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Comments: Comments on the Spruce Vegetation Management Project

I am writing to express my objections to the proposed Spruce Vegetation Management Project suggested for the Black Hills National Forest. I have been a botanist in the Black Hills for 40 years and recognize that the timber industry is an important management tool for thinning and harvesting pines as well as contributing to the economics of the Black Hills area.

Some of the most species-rich areas in the Black Hills are the places dominated by spruce. I saw no mention of the many species associated with the spruce forest. This plan to manage spruce should not be approved unless there are plans to preserve the numerous sensitive species associated with the spruces. Obviously clear cutting 40 acres of spruce, especially by heavy machinery, machine piling and pile burning, would have a devastating impact on the sensitive species associated with the spruce causing irreparable damage to the forest resources. Repeating this insult over 25,000 acres is impossible to justify.

The Spruce Vegetation Management Project made no mention of climate change. The effect of climate change on spruce and associated species could be devastating. McPartland et al. (2020) noted that with more warming there would be increased shrub density and therefore species diversity declines due to shrub competition. Henderson et al. (2002) had numerous recommendations including incorporation of probable range of climate impacts and management options to deal with those impacts. They recommended the inclusions of estimates of net CO₂ impacts on vegetation management. Land managers should also implement systematic monitoring for climate change impacts on the Plains island forests. They concluded that spruce may not be capable of reproduction after 2050.

There are currently few mature landscapes in the Black Hills. The most outstanding of those are the spruce areas. Spruce forests have expanded primarily because of fire suppression (Landfire 2007a). If thinning must be done it would make sense to gently remove some of the younger ladder fuels and leave the large spruces unmolested.

Marriott et al. (1999) described two types of spruce forests in the Black Hills, the *Picea glauca*/*Linnaea borealis* forest which is in large patches and an endemic to the Black Hills. Also described is the *Picea glauca*/*Vaccinium scoparium* forest which occurs in small patches and is also endemic to the Black Hills. The two spruce forest types are both globally ranked with the *Picea glauca*/*Vaccinium scoparium* forest type ranked G1-G2 and the *Picea glauca*/*Linnaea borealis* forest is ranked G2-G3. Nature Serve Explorer (www.natureserve.org) lists the Black Hills spruce forest as G2 or imperiled.

Timberlake and Joyce (2022) noted that white spruce in the Black Hills is especially vulnerable to drought and fire with climate changes. This needs to be addressed in any environmental assessment.

References:

Henderson, N., E. Hogg, E. Barrow, and B. Dolter. 2002.

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Marriott, H., D. Faber-Langendoen, A. McAdams, D. Stutzman and B. Burkhart. 1999. Black Hills Community Inventory: Final Report. The Nature Conservancy. 175 pp.

McPartland, M.Y., R.A. Montgomery, P.J. Hanson, J.R. Phillips, R. Kolka, and B. Palik. 2020. Vascular plant species response to warming and elevated carbon dioxide in a boreal peatland. *Environmental Research Letters* 15: 120466 pp. 1-12.

Timberlake, T. and L. Joyce. 2022. Climate change vulnerability in the Black Hills National Forest. (Western Wildlands Environmental Threat Assessment Center) presented at the Black Hills Area Botany and Ecology Workshop 18 Mar 2022.