

ATTACHMENT SS2

REGION 2 SENSITIVE SPECIES EVALUATION FORM

Species: <i>Botrychium lineare</i> W.H. Wagner / Narrowleaf grapefern / BOLI7 Global rank: G1			
Criteria	Rank	Rationale	Literature Citations
1 Distribution within R2	A	S1 in CO; 2 of 9 (possibly 11) known populations are in CO on the PSICC; another site is in CO on a Superfund site near Leadville (Lake County); an historic location in Boulder County, CO has not been seen for at least 20 years. Confidence in Rank High	<ul style="list-style-type: none"> NatureServe 2001 Candidate and Listing Priority Assignment Form, USFWS 1/31/2002
2 Distribution outside R2	B	S1 in MT, WA, OR, CA; extirpated in ID; 2 populations occur in OR, 3 in MT, and 1 in WA. 2 new populations found in 2002 in ID and NV must still be confirmed by electrophoretic analysis. Confidence in Rank High	<ul style="list-style-type: none"> NatureServe 2001 Candidate and Listing Priority Assignment Form, USFWS 1/31/2002
3 Dispersal Capability	D	This species reproduces by spores, as do all <i>Botrychium</i> . The spores are very tiny and lightweight and may be disseminated by wind, water, or possibly animal vectors. This may explain the broad and often disjunct distribution patterns exhibited by moonworts. All <i>Botrychium</i> species are obligately dependent on mycorrhizal fungi throughout their lifecycle. Confidence in Rank High	<ul style="list-style-type: none"> Candidate and Listing Priority Assignment Form, USFWS 1/31/2002
4 Abundance in R2	A	Total number of individuals for the 9 confirmed, occupied sites in the US is about 190. Populations range in size from 2 to 100 individuals. Only 3 populations have more than 15 individuals. Of the 3 largest populations, 1 occurs in CO (PSICC) – 45 individuals. Of course, these numbers are an estimate since <i>Botrychium</i> species don't come up every year and exist below ground for most of their lifecycle. The amount of habitat occupied by <i>B. lineare</i> is extremely restricted and makes this species vulnerable to extirpation due to random naturally occurring events. <i>B. lineare</i> is listed as USFWS Candidate species (warranted but precluded from listing). Confidence in Rank High	<ul style="list-style-type: none"> Candidate and Listing Priority Assignment Form, USFWS 1/31/2002
5 Population Trend in R2	D	No information on population trend. Confidence in Rank High	

ATTACHMENT SS2

Species: *Botrychium lineare* W.H. Wagner / Narrowleaf grapefern / BOLI7 Global rank: G1

Criteria	Rank	Rationale	Literature Citations
<p>6 Habitat Trend in R2</p>	<p>D</p>	<p>Habitat: “deep grass and forbs of meadows, under trees in woods, and on shelves on limestone cliffs, mainly at higher elevations”; it’s also stated that it’s difficult to describe a typical habitat for this species since the known sites are so different. This species is found in a disjunct distribution ranging from sea level in Quebec to 9,840 ft in CO. This species seems to be a habitat generalist and is often found in disturbed habitats along roadsides.</p> <p>Habitat in CO is grassy slopes, among medium height grasses, along edges of streamside forests.</p> <p>Since the habitat is so difficult to define, habitat trend can’t be determined.</p> <p>Confidence in Rank High</p>	<ul style="list-style-type: none"> • Wagner and Wagner 1994 • Candidate and Listing Priority Assignment Form, USFWS 1/31/2002 • NatureServe 2001, PCA for CO
<p>7 Habitat Vulnerability or Modification</p>	<p>A</p>	<p>Some <i>B. lineare</i> populations are located on roadsides and may be affected by road maintenance activities including herbicide spraying, mowing, or vehicles pulling off the road. Habitat succession and fire suppression may threaten <i>B. lineare</i>. However, the relationship between habitat succession and fire suppression to its persistence is not clear. In some cases, wildfires or controlled fires create high ground temperatures that may sterilize the soil and eliminate fungal species that are necessary for moonwort survival.</p> <p><i>B. lineare</i> may be affected by livestock or wildlife grazing, but specific effects are unknown. However, if grazing occurs prior to spore maturation and release, the capacity for sexual reproduction may be compromised. Also, trampling by wildlife and livestock may have negative effects on <i>B. lineare</i> populations above and below ground. <i>B. lineare</i> has not been observed in areas with obvious disturbance by livestock.</p> <p>Other threats include exotic species invasion, development, timber harvest, and recreational impacts like trampling and campfires.</p> <p>Confidence in Rank Medium</p>	<ul style="list-style-type: none"> • Candidate and Listing Priority Assignment Form, USFWS 1/31/2002 • NatureServe 2001, CO PCA

ATTACHMENT SS2

Species: <i>Botrychium lineare</i> W.H. Wagner / Narrowleaf grapefern / BOLI7 Global rank: G1			
Criteria	Rank	Rationale	Literature Citations
8 Life History and Demographics	D	<p>Surveys and identification of moonworts are complicated by their biology. They are small and usually scarce. They can't be identified in their immature states. Fronds may grow aboveground in some growing seasons or may not during unfavorable seasons. <i>B. lineare</i> was initially described in 1994 and is considered one of the more distinctive of the moonworts.</p> <p>Insufficient information to infer impacts of life history or demographics; the <i>Botrychium</i> style of life (long underground portion of the lifespan) is supportive of a stable population that may not readily appear as such to the aboveground observer.</p> <p>Confidence in Rank High</p>	<ul style="list-style-type: none"> Candidate and Listing Priority Assignment Form, USFWS 1/31/2002
Initial Evaluator(s):			Date:
Beth A. Burkhart, Botanist – Species Conservation Project/Black Hills NF			10/09/2002

References:

Wagner, W.H. and F.S. Wagner. 1994. Another widely disjunct, rare and local North American moonwort (Ophioglossaceae: Botrychium subg. Botrychium). American Fern Journal 84(1):5-10.

ATTACHMENT SS2

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

<u>Colorado NF/NG</u>		<u>Kansas NF/NG</u>		<u>Nebraska NF/NG</u>		<u>South Dakota NF/NG</u>		<u>Wyoming NF/NG</u>	
Known	Likely	Known	Likely	Known	Likely	Known	Likely	Known	Likely
		Cimmaron NG		Samuel R.McKelvie NF		Black Hills NF		Shoshone NF	
				Halsey NF		Buffalo Gap NG		Bighorn NF	
				Nebraska NF		Ft. Pierre NG		Black Hills NF	
				Ogalala NG				Medicine Bow NF	
								Thunder Basin NG	
	K								

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.