerous O. hymenoides.
3. **Density:** Patchy but widespread.
4. **Presence of dispersed seed:** Unknown.
5. **Evidence of reproduction:** Most plants in early flowering.
6. **Evidence of expansion/contraction:** Unknown.

019. Carbon County: Shirley Basin; ca 1.5 mi N of Muddy Creek

1. **Area:** 20 acres
2. **Number and age of plants:** ca 200-300.
3. **Density:** Locally abundant.
4. **Presence of dispersed seed:** Unknown.
5. **Evidence of reproduction:** Most plants observed in flower.
6. **Evidence of expansion/contraction:** Unknown.

020. Natrona County: N Platte River Basin: Bolten Creek Road

1. **Area:** ca 2 acres.
2. **Number and age of plants:** Unknown. Observed to be

- locally common with O. hymenoides.
3. **Density:** Locally abundant but restricted to limited habitat.
  4. **Presence of dispersed seed:** Unknown.
  5. **Evidence of reproduction:** Most plants in flower and fruit.
  6. **Evidence of expansion/contraction:** Unknown.
021. Natrona County: Bates Hole; Haystack Buttes
1. **Area:** 10-20 acres.
  2. **Number and age of plants:** 800-1500 plants estimated in area.
  3. **Density:** Extremely abundant in local area; co-dominant with Agropyron cristatum.
  4. **Presence of dispersed seed:** Unknown.
  5. **Evidence of reproduction:** Most plants in flower or fruit.
  6. **Evidence of expansion/contraction:** Population has probably increased since this site has been disturbed and revegetated with crested wheatgrass.
022. Natrona County: Rattlesnake Hills; ridge system ca 2 mi E of Ryan Hill
1. **Area:** ca 100 acres.
  2. **Number and age of plants:** Several thousand plants estimated in 1993.
  3. **Density:** Locally densely clustered to widely scattered.
  4. **Presence of dispersed seed:** Unknown.
  5. **Evidence of reproduction:** Most plants in flower or fruit.
  6. **Evidence of expansion/contraction:** Unknown.
023. Natrona County: Bates Hole; Twin Buttes
1. **Area:** ca 40 acres.
  2. **Number and age of plants:** Unknown, but probably several hundred clumps.
  3. **Density:** Locally abundant, one of the dominant grass species on the lower slopes and draws.
  4. **Presence of dispersed seed:** Unknown.
  5. **Evidence of reproduction:** Most plants in flower and fruit.
  6. **Evidence of expansion/contraction:** Unknown.
054. Fremont County: Sweetwater River Valley; banks of Sweetwater River ca 6 mi SSW of Sweetwater

Station

1. **Area:** ca 5 acres.
2. **Number and age of plants:** No census taken due to difficulty of recognizing fruiting plants late in the season. Observed to be locally common.
3. **Density:** Locally abundant in 2 subpopulations.
4. **Presence of dispersed seed:** Yes.
5. **Evidence of reproduction:** Most plants in fruit.
6. **Evidence of expansion/contraction:** Unknown.

055. Fremont County: Wind River Basin; Cedar Rim Draw

1. **Area:** ca 2 acres (but much more potential habitat in adjacent area).
2. **Number and age of plants:** Small population, most vegetative or past fruiting.
3. **Density:** Scattered.
4. **Presence of dispersed seed:** Yes.
5. **Evidence of reproduction:** Most plants in late fruit.
6. **Evidence of expansion/contraction:** Unknown.

056. Sublette County: Green River Basin; adjacent to WY Hwy 191, 18 rd mi N of Farson

1. **Area:** 1 acre (but more unsurveyed habitat in area).
2. **Number and age of plants:** 10-20 plants.
3. **Density:** Scattered.
4. **Presence of dispersed seed:** Unknown.
5. **Evidence of reproduction:** Most plants in late fruit.
6. **Evidence of expansion/contraction:** Unknown.

060. Carbon County: Rawlins Uplift; Rawlins

1. **Area:** ca 40 acres.
2. **Number and age of plants:** ca 24 observed at two subpopulations.
3. **Density:** Unknown.
4. **Presence of dispersed seed:** Unknown.
5. **Evidence of reproduction:** Plants in flower and fruit.
6. **Evidence of expansion/contraction:** Unknown.

061. Carbon County: Rawlins Uplift; Road to Chokecherry Knob

1. **Area:** ca 80 acres.
2. **Number and age of plants:** Several thousand observed along road in 1993.

3. **Density:** Locally abundant.
4. **Presence of dispersed seed:** Unknown.
5. **Evidence of reproduction:** Most plants in flower or fruit.
6. **Evidence of expansion/contraction:** Unknown.

### C. Phenology

1. **Patterns:** Flowering begins in early June and continues into August (Fertig 1992). Fruit are produced from June to August. Fertile seeds are often dispersed within 2 weeks of maturing (Robertson 1977), but inviable seed may persist into the following spring.
2. **Relation to climate and microclimate:** In Oryzopsis hymenoides, exposure to mesic conditions promotes outcrossing, while dry conditions at flowering time promotes self-fertilization (Jones 1990). Early season moisture, however, may delay flowering. Similar patterns may be present in O. contracta.

### D. Reproductive ecology

1. **Types of reproduction:** Oryzopsis contracta reproduces primarily by seed. Vegetative reproduction by rhizomes has not been observed in this species.
2. **Pollination**
  - a. **Mechanisms:** Wind pollinated.
  3. **Seed dispersal**
    - a. **General mechanisms:** The deciduous awns on the lemmas of O. contracta may assist dispersal by large mammals. Seed may also spread locally by wind or gravity.
    - b. **Dispersal patterns:** The patchy nature of individual bunches suggests that dispersal may be irregular across the landscape.

#### 4. Seed

- a. **Amount of seed production:** 1 seed is produced per floret. Seed may be produced throughout the growing season.
- b. **Seed viability and longevity:** In the closely related O. hymenoides, seeds may remain viable for up to 26 years (Jones 1990).
- c. **Dormancy:** Seed dormancy in Oryzopsis hymenoides is regulated by physical and physiological properties of the hardened lemma and palea (Zemetra et al. 1983).
- d. **Germination requirements:** Seeds of Oryzopsis hymenoides require a period of cold treatment for germination. Mechanical scarification and aging have been shown to improve germination rates in cultivated O. hymenoides (Zemetra et al. 1983; Jones and Nielson 1992).
- e. **Percent germination:** Unknown under natural conditions. Manipulation of seeds of O. hymenoides under cultivation can increase germination significantly (Jones and Nielson 1992).

#### 8. Population ecology

- A. **General summary:** Oryzopsis contracta often occurs in small, the largest populations of this species. The grass may be at a competitive advantage in some early seral environments.
- B. **Positive and neutral interactions:** Unknown.
- C. **Negative interactions**
1. **Herbivores, predators, pests, parasites, diseases:**

The species is grazed by numerous native herbivores and by domestic livestock. As a perennial bunchgrass, it is potentially vulnerable to heavy grazing and is likely to be a decreaser. It may be susceptible to some of the same diseases as Oryzopsis hymenoides, including loose smut, and various root fungi (Robertson 1977).

## 2. Competition

- a. Intraspecific:** This species generally occurs in widely scattered patches, minimizing competition between bunches for nutrients and space.
- b. Interspecific:** At many locations, Oryzopsis contracta co-occurs with its close relative O. hymenoides. The two taxa appear to have similar habitat requirements and may be competitors for available nutrients and space. Hybridization, although reported to be rare (Shechter and Johnson 1966, 1968), could have a negative impact on O. contracta by reducing its ability to replenish the seedbank with viable seed.

**3. Toxic and allelopathic interactions:** Unknown.

## D. Hybridization

- 1. Naturally occurring:** Natural hybrids between Oryzopsis contracta and O. hymenoides have been reported by Shechter and Johnson (1966, 1968). These were found to be uncommon and entirely infertile. Although O. hymenoides has been shown to hybridize with at least 10 species of Stipa (Johnson 1972), O. contracta is not known to hybridize with any other species in nature.
- 2. Artificially induced:** Hybridization between O. contracta and O. hymenoides was induced by Shechter and Johnson (1968). Hybrid plants were found to be morphologically intermediate between the parent species and infertile.

## 9. Current land ownership and management responsibility

**A. General nature of ownership:** United States government (Bureau of Land Management and US Forest Service), State of Wyoming, and private.

**B. Specific landowner:**

**Colorado:** Unknown.



**Montana:** Beaverhead National Forest.

**Wyoming:**

- 001.Casper BLM (Buffalo RA)
- 002.Worland BLM (Grass Creek RA)
- 003.private
- 004.Rawlins BLM (Great Divide RA), private
- 005.Casper BLM (Platte River RA), + private?
- 006.private?
- 007.Rawlins BLM (Great Divide RA) + private?
- 008.Rawlins BLM (Great Divide RA) + private?
- 009.private
- 010.Rock Springs BLM (Green River RA) checkerboard
- 011.Casper BLM (Platte River RA) + private?
- 012.Casper BLM (Platte River RA)
- 013.Worland BLM (Washakie RA)
- 014.Rock Springs BLM (Pinedale RA)
- 015.Rock Springs BLM (Green River RA)
- 016.private
- 017.Casper BLM (Platte River RA)
- 018.Rock Springs BLM (Green River RA)
- 019.Rawlins BLM (Great Divide RA)
- 020.Casper BLM (Platte River RA)
- 021.Casper BLM (Platte River RA)
- 022.Casper BLM (Platte River RA)
- 023.Casper BLM (Platte River RA)
- 024.Rock Springs BLM (Pinedale RA)
- 025.Rock Springs BLM (Green River RA)
- 026.Casper BLM (Platte River RA)
- 027.Casper BLM (Platte River RA)
- 028.Casper BLM (Platte River RA) + private
- 029.Casper BLM (Platte River RA)
- 030.private
- 031.Casper BLM (Platte River RA) + private?
- 032.private
- 033.private
- 034.State of Wyoming (or private?)
- 035.Rawlins BLM (Great Divide RA) + private?
- 036.State of Wyoming & Rawlins BLM (Lander RA)
- 037.Rawlins BLM (Great Divide RA) checkerboard
- 038.Rock Springs BLM (Pinedale RA)
- 039.Rock Springs BLM (Green River RA) + State of Wyoming
- 040.Bridger-Teton NF (Jackson RD)
- 041.private
- 042.Casper BLM (Platte River RA) + private
- 043.Rawlins BLM (Lander RA) + State of Wyoming, private
- 044.Rawlins BLM (Lander RA)
- 045.Rawlins BLM (Lander RA) or private?

- 046. Rawlins BLM (Lander RA)
- 047. State of Wyoming
- 048. Rock Springs BLM (Kemmerer RA) + private
- 049. Bridger-Teton NF (Jackson RD)
- 050. Worland BLM (Grass Creek RA)
- 051. Worland BLM (Grass Creek RA) + private
- 052. Worland BLM (Cody RA)
- 053. Worland BLM (Grass Creek RA)
- 054. private (TNC Sweetwater Preserve)
- 055. Rawlins BLM (Lander RA)
- 056. Rock Springs BLM (Green River RA)
- 057. Rock Springs BLM (Green River RA)
- 058. Rock Springs BLM (Green River RA)
- 059. Ashley NF (Flaming Gorge NRA)
- 060. Rawlins BLM (Great Divide RA) + private
- 061. Rawlins BLM (Great Divide RA) + private
- 062. Rawlins BLM (Great Divide RA)
- 063. Worland BLM (Washakie RA)
- 064. Worland BLM (Washakie RA)
- 065. Rock Springs BLM (Kemmerer RA)
- 066. Rawlins BLM (Great Divide RA) or private?
- 067. private
- 068. Rawlins BLM (Great Divide RA) checkerboard
- 069. Rock Springs BLM (Green River RA)

**C. Management responsibility:** 35 of the 69 documented occurrence populations in Wyoming and Montana are managed by the US Forest Service. The remaining populations are found on private or state lands, or the ownership is not known.

**D. Easements, conservation restrictions, etc.:** The Wyoming Field Office of The Nature Conservancy manages one population of Oryzopsis contracta on its Sweetwater River Preserve in Fremont County. No other privately-owned populations are formally protected at present.

## 10. Management Practices and Experience

### A. Habitat management

#### 1. Review of past management and land use experience

**a. This taxon:** Most surveyed populations of Oryzopsis contracta occur on sandy substrates in disturbed sites or areas with low vegetative cover. Many of these sites

are on road right-of-ways that may be periodically mowed or subject to weed control activities. Other populations are known or suspected to occur on sites that are managed primarily for livestock grazing. Some populations occur on areas that are leased for oil, gas, or coal development (Fertig 1993 b; Hartman and Nelson 1993).

**b. Related taxa:** Oryzopsis hymenoides is recognized as one of the most important forage grasses of western North America (Jones 1990). It is widespread on lands managed for livestock grazing and mineral leasing throughout Wyoming. The species is known to be a decreaser under destructive grazing practices (USDA 1937). Several cultivars have been developed by the Soil Conservation Service for use in range enhancement and rehabilitation of disturbed lands (Jones 1990).

**2. Performance under changed conditions:** As a bunchgrass, Contracted Indian ricegrass is likely to be a decreaser under destructive grazing practices. Surface disturbances associated with road construction may have a harmful short term impact on populations. In the absence of additional disturbance, however, many roadside populations have been observed to recover strongly. Similar recovery may be possible following disturbances associated with mineral development.

**3. Current management policies and actions:** Current management is the same as past management (see above).

**4. Future land use:** No changes in land use are expected.

## **B. Cultivation**

**1. Controlled propagation techniques:** No studies have

been conducted on the propagation of Contracted Indian ricegrass. Extensive research, however, has been conducted on the cultivation of Oryzopsis hymenoides. A high degree of inherent seed dormancy has been found to be the primary obstacle to propagation of this species commercially (Jones and Nielson 1992). Scarification and treatment with sulfuric acid has been found to weaken mechanical dormancy while pre-chilling, fall planting, and application of growth-regulating hormones have been successful in weakening physiological dormancy (Zemetra et al. 1983; Jones and Nielson 1992).

2. **Ease of transplanting:** Unknown.
3. **Pertinent horticultural knowledge:** Preparation of seed to enhance germination is expensive and stands are often difficult to establish in Oryzopsis hymenoides (Jones 1990). Additional research is desirable to improve propagation techniques for this species and O. contracta.
4. **Status and location of cultivated material:** No cultivated material of Oryzopsis contracta is presently known.

#### 11. Evidence of threats to survival

##### A. Present or threatened destruction, modification, or curtailmen

1. **Past threats:** Heavy grazing in the past may have reduced or eliminated some populations of Oryzopsis contracta.
2. **Existing threats:** Contracted Indian ricegrass is likely to be a decreaser under destructive grazing practices. Large-scale surface disturbances associated with mineral development or road construction may have a short-term negative impact on local populations (Fertig 1993 b). Competition with exotic species may also reduce local populations in some disturbed habitats. Additional competition with Oryzopsis hymenoides, especially cultivated varieties

used for range rehabilitation, may restrict the establishment of O. contracta.

3. **Potential threats:** Development of rangeland habitat for commercial or residential use could become a threat in areas such as the Big Hollow west of Laramie.

- B. **Overutilization for commercial, sporting, scientific, or educational uses:**  
Overutilization as livestock forage is a threat.

- C. **Disease, predation, or grazing:** Oryzopsis contracta may be susceptible to damage by loose smut and root fungi, as is O. hymenoides (Robertson 1977). The plant is highly palatable to native and domestic grazers and is probably a decreaser under heavy grazing pressure.

- D. **Inadequacy of existing regulatory mechanisms**

1. **Past threats:** Many of the land use practices detrimental to Contracted Indian ricegrass were done before its existence was known at a site or before it was recognized as a potential species of concern.

2. **Existing threats:** BLM Manual 6840 and Forest Service Manual 2670 require these federal agencies to manage USFWS Candidate species in such a manner that these species and their habitats are conserved and to ensure that authorized actions do not contribute to the need for listing these species as Threatened or Endangered (Willoughby et al. 1992, USDA Forest Service 1988). BLM and USFS regulations are adequate to address current management conflicts on public lands. These same regulations, however, do not apply to populations on private or state lands.

3. **Potential threats:** Existing regulatory measures are adequate to address potential threats.

## II. **Assessment and recommendations**

12. **General assessment of vigor, trends, and status:** Oryzopsis

additional historical populations are known from Colorado, Montana, and Wyoming. Surveyed populations range in size from 10-20 to many thousand clumps. Individual plants may be widely scattered over a large area or numerically dominant at a localized site. Most sites surveyed in 1993 were found to have vigorous plants with a heavy fruit set. Threats to these plants were considered to be minimal.

### 13. Recommendations for listing or status change

- A. Recommendation to U. S. Fish and Wildlife Service:** Oryzopsis previously believed. When this species was originally recommended for C2 status it was known from only 13 occurrences in Colorado and Wyoming (only 9 of which were extant). Field surveys in 1993 documented 23 new populations in Wyoming and examination of herbarium material led to the discovery of over 30 records previously mis-identified as Oryzopsis hymenoides. There are now at least 63 extant occurrences known throughout the basin country of central, southeastern, and western Wyoming. In addition, threats to the species from surface disturbance have been found to be less severe than originally suspected. Many of the largest known populations have been found to occur on recently disturbed, sparsely vegetated roadsides.
- B. Recommendation to other federal agencies:** Special management in range improvement, erosion control, and mine reclamation.
- C. Other status recommendations**
1. **Counties and local areas:** County agricultural organizations should investigate the use of Contracted Indian ricegrass for range improvement.
  2. **State:** State agriculture departments and Universities should investigate the use of this species for range improvement and reclamation.

### 14. Recommended critical habitat

- A. Concise statement:** None recommended.

**15. Conservation/recovery recommendations**

**A. General conservation recommendations**

**1. Recommendations regarding present or anticipated activities:** Managers of public and private lands grazed by livestock should recognize that Oryzopsis contracta is potentially a decreaser under heavy grazing and should adopt appropriate stocking and rotation levels to maintain this valuable species.

**2. Areas recommended for protection:** Examples of outstanding habitat should be preserved by the BLM or USFS as baseline areas for determining long and short term ecological changes and for use as comparison areas for assessing effects of resource management techniques.

**B. Monitoring activities and further studies:** Selected populations should be monitored on a 3-5 year cycle to determine population trends. Trend data are especially needed for sites subjected to different management activities. Additional new populations should be documented by specimens and deposited in major state herbaria. Surveys should be conducted in northern and western Colorado and southern Montana to determine the species' abundance there.

**16. Interested parties:**

Bureau of Land Management  
Wyoming State Office  
ATTN: Jeff Carroll  
P.O. Box 1828  
2515 Warren Ave.  
Cheyenne, WY 82003

US Fish and Wildlife Service  
Office of Endangered Species  
ATTN: Dr. James Miller  
P.O. Box 25486  
Denver Federal Center  
Denver, CO 80225

US Fish and Wildlife Service  
ATTN: Chuck Davis  
4000 Morrie Ave.  
Cheyenne, WY 82001

Colorado Natural Heritage Program  
c/o University of Colorado Museum  
Hunter 115, Campus Box 315  
Boulder, CO 80309-0315

Montana Natural Heritage Program  
1515 East Sixth Ave.  
Helena, MT 59620

Wyoming Native Plant Society  
1604 Grand Ave.  
Laramie, WY 82070

Colorado Native Plant Society  
P.O. Box 200  
Ft. Collins, CO 80522

### **III. Information sources**

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**B. Museum collections consulted:** The following herbaria were consulted or are known to have specimens of Oryzopsis contracta:

Central Wyoming College Herbarium (CWC), Riverton, WY.

Rocky Mountain Herbarium (RM), University of Wyoming, Laramie, WY.

University of California at Los Angeles Herbarium  
(UCLA), Los Angeles, CA.

Wyoming Agriculture College Herbarium (WYAC), University  
of Wyoming, Laramie, WY.

**C. Fieldwork:** Field surveys for Oryzopsis contracta were conducted by the author in conjunction with other rare plant survey projects for the Casper and Rock Springs districts, BLM from June-August, 1993. Additional field work was done by Ronald Hartman and Ernie Nelson of the Rocky Mountain Herbarium and Ron Kass for the Rock Springs BLM.

1993 field surveys were also conducted by the following BLM employees and volunteers who kindly shared their information and specimens: Frank Blomquist, Connie Breckinridge and Susan Foley, BLM Rawlins District; Charmaine Refsdal, BLM volunteer; Dallas Heller and Donald Serrano, BLM Worland District; Steve Laster, BLM Rock Springs District.

Herbarium studies were conducted by the author in 1993-94. All specimens of O. contracta and O. hymenoides in the collections at the University of Wyoming (RM and WYAC) and Central Wyoming College were examined for this status survey.

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**18. Summary of materials on file:** Original survey forms, maps, color photographs, and specimens collected during field work in 1993 are deposited in the Rocky Mountain (RM) and Central Wyoming College (CWC) herbaria.

#### **IV. Authorship**

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Appendix A.

Element Occurrence Records and Maps

Appendix B.

Additional Populations  
Surveyed in 1994

Since completing this status survey in April, 1994, several additional populations of Oryzopsis contracta have been found in Wyoming. Location data for these new occurrences is listed below.

## WYOMING

### Fremont County

Beaver Rim Divide: south end of Cedar Rim, ca 6 air mi north of Sweetwater Station, T31N R95W S27 SE4 of SW4. Locally abundant on white, fine-textured ash soils at base of rim.

With Lomatium nuttallii, Yermo xanthocephalus, Penstemon paysoniorum, Cirsium aridum, Artemisia tridentata, and Oryzopsis hymenoides. Note: In vicinity as EO # 055. Ownership: Rawlins BLM (Lander RA). Collections: Fertig 14838 (RM). Last observed: 13 June 1994.

Beaver Rim Divide: along Cedar Rim Draw Road for first 2 miles east of junction with WY Hwy 135, 6.75 mi north of Sweetwater Station, T31N R95W S21 SE4 of SE4 & S22 W2 of SW4. Locally common on sandy soil at edge of bladed dirt road and in barrow pit with Elymus smithii, Chrysothamnus viscidiflorus. Note: In vicinity of EO # 055. Ownership: Rawlins BLM (Lander RA). Collections: Fertig 14842 (RM). Last observed: 13 June 1994.

### Park County

North Fork Shoshone River Drainage: Rattlesnake Creek, ca 0.5 miles southwest of The Palisades, ca 8.5 air miles northwest of Buffalo Bill Reservoir, T53N R104W S3 NW4 of SE4. Dry, west-facing slopes in Artemisia tridentata var. wyomingensis grassland on redbed knoll above creek. Replaces O. hymenoides in abundance on redbeds. Ownership: private. Collections: Fertig 15341 (RM). Last observed: 9 August 1994.

South Fork Shoshone River Drainage: ridge system on northeast side on Hardpan Creek, ca 5 air miles east of Citadel Mountain, T50N R105W S2. South-facing slopes of fine-textured volcanic soil and scattered gravel in Artemisia tridentata var. wyomingensis-Elymus spicatus community. Ownership: private. Observer: Walter Fertig (specimen not collected). Last observed: 12 August 1994.

### Sweetwater County

Great Divide Basin: Southwest face of Bush Rim, along lower



road, 5 miles due east of Jack Morrow Creek, T24N R101W S8 NW4 of NW4. Locally dominant grass species in sandy-gravelly Wyoming big sagebrush community. Note: Site is near Merrill and Wilcox's 1901 collection site ("Leucite Hills", EO # 010). Ownership: Rock Springs BLM (Green River RA). Observer: W. Fertig (specimen not collected). Last observed: 29 May 1994.

Great Divide Basin: north side of Delaney Rim, ca 4.25 miles south of Tipton off Interstate 80, T18N R96W S6. Very common on lower slopes and flats, primarily on clay substrates. Occurs with O. hymenoides. Ownership: Rawlins BLM (Great Divide RA). Collections: Fertig 14853 (RM). Last observed: 14 June 1994.

Great Divide Basin: South of Bitter Creek on County Hwy 19 on east side of Antelope Creek, T17N R99W S36. Very common on clay-sand flats in Atriplex gardneri-Artemisia pedatifida-A. spinescens community. Ownership: State of Wyoming. Collections: Fertig 14861 (RM). Last observed: 14 June 1994.

Great Divide Basin: East end of Steamboat Mountain Rim, 0.75-1 mile east of Freightier Gap, T23N R101W S4 NW4 of NW4 and S5 NE4 of NE4. 700-1000 plants observed on sandy-clay slopes. Ownership: Rock Springs BLM (Green River RA). Collections: Fertig 14871 (RM). Last observed: 14 June 1994.

Great Divide Basin: near Continental Divide on Sweetwater County Road 83 ca 1 mile north of Freightier Gap, T24N R101W S29 SW4. Open roadsides on fine-textured grey-brown clay and in adjacent Artemisia tridentata var. wyomingensis - Chrysothamnus viscidiflorus community. Equally common with O. hymenoides. Ownership: Rock Springs BLM (Green River RA). Collections: Fertig 14875 (RM). Last observed: 15 June 1994.

Rock Springs Uplift: rim of White Mountain along White Mountain Road, extending from beacon northwest for 2 miles, T18N R106W S8 N2 of South2, S9 N2. Sandy roadside (derived from weathered red sandstone) with O. hymenoides, and Agropyron cristatum. Ownership: Rock Springs BLM (Green River RA) and private. Collections: Fertig 14886. Last observed: 21 June 1994.

Rock Springs Uplift: east slope of White Mountain 0.5-1.5 miles north of US Hwy 191, ca 10 air miles north-northwest of Rock Springs, T21N R105W S32 E2, S33. Local on sandier

soils on barren, grey-white shale ridges and low hills of the Green River Formation. Ownership: Rock Springs BLM (Green River RA) and private. Collections: Fertig 14894 (RM). Last observed: 21 June 1994.

Overthrust Belt: east slope of Cedar Mountain, upslope (NW) of switchbacks on Cedar Mountain Road, 10.5 air mi north of McKinnon, T14N R111W S20 SE4 of NE4. Common on sandy-gravel soils among small to mid-size rocks of Bishop Conglomerate and at edge of ant mounds. With O. hymenoides. Ownership: Rock Springs BLM (Green River RA). Collections: Fertig 14903 (RM). Last observed: 23 June 1994.