REGION 2 SENSITIVE SPECIES EVALUATION FORM

Species: *Lycopodium complanatum* / Groundcedar / LYCO3

Criteria	Rank	Rationale	Literature Citations
1 Distribution within R2	A	Occurs from five populations on the Black Hills – 1 in Wyoming, 4 in South Dakota. Three of the populations in South Dakota occur on private property. The population in Wyoming is on Forest Service administered land, as is the remaining population from South Dakota. Has not been reported from any other forest in Region 2. Confidence in Rank **High**	• BHNF Sensitive Plant Monitoring, 2000, 2001 • FS Records
2 Distribution outside R2	C	Circumboreal, widely distributed in northernmost United States, and throughout much of Canada. Confidence in Rank **High**	• FNA Vol. 2, 1993
3 Dispersal Capability	B	The spores of *Lycopodium complanatum*, like the spores of other ferns and fern allies, can occasionally be transported over long distances, but the locations in R2 are highly disjunct from the normal range. Spores can only germinate in appropriate environments. Confidence in Rank **Medium**	• FNA Vol. 1, 1993
4 Abundance in R2	A	*Lycopodium complanatum* is rare (because of the limited boreal remnant habitats they occur in) in the Black Hills National Forest, and does not occur elsewhere in Region 2. Confidence in Rank **High**	• BHNF Sensitive Plant Monitoring, 2000, 2001 • FS Records
5 Population Trend in R2	D	No information is available. Confidence in Rank **High**	•

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6 Habitat Trend in R2	B	In North America, groundcedar is ranked as an upland species that occasionally occurs in wetland habitats in the northern and northeastern United States. Due to the limited number and size of populations of both species in the Black Hills, no clear patterns of association with habitats, disturbance, or any other factor are apparent. The currently known Black Hills National Forest occurrences of groundcedar and stiff clubmoss are in moist, somewhat acidic soils fairly dense, shaded habitats. The boreal spruce habitats groundcedar and stiff clubmoss occupy in the Black Hills are disjunct from the main distribution of white spruce to the north and in the northern Rocky Mountains These remnant boreal forests occur primarily in the northern Black Hills on north facing slopes and draws with paper birch (*Betula papyrifera*) as a common seral or dominant canopy component. Colorado habitat trend unknown. Confidence in Rank **Medium**	• USFWS 1996; USDA NRCS 2001 • USDA Soil Conservation Service 1983 • Hoffman and Alexander 1987 • Marriott and Faber-Langendoen 2000.
7 Habitat Vulnerability or Modification	A	One of the currently known populations is located in a designated Botanical Area and many activities are restricted. Spores of Lycopodium likely require some disturbance of the mineral soil in order to germinate and *Lycopodium* gametophytes appear to need disturbance to mature. Moderate soil disturbances may create favorable microhabitats for *Lycopodium* spore germination and clonal expansion (Nauertz 1999). Therefore, it is possible that soil disturbance in suitable, but unoccupied, habitats could facilitate the establishment of new populations, but the appropriate degree and scale of such disturbance is not known. The greatest risk to the species is the currently small number of populations and small population size. There are no apparent ongoing risks to either species, but the currently known locations are small enough that random events, such as drought or fire, could eradicate a population entirely. As boreal remnants, climatic changes since the last glacial period may be the primary controlling factor for the frequency and persistence of these species and habitats that would support them. It should be considered that remnant populations of northern boreal species simply might not be able to persist, or to colonize other sites, under current or future climatic conditions in the Black Hills. Confidence in Rank **High**	• Nauertz Thesis 1999
8 Life History and Demographics	D	*Lycopodium complanatum*, like most species of fern allies, reproduces clonally as well as sexually, and should tolerate some small-scale disturbance (tolerances of small scale disturbances are evident at sites in the Black Hills and has been described in Nauertz 1999). It is unknown how long it takes *Lycopodium* spp. to colonize or recolonize from large-scale disturbances. *Lycopodium* species, however, often need disturbances that expose mineral soils in order to establish. The nearest populations outside of Region 2 are in Minnesota and Saskatchewan. Confidence in Rank **High**	• Nauertz Thesis 1999 • FNA Vol. 2, 1993

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Criteria	Rank	Rationale	Literature Citations
Evaluator(s): Reed Wight Crook – Botanist, Black Hills National Forest Darcie J. Bacon – Botanist, Black Hills National Forest			Date: 26 Nov. 2001 Updated June 28, 2002

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

Species Name: *Lycopodium complanatum* / Groundcedar / LYCO3

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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			Cimarron NG			Samuel R.McKelvie NF			Black Hills NF	X		Shoshone NF		
White River NF						Halsey NF			Buffalo Gap NG			Bighorn NF		
Routt NF						Nebraska NF			Ft. Pierre NG			Black Hills NF	X	
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														
Pawnee NG														

References

Flora of North America North of Mexico. 1993. Volume 1, Introduction. Edited by Flora of North America Editorial Committee. Oxford University Press, New York, NY.

Flora of North America North of Mexico. 1993. Volume 2, Pteridophytes and Gymnosperms. Edited by Flora of North America Editorial Committee. Oxford University Press, New York, NY.

[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.

FS Records can include: monitoring data, district data, historical accounts, ect.

Hoffman, George R.; Alexander, Robert R. 1987. Forest vegetation of the Black Hills National Forest of South Dakota and Wyoming: a habitat type classification. Res. Pap. RM-276. Fort Collins, CO: USDA Forest Service, Rocky Mountain Forest and Range Experiment Station. 48 p.

Marriott, Hollis J.; Faber-Langendoen, Don. December 2000. Black Hills Community Inventory, volume 2: plant community descriptions. Minneapolis, Minnesota: The Nature Conservancy Midwest Conservation Science Center and Association for Biodiversity Information. 326 p.

Nauertz, E.A., 1999. Impact of various silvicultural practices on the abundance and frequency of Lycopodium species in northern hardwood forests. Michigan Technilogical University, Houghton, Michigan. Thesis. 164p.

USDA Forest Service. 2000. Unpublished Monitoring Sensitive Plant Monitoring Data. Black Hills National Forest.

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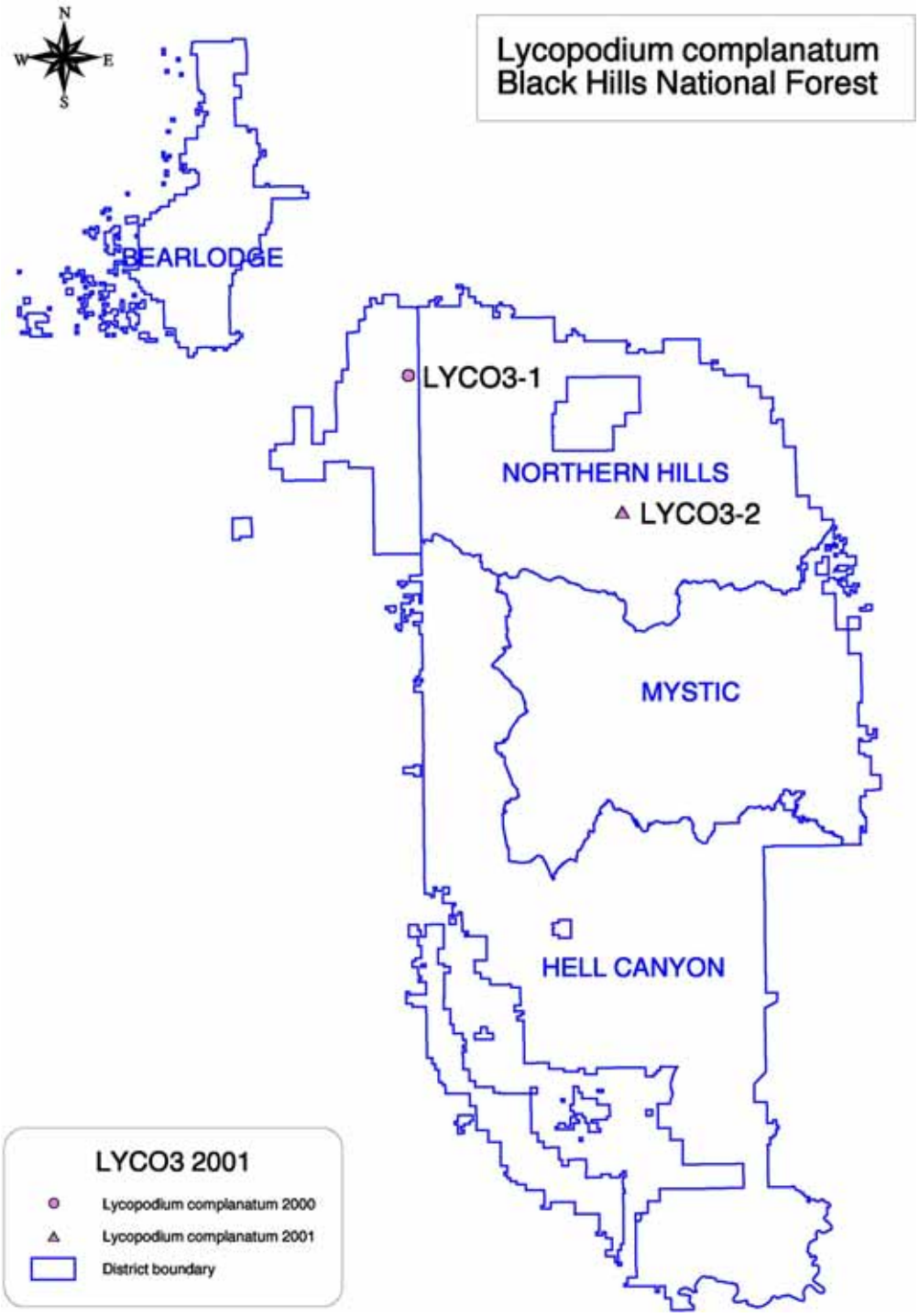
USDA NRCS. 2001. The PLANTS Database, Version 3.1 (http://plants.usda.gov). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

USDA Soil Conservation Service. 1983. Soil Survey of Crook County, Wyoming. 320 p. (plus maps).


Lycopodium complanatum
Black Hills National Forest
N
W
E
S
BEARLODGE
LYCO3-1
NORTHERN HILLS
LYCO3-2
MYSTIC
HELL CANYON
LYCO3 2001
Lycopodium complanatum 2000
Lycopodium complanatum 2001
District boundary