SPECIES EVALUATION

Cryptogramma stelleri, Priority 1. *Cryptogramma stelleri* (Gmelin) Prantl (CRST2). Steller's cliff brake, slender rock brake, fragile rock-brake. CNHP G5 / S2, Track A. G5 N?. CO S2, WY S1. WY Disjunct, 1 SNF, 1 BNF; GMUG-Ouray, Taylor River-Cebolla,MBR-Parks, Yampa,MBR-Parks, SJ & RG-Columbine, Conejos Peak, Pagosa,WR-Sopris

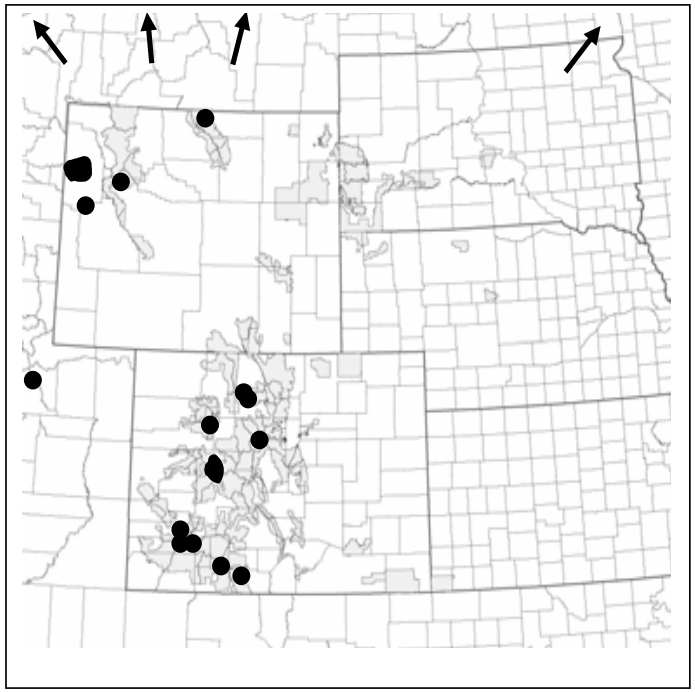
Criteria	Rank	Confi-dence	Rationale	Sources of Information
1 Distribution within R2	B	M	Distribution is very patchy, corresponding to patchy occurrences of this unusual habitat. Ranked S2 in Colorado and S1 in Wyoming. Not ranked in Montana or Utah.	Specimens at COLO and RM, Fertig 2000, Weber and Wittmann 2001ab, Dorn 2001.
2 Distribution outside R2	C	H	More widespread in Alaska, Siberia, eastern Canada.	Specimens at COLO and RM, Fertig 2000, Weber and Wittmann 2001ab, Dorn 2001, Hultén 1968.
3 Dispersal Capability	D	M	Dispersal mechanisms unknown to me. Spores, however, commonly disperse long distances via the atmosphere or water.	Heidel and Laursen 2002, Fertig 2000.
4 Abundance in R2	B	M	Still fairly rare, but few limestone cliffs have been searched for this species. I estimate that 10-20 more localities await discovery in R2. Five occurrences in Wyoming and about ten in Colorado. The descriptions allow an inference of small populations, but I know of no counts on populations.	CNHP records, specimens at COLO and RM, Fertig 2000, Weber and Wittmann 2001ab, Dorn 2001, Hultén 1968.
5 Population Trend in R2	D	H	Population trend unknown, because no population demographics studied.	
6 Habitat Trend in R2	B	H	"Extremely rare, crevices of limestone cliffs" (Weber and Wittmann 2001ab). In Wyoming, in thin-soil, mossy locations on limestone cliffs near water. These habitats have changed little for many decades.	Fertig 2000, Weber and Wittmann 2001ab, my observations.
7 Habitat Vulnerability or Modification	C	H	These habitats are very resilient to all activities except limestone mining, which is no longer economically viable in any mountain area in R2. Roads and trails can usually easily avoid cliffs. It is a mystery to me how Heidel and Laursen (2002) could imagine timber management or roads to threaten these habitats.	My observations.
8 Life History and Demographics	D	H	Details of life history and demographics unknown, at least for the Rocky Mountains. Perhaps a literature search would turn up something from other areas.	

National Forests in the Rocky Mountain Region where species is KNOWN (K) or LIKELY (L)* to occur:
*. Likely is defined as more likely to occur than not occur on the National Forest or Grassland. This generally can be thought of as having a 50% chance or greater of appearing on NFS lands.

COLORADO NF/NG	K	L		K	L		K	L
Arapaho-Roosevelt NF			NEBRASKA NF/NG			WYOMING NF/NG		
White River NF	K		Samuel R. McKelvie NF			Shoshone NF	K	
Routt NF	K		Halsey NF			Bighorn NF	K	
Grand Mesa Uncompahgre Gunnison NF	K		Nebraska NF			Black Hills NF		
San Juan NF	K		Ogalala NG			Medicine Bow NF		
Rio Grande NF	K		SOUTH DAKOTA NF/NG			Thunder Basin NG		
Pike-San Isabel NF	K		Black Hills NF			KANSAS NF/NG		
Comanche NG			Buffalo Gap NG			Cimarron NG		
Pawnee NG			Ft. Pierre NG					

Taxonomy. Most botanists accept *Cryptogramma stelleri* as a valid species.

Discussion. *Cryptogramma stelleri* is still a rare species in R2, but the distribution is still incomplete, and we no nothing of population sizes or dynamics, nor do we know demographics or responses to disturbances. We do not know enough to be able to assess its viability status; from what we do know, it probably is not a great viability concern. Habitats are very resilient.



References

Albee, Beverly J.; Leila M. Shultz; and Sherel Goodrich. 1988. Atlas of the Vascular Plants of Utah. Utah Museum of Natural History. http://www.nr.usu.edu/Geography-Department/utgeog/utvatlas/ut-vascatlas.html, accessed September, 2002.

Heidel, Bonnie; and Scott Laursen. 2002. Sensitive species evaluation: *Cryptogramma stelleri*. Attached below.

Harrington, Harold D. 1954. Manual of the plants of Colorado: For the identification of the ferns and flowering plants of the state. Denver, CO: Sage Books. 666 pp.

Hultén, Eric . 1968. Flora of Alaska and neighboring territories. Stanford, CA: Stanford University Press, 1008 pp,

Johnston, Barry C. Field guide to sedge species of the Rocky Mountain Region. Publication R2-RR-01-03, 318 pp. Denver, CO: USDA Forest Service, Renewable Resources.

Fertig, Walter . 2000. State species abstract: *Cryptogramma stelleri*. Laramie, WY: Wyoming Natural Diversity Database, 2 pp. http://uwadmnweb.uwyo.edu/WYNDD.

Mitsch, William J.; and James G. Gosselink. 1993. Wetlands, Second Edition. New York, NY: John Wiley and Sons, 722 pp.

Rocky Mountain Herbarium. 1998. Atlas of the vascular plants of Wyoming. http://www.esb.utexas.edu/tchumley/wyomap/atlas.htm, accessed September, 2002.

Weber, William A.; and Ronald C. Wittmann. 2000. Catalog of the Colorado flora: A biodiversity baseline. Boulder, CO: University of Colorado Museum. Revised March 11, 2000. http://www.colorado.edu/CUMUSEUM/research/botany/Catalog/Catalog.htm, downloaded September, 2002.

Weber, William A.; and Ronald C. Wittmann. 2001a. Colorado flora: Western slope, Third Edition. Niwot, CO: Colorado Associated University Press. 488 pp.

Weber, William A.; and Ronald C. Wittmann. 2001b. Colorado flora: Eastern Slope, Third Edition. Boulder, CO: University Press of Colorado. 521 pp.

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SPECIES EVALUATION

REGION 2 SENSITIVE SPECIES EVALUATION FORM

Species: *Cryptogramma stelleri* / Fragile Rockbrake, Slender Rock-brake			
Criteria	Rank	Rationale	Literature Citations
1 Distribution within R2	AD	Region 2 harbors disjunct Rocky Mountain populations of Fragile rockbrake. Within Wyoming, it occurs in the Bighorn and Shoshone national forests in Sheridan and Fremont counties on the Wind River and Bighorn ranges in Fremont and Sheridan and counties. It also occurs in Colorado. This species is found in moist, protected locations. In Wyoming, it occurs in thin, mossy soil on shady limestone cliffs near water at 6600-8700 feet. Confidence in Rank High	• Dorn 1992 • Evert no date • Fertig 1998, 1999, 2000 • Harrington 1954 • Hartman et al. 1991 • Jones and Fertig 1998 • University of Wyoming 1998 • Welp et al. 2000
2 Distribution outside R2	B	Fragile rockbrake is known from Alaska to Labrador south to Oregon, Montana, Iowa, Michigan, and West Virginia, with disjunct populations in Wyoming, New Mexico, and Utah. In Wyoming, it is also known outside Region 2 boundaries from the Teton Range and Yellowstone Plateau in Park and Teton counties. Confidence in Rank High	• Cronquist et al. 1972 • Fertig 2000 • Gleason and Cronquist 1991 • Hitchcock et al. 1961 • Hulten 1968 • Lellinger 1985 • Markow and Fertig 1993 • NatureServe 2002 • Porsild and Cody 1980 • University of Wyoming 1998 • Welsh 1993
3 Dispersal Capability	CD	Not known. Spores, however, commonly disperse long distances via the atmosphere or water. Confidence in Rank High	• -
4 Abundance in R2	A	It is known in Wyoming from 5 extant occurrences, 3 of which have been located since 1990 (most recently in 1996) and 1 historical record. Only two of these are in Region, on the Bighorn and Shoshone national forests. Little census data are available, but this species appears to be extremely uncommon and restricted to small microsites within a specialized habitat (ledges with thin mossy soil in shady limestone cliffs near water). It is ranked “S1” in Wyoming and “S2” in Colorado. Confidence in Rank Medium	• Fertig 2000 • WYNDD 2001
5 Population Trend in R2	D	Not known. Confidence in Rank High	• -
6 Habitat Trend in R2	A	The habitat quality of Fragile rockbrake may have decreased in the last century due to the logging. Confidence in Rank Low	• Fertig 2000
7 Habitat Vulnerability or Modification	A	Fragile rockbrake may be threatened by logging activity or road construction in its habitat. It occurs on Bighorn, Bridger-Teton, Shoshone, and Targhee national forests, which are managed for multiple use. It also occurs in Yellowstone National Park. Confidence in Rank Low	• Fertig 2000

SPECIES EVALUATION

Species: *Cryptogramma stelleri* / Fragile Rockbrake, Slender Rock-brake			
Criteria	Rank	Rationale	Literature Citations
8 Life History and Demographics	D	Fragile rockbrake is a perennial fern with leaves scattered along a creeping, scaly rhizome. The spore producing period is from July to August. Life history information on this species, including life history stages, population structure, longevity, mortality, pollination biology and gamete/spore biology, are not available. Confidence in Rank High	• Fertig 2000 • Hartman et al. 1991
Initial Evaluator(s): Bonnie Heidel and Scott Laursen			Date: February 19, 2002

National Forests in the Rocky Mountain Region where species is KNOWN (K) or LIKELY(L)[1] to occur:

Colorado NF/NG	**Known**	**Likely**	**Kansas NF/NG**	**Known**	**Likely**	**Nebraska NF/NG**	**Known**	**Likely**	**South Dakota NF/NG**	**Known**	**Likely**	**Wyoming NF/NG**	**Known**	**Likely**
Arapaho-Roosevelt NF			Cimmaron NG			Samuel R.McKelvie NF			Black Hills NF			Shoshone NF	X	
White River NF						Halsey NF			Buffalo Gap NG			Bighorn NF	X	
Routt NF						Nebraska NF			Ft. Pierre NG			Black Hills NF		
Grand Mesa, Uncompahgre, Gunnison NF						Ogalala NG						Medicine Bow NF		
San Juan NF												Thunder Basin NG		
Rio Grande NF														
Pike-San Isabel NF														
Comanche NG														

Literature cited

Cronquist, A., A.H. Holmgren, N.H. Holmgren, and J.L. Reveal. 1972. Intermountain Flora, Volume 1: Geological and Botanical History of the Region, its Plant Geography and a Glossary. The Vascular Cryptogams and the Gymnosperms. The New York Botanical Garden, New York.

Dorn, R.D. 2001. Vascular Plants of Wyoming, third edition. Mountain West Publishing, Cheyenne, WY.

Evert, E.F. No Date. Rare Plants: Teton-Darby Canyon Area. Unpublished report.

Fertig, W. 1998. The status of rare plants on Shoshone National Forest: 1995-97 survey results. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.

Fertig, W. 1999. The status of rare plants in the Bighorn Landscape. Report prepared for The Nature Conservancy Wyoming Field Office by the Wyoming Natural Diversity Database, Laramie, Wyoming.

Fertig, W. 2000. State Species Abstract: *Cryptogramma stelleri*. Wyoming Natural Diversity Database. Available on the internet at www.uwyo.edu/wyndd

Gleason, H.A. and A. Cronquist. 1991. Manual of Vascular Plants of Northeastern United States and Canada. New York Botanical Garden, Bronx, NY.

Harrington, H. D. 1954. Manual of the Plants of Colorado. Sage Books, Chicago, IL.

Hartman, R.L., B.E. Nelson, and W. Fertig. 1991. General floristic/sensitive plant species surveys of Fish Creek/Moccasin Basin Implementation Area, Gros Ventre Burn Areas, and Willow Creek Implementation Area on Bridger-Teton National Forest, 1990. Unpublished report prepared for the Bridger-Teton National Forest by the Rocky Mountain Herbarium, University of Wyoming.

[1] Likely is defined as more likely to occur than not occur on the National Forest or Grassland. This generally can be thought of as having a 50% chance or greater of appearing on NFS lands.

Hitchcock, C.L., A. Cronquist, and M. Owenbey. 1969. Pt. 1. Vascular Cryptograms, Gymnosperms, and Monocotyledons, IN: Hitchcock, C.L., A. Cronquist, M. Owenbey, and J.W. Thompson (eds). Vascular Plants of the Pacific Northwest. University of Washington Publications in Biology 17(1): 1-914.
Hulten, E. 1968. Flora of Alaska and Neighboring Territories. Stanford University Press. Palo Alto, CA.
Jones, G.P. and W. Fertig. 1998. Ecological evaluation of the Mann Creek potential research natural area within the Bighorn National Forest, Sheridan County, Wyoming. Unpublished report prepared for the Bighorn National Forest, USDA Forest Service by the Wyoming Natural Diversity Database. Laramie WY.
Lellinger, D.B. 1985. A Field Manual of the Ferns and Fern Allies of the United States and Canada. Smithsonian Institution Press, Washington, D. C.
Markow, S. and W. Fertig. 1993. Report on a general floristic survey of vascular plants of Targhee National Forest and vicinity. Unpublished report prepared for Targhee National Forest by the Rocky Mountain Herbarium and the Wyoming Natural Diversity Database, Laramie, WY.
NatureServe. 2002. Explorer – an encyclopedia of life. Plant and animal data posted at www.natureserveexplorer.org, Arlington, VA.
Porsild, A.E. and W.J. Cody. 1980. Vascular Plants of Continental Northwest Territories, Canada. National Museums of Canada, Ottawa.
Porter, C.L. 1962. A Flora of Wyoming, Part 1. Bulletin 402:1-39. Agricultural Experiment Station, University of Wyoming.
University of Wyoming – Rocky Mountain Herbarium. 1998. Atlas of the Flora of Wyoming. Posted electronically thru 1998 at: http://www.esb.utexas.edu/tchumley/wyomap/ and unposted accession information at the Rocky Mountain Herbarium through 2001.
Welp, L., W.F. Fertig, G.P. Jones, G.P. Beauvais, and S.M. Ogle. 2000. Fine filter analysis of the Bighorn, Medicine Bow, and Shoshone National Forests in Wyoming. Wyoming Natural Diversity Database, Laramie, WY.
Welsh, S.L., N.D. Atwood, S. Goodrich, and L.C. Higgins, (eds). 1993. A Utah Flora, second edition, revised. Brigham Young University Print Services, Provo, UT.